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Mid-Infrared Asteroid Survey with AKARI

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Mid-Infrared Asteroid Survey with AKARI

Fumihiko Usui

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Abstract

We present the results of an unbiased asteroid survey in the mid-infrared wavelengths with the Infrared Camera (IRC) on board the Japanese infrared satellite AKARI.

Asteroids are one of the small bodies in the inner solar system mainly inside the orbit of Jupiter, and are typically composed of rocky or metallic materials. The physical properties of asteroids are fundamental to understanding the formation of our solar system, since asteroids still record the initial conditions of our solar nebula 4.6 Gyr ago. Size is one of the most basic physical quantities of an asteroid. Several methods have been developed to measure the size of asteroids. The most straightforward approach is by direct imaging, with the Hubble Space Telescope or large ground-based telescopes with adaptive optics. Radar observations and speckle interferometry, as well as stellar occultations are also useful for resolving the shapes of asteroids. Spacecraft missions are undoubtedly the most direct tool for investigating asteroids. Although these methods are available, they require the convergence of critical conditions, such as the selection of large targets with trajectories approaching the Earth, and/or narrow observational windows combined with multi-epoch and multi-aspect angle data sets. The sheer number of asteroids poses yet another difficulty; as of the end of 2012, the number of known asteroids is more than 600,000 which precludes detailed observations of all individual bodies.

One of the most effective indirect methods is by radiometric technique, in which a combination of the thermal infrared flux and the reflected visible flux provide unique solutions for size and albedo. This approach has yielded a wealth of information both on individual objects and entire populations of asteroids. Using radiometric measurements, a large number of objects can be observed in a short period of time, thus providing uniform data for large populations of asteroids. Infrared observations using space-borne telescopes are suitable for this method. When integrated into an all-sky survey, large number of data can be obtained rapidly. The first systematic survey with a space telescope was made by the Infrared Astronomical Satellite (IRAS) launched in 1983. IRAS observed more than 96% of the sky during the 10-month mission life. It derived the size and albedo of 2470 asteroids.

AKARI, the first Japanese space mission dedicated to infrared astronomy, carried out the second generation infrared all-sky survey after IRAS. It surveyed more than 96% of the sky in six bands at the mid- to far-infrared spectral range during the 16-month cryogenic mission phase. The mid-infrared part of the survey was conducted in two broad bands using IRC on board AKARI. The IRC All-Sky Survey has advantage over the IRAS survey in the sensitivity and spatial resolution. Point-source detection events were extracted and processed in the IRC All-Sky Survey data, from which the IRC Point Source Catalog (IRC-PSC) was produced after checking the position of sources with multiple detections. About 20% of the extracted events in the All-Sky Survey data were not used for the IRC-PSC, because of a lack of confirmation detections. Since solar system objects have their orbital motions, detection cannot be confirmed in principle by the same positions of the sky. We identified asteroids out of the excluded events from the IRC-PSC. In this process, we searched for events whose positions agree with those of asteroids with known orbits. For each identified object, we calculated the size and albedo based on the Standard Thermal Model of asteroids. Then we obtained an unbiased, homogeneous asteroid catalog named the *Asteroid Catalog Using AKARI*, or *AcuA*, which contains 5120 objects in total, twice as many as the IRAS asteroid catalog. AcuA comprises 4953 main belt asteroids (MBAs), 58 near-Earth asteroids, and 109 Jovian Trojans. It is remarkable that AcuA provides a "complete" data set of all asteroids brighter than the absolute magnitude of $H < 9$, or all MBAs brighter than $H < 10.3$. The MBAs of $H < 10.3$ correspond to the objects larger than 20 km in size.

Based on the complete data set of the AcuA MBAs larger than 20 km, we present an analysis of size and albedo properties of MBAs. We confirmed that the albedo distribution of MBAs is strongly bimodal. The bimodal distribution in each group consists of low-albedo components in C-type asteroids and high-albedo components in S-type asteroids. We found that the small asteroids have much more variety in albedo than the large asteroids. In spite of the albedo transition process like space weathering, the heliocentric distribution of the mean albedo of asteroids in each taxonomic type is nearly flat. The mean albedo of the total, on the other hand, gradually decreases with an increase in semimajor axis. This can be explained by the compositional ratio of taxonomic types; that is, the proportion of dark asteroids such as C- and D-types increases, while that of bright asteroids such as

S-types decreases, with increasing heliocentric distance. The heliocentric distributions of X-subclasses: E-, M-, and P-types, which can be divided based on albedo values, are also examined. P-types, which are the major component in X-types, are distributed throughout the main belt regions, and the abundance of P-types increases beyond 3 AU. This distribution is similar to that of C- or D-types.

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Contents

1 Introduction **1**
1.1 Asteroids 1
1.2 Asteroidal populations 2
  1.2.1 History of the discovery of asteroids 2
  1.2.2 Number of discovered asteroids 4
  1.2.3 Orbital characteristics of asteroids 6
1.3 Size of asteroid 14
  1.3.1 Methods to determine asteroidal size and albedo 14
1.4 Thermal infrared observations of asteroids 22
  1.4.1 Radiometry with ground-based telescopes 24
  1.4.2 Radiometry with space telescopes 24
1.5 Scope of this work 26

2 AKARI/IRC Mid-Infrared Asteroid Survey **29**
2.1 Infrared astronomical satellite AKARI 30
  2.1.1 AKARI overview 30
  2.1.2 AKARI IRC All-Sky Survey 39
2.2 Data processing and catalog creation 42
  2.2.1 Event list for asteroid identification 44

2.2.2 Asteroid identification 44
2.2.3 Color correction and removal of spurious identification 48
2.2.4 Thermal model calculation 49
2.2.5 Final adjustment and creation of the catalog 52
2.3 Evaluation of the asteroid catalog 52
2.3.1 Uncertainty of the catalog data 52
2.3.2 Total number and spatial distribution 55
2.3.3 Completeness of the survey 58
2.3.4 Number of detections per asteroid 65
2.3.5 Size and albedo distribution 66
2.3.6 V band magnitude of the identified asteroids 71
2.3.7 Detection limit of the size of asteroids 71
2.3.8 Possibility of discovery of new asteroids 73
2.3.9 Comparison with the previous works 73

3 Albedo Properties of Main Belt Asteroids Based on AKARI Asteroid Catalog 87

3.1 Taxonomic classifications and albedo of asteroids 88
3.2 AcuA main belt asteroids 91
3.3 Albedo properties of MBAs 94
3.3.1 Albedo size-dependencies 94
3.3.2 Variations in the distributions of albedo values 99
3.4 Discussion about albedo variations 107

4 Conclusion 113

References 115

Appendices 145

A H–G magnitude system for asteroids 145
B Relationship between the absolute magnitude and asteroidal diameter and albedo 147

C Mean albedo for each taxonomic class 150
D Parameter dependency of the Standard Thermal Model 151
E Data of the Asteroid Catalog Using AKARI (AcuA) 152

1

Introduction

1.1 Asteroids

The present-day solar system consists of the Sun and all of its orbiting objects. According to current definitions, these orbiting objects comprise eight planets, five recognized dwarf planets, their satellites and rings, and a very large number of small solar system bodies including asteroids, comets, and interplanetary dust particles. Asteroids are also called "minor planets" and are a large population of small bodies in the inner solar system, which mainly orbit inside the orbit of Jupiter. Asteroids have no atmosphere or detectable cometary activity and are typically composed of rocky or metallic materials. Small bodies without cometary activities exist beyond the orbit of Jupiter, such as Centaurs or trans-Neptunian objects. Although these objects are also given asteroidal designations, these objects are not considered in this work as they are probably volatile-rich and more closely resemble comets than asteroids.

The physical properties of asteroids are fundamental to understanding the formation of our solar system. Asteroids did not accrete sufficient material to form planets, and thus still record the initial conditions of our solar nebula 4.6 Gyr ago. Asteroids are not considered to be disrupted fragments of larger planets and are thought to be the primary remnants of the original building blocks of planets, which never fully accreted into a major planet. The composition and size distribution of asteroids provide significant information on their evolutionary history, even though collisions, mass depletion, mixing, and thermal differentiation have influenced their present-day physical and orbital properties.

Asteroids have been studied for more than two centuries, which comprises the latter half of the period in which modern astronomical studies have been carried out since the pioneering telescopic observations of the Jovian satellites by Galileo Galilei (1564–1642) (Galilei 1610). However, despite this long history of scientific research, relatively little is still known about the properties of asteroids, such as their spatial distribution, compositional gradients, and variety of physical conditions. Until recently, most asteroid studies involved ground-based astronomical observations or studies of meteorites. Meteorites are solid objects of extraterrestrial origin and, apart from a small number from Mars and the Moon, most originate from asteroids. One of the main objectives of asteroidal studies is to link meteorite studies with astronomical data on asteroids and other solar system bodies.

Thus, asteroids provide us with direct evidence of the nature of, and the processes that took place in, the early solar system. Furthermore, studies of asteroids are the only way to identify the parent bodies of meteorites, which can constrain elemental and temperature gradients in the solar nebula. Recently, studies of asteroids have been substantially enhanced by spacecraft missions. As such, it is now possible to study asteroids in a number of different ways: astronomical observations with advanced telescopes; theoretical simulations of their formation processes and orbital evolution; petrological, chemical, and isotopic studies of meteorites from asteroids; and in situ observations with spacecraft and direct study of materials from sample return missions.

1.2 Asteroidal populations

1.2.1 History of the discovery of asteroids

The first asteroid to be discovered was (1) Ceres[1] in 1801. It was Galileo's contemporary, Johannes Kepler (1571–1630), who first noticed that there was a disproportionately large void in the planetary system between the orbits of Mars and Jupiter (Kepler 1596). Two centuries later, motivated by the Titius–Bode law (Titius 1766; Bode 1772) and the discovery of Uranus in 1781 (Herschel 1781), astronomers intensified the search for the "missing

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[1] Ceres was reclassified as a dwarf planet at the IAU General Assembly in August 2006, although it is treated as an asteroid in this work.

fifth planet". Franz Xaver von Zach (1754–1832) organized the "celestial police", a group of astronomers, to make a systematic search for this "missing planet" (von Zach 1801). However, much of this work was the serendipitous result of the efforts of Giuseppe Piazzi (1746–1826) who was the director of the Palermo Observatory. Piazzi was not part of the search group, but had constructed a faint star catalog (Piazzi 1803, 1814) as a substitute for the existing one (Wollaston 1789). The circumstances around his discoveries have been described in detail by Foderà Serio et al. (2002).

In 1802, (2) Pallas was unexpectedly discovered by Heinrich Wilhelm Olbers (1758–1840) during a follow-up observation to locate (1) Ceres. At that time, (1) Ceres and (2) Pallas were considered to be two fragments of a much larger single planet that once occupied the orbital region between Mars and Jupiter. William Herschel (1738–1822) named such bodies *asteroids*, which is derived from the Greek word (*αστεροειδής*) for "star-like", because these objects appear as point-like, stellar objects with typical telescopes and are unlike other planets or comets. He reported in his paper (Herschel 1802):

> With this intention, therefore, I have endeavoured to find out a leading feature in the character of these new stars; and, as planets are distinguished from the fixed stars by their visible change of situation in the zodiac, and comets by their remarkable comas, so the quality in which these objects differ considerably from the two former species is that they resemble small stars so much as hardly to be distinguished from them, even by very good telescopes. It is owing to this very circumstance, that they have been so long concealed from our view. From this, their asteroidical appearance, if I may use that expression, therefore, I shall take my name, and call them *Asteroids*; reserving to myself, however, the liberty of changing that name, if another, more expressive of their nature, should occur. These bodies will hold a middle rank, between the two species that were known before; so that planets, asteroids, and comets, will in future comprehend all the primary celestial bodies that either remain with, or only occasionally visit, our solar system.

Subsequently, (3) Juno and (4) Vesta were discovered within five years: (3) Juno was discovered by Karl Ludwig Harding (1765–1834) in 1804; (4) Vesta was discovered by Olbers in 1807. The history of asteroid discoveries has been reviewed in detail by Cunningham (1988).

1.2.2 Number of discovered asteroids

New discoveries of asteroids were paused within the next few decades after the first four asteroids, partly because of the the Napoleonic wars, as well as the death of many of the leading astronomers at that time who were associated with these first discoveries of asteroids (Herschel in 1822, Piazzi in 1826, von Zach in 1832, Harding in 1834, and Olbers in 1840). Nearly forty years passed before the discovery of the next asteroid, which was (5) Astraea discovered in 1845 by Karl Hencke, a German postmaster. After 1850, the rate of asteroid discoveries began to accelerate, largely due to the efforts of amateur astronomers using improved star charts. In 1891, astrophotographic techniques were introduced by Max Wolf to automate the discovery of asteroids, as opposed to older visual methods (e.g., Holden 1896). The new photographic method made the search for new objects more efficient, and the accuracy and reliability of position measurements were also greatly improved. Due to the dedicated efforts of a small number of observers, the rate of asteroid discoveries has continued to increase through much of the twentieth century, although this was disrupted by World War II. With the advent of Charge-Coupled Devices (CCD) it is now technologically possible to carry out large-scale studies of asteroids.

Presently, the number of cataloged asteroids with known orbits exceeds 600,000, with several tens of thousands of new asteroids added each year to the catalog. Figure 1.1 shows the number of asteroids with known orbits discovered through time.

Asteroid surveys have monotonically increased the number of discoveries since 1801. After World War II, a significant jump in asteroid discoveries took place in the 1960s due to the Palomar-Leiden survey (PLS; van Houten et al. 1970). Use of photoelectric methods, including CCD photometry, has rapidly increased the rate of discoveries since ca. 1980. The first CCD scanning observations were started by a group based at the University of Arizona, which was named Spacewatch (McMillan 2007). In the past two decades, very large numbers of discoveries have been facilitated by computerized methods and/or robotic telescopes, e.g., the Near Earth Asteroid Tracking (NEAT; Helin et al. 1997) on Haleakala, Maui, Hawaii; the Lincoln Laboratory's Near Earth Asteroid Research Program (LINEAR; Stokes et al. 2000) on the White Sands Missile Range near Socorro, New Mexico; the Lowell Observatory Near-Earth-Object Survey (LONEOS; Bowell et al. 1995) in Flagstaff, Ari-

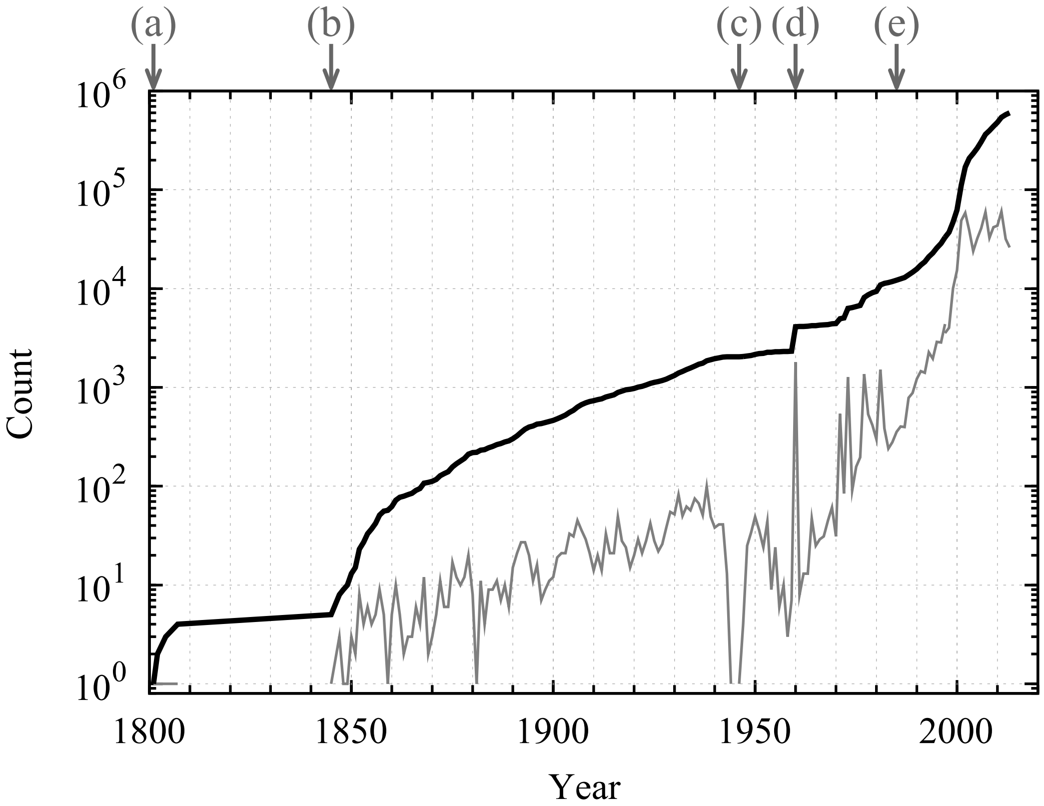

Figure 1.1 Chronology of the number of discovered asteroids during 1801–2012. The black line shows the cumulative number of discoveries and the gray line indicates the number of discoveries each year. Some historical events are shown as labeled arrows; (a) the discovery of the first asteroid (1) Ceres, (b) the discovery of (5) Astraea, (c) the end of World War II, (d) the beginning of the Palomar-Leiden survey, and (e) the advent of CCD observations.

Table 1.1 Number of discoveries of numbered asteroids*

Rank	Number of discoveries	Years	Name
1	135823	1997–2010	Lincoln Near-Earth Asteroid Research(a) (LINEAR)
2	69752	1985–2012	Spacewatch(b)
3	35377	1995–2007	Near-Earth Asteroid Tracking(c) (NEAT)
4	19052	1998–2008	Lowell Observatory Near-Earth-Object Search(d) (LONEOS)
5	18565	2004–2011	Mt. Lemmon Survey(e) (MLS)
6	15998	1998–2011	Catalina Sky Survey NEO search(f) (CSS)
7	4550	1960–1977	Palomar-Leiden survey(g) (PLS)

* Statistics are from the minor planet center (`http://www.minorplanetcenter.net/iau/lists/MPDiscsNum.html`), retrieved on December 28th 2012. (a) Stokes et al. (2000). (b) McMillan (2007). (c) Helin et al. (1997). (d) Bowell et al. (1995). (e) part of the Catalina Sky Survey (e.g., Larson 2007). (f) Larson et al. (2003). (g) van Houten et al. (1970).

zona. The top seven programs that have contributed to the total number of discoveries are summarized in Table 1.1. Upcoming surveys such as the Panoramic Survey Telescope And Rapid Response System (PanSTARRS; Hodapp et al. 2004) and the Large Synoptic Survey Telescope (LSST; Ivezić et al. 2008) are expected to make further significant contributions to asteroid discoveries.

1.2.3 Orbital characteristics of asteroids

Definition of orbital elements

Computation of an asteroid orbit requires the determination of six parameters. Five parameters are needed to describe the size, shape, and orientation of the elliptical orbit. The sixth parameter provides the position of the asteroid at a given time, typically when it passes the perihelion. A schematic view of the orbit of an asteroid is shown in Fig.1.2.

The size and shape of the orbit are given by the length of the semimajor axis (a) and the eccentricity (e). In this work, all asteroid orbits are considered to be elliptical (i.e., $0 < e < 1$). Using a and e, the perihelion distance (q) and the aphelion distance (Q) are given by $q = a(1 - e)$, and $Q = a(1 + e)$. The inclination (i) is the angle between the plane of the orbit of the asteroid and that of the Earth (i.e., the ecliptic). When $i > 90°$, the motion is opposite to that of the planets and is referred to as "retrograde", and otherwise is referred to as "prograde". It should be noted that of the known asteroids, those with retrograde orbits are extremely rare, and within $a < 6$ AU, there are only five currently known retrograde asteroids ((343158) 2009 HC82, 2007 VA85, 6206 P-L, 2007 VW266, and 2005 NP82). Some asteroids still have large uncertainties associated with their orbital elements. The longitude of the ascending node (Ω) is the angular distance measured eastward in the plane of the Earth's orbit from the vernal equinox to the point where the asteroid crosses the ecliptic from south to north. The argument of perihelion (ω) is defined as to how the major axis of the ellipse is oriented in its orbital plane by providing the angle between the ascending node and the perihelion point measured in the direction of motion. The mean anomaly at the epoch (M) is defined as the position of the asteroid along the ellipse at a specific time. These orbital parameters do change with time, mainly due to planetary perturbations. As such, these parameters are quoted for a specific epoch,

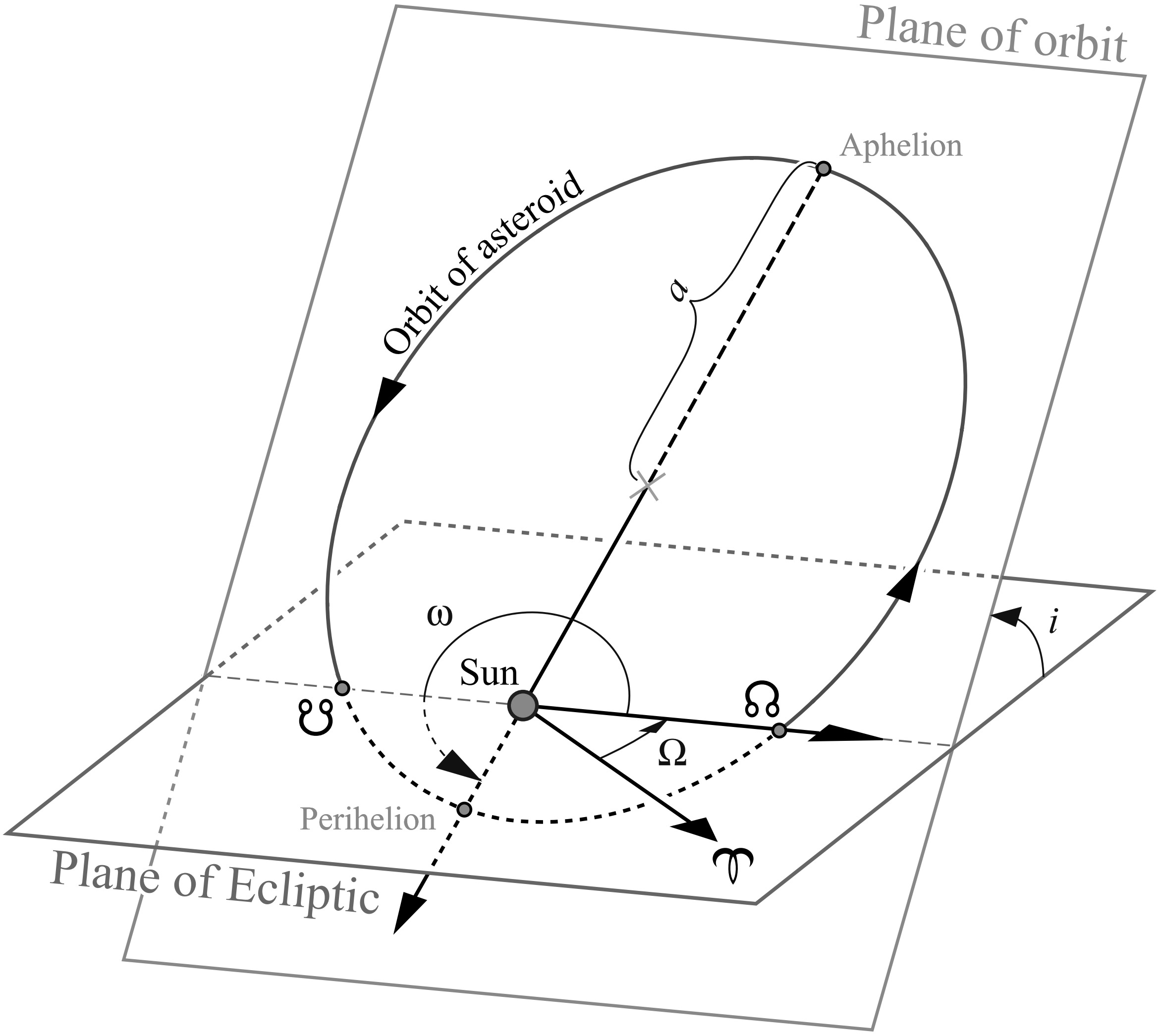

Figure 1.2 Schematic view of the orbital elements of an asteroid: the semimajor axis (a), the eccentricity (e), the inclination (i), the longitude of the ascending node (Ω), and the argument of perihelion (ω), while e is not explicitly indicated in this figure. Furthermore, when the mean anomaly at the epoch (M) is given, the position of an asteroid can be determined at any specified time. Symbols ♈, ☊, and ☋ denote the direction of the vernal equinox, the ascending node of the orbit, and the descending node of the orbit, respectively. Note that the inclination and eccentricity in this figure are shown at an exaggerated scale. For reference, the mean value of the eccentricity and inclination for 562,788 asteroids with known orbits as of October 27th 2012 are $\overline{e} = 0.155 \pm 0.087$ and $\overline{i} = 8.357° \pm 6.292°$.

which is a moment in time used as a reference point for the orbital elements.

Distribution of asteroids

The distribution of asteroids with respect to their semimajor axis is highly uneven. Figure 1.3 shows a snapshot of the locations of asteroids with known orbits. In this two-dimensional view, the main concentration of asteroids forms an annulus between the orbits of Mars and Jupiter, which is called the main belt. There are two clouds of asteroids located approximately 60° either side of Jupiter, which are known as the Jovian Trojans. A number of asteroids whose orbits lie largely inside the main belt, are the near-Earth asteroids.

More detailed information about asteroidal populations is revealed by examining the distributions of orbital elements. Figure 1.4 shows the distribution of semimajor axes of asteroids with known orbits. This distribution is not smooth and there are concentrations of asteroids around some semimajor axis values. There are also distinct gaps at some semimajor axis values where no asteroids are found. These were first identified by Kirkwood (1867) and are now known as Kirkwood gaps; these gaps coincide with the positions of mean motion resonances of Jupiter (Froeschle & Greenberg 1989; Scholl et al. 1989; Yoshikawa 1989). These resonances occur when the orbital period of an asteroid is a low-order multiple of Jupiter's period, such that Jupiter and the asteroid experience regular close approaches at the same points in their orbits. The resulting gravitational influence of Jupiter has the effect of increasing the asteroids' orbital eccentricities. The resonance gaps in the main belt shown in Fig.1.4 disappear in Fig.1.3, because the gaps shown are related to the semimajor axis and not the instantaneous heliocentric distance (see also Fig.1.5).

Figure 1.6 shows the distribution of asteroidal inclination and eccentricity plotted versus semimajor axis for 562,788 asteroids with known orbits. In this work, we use the classification of orbital element zones for the asteroids given in Table 1.2, which is a slightly modified version of that from Zellner et al. (1985a). In general terms, there are three asteroid populations:

Near-Earth asteroids

The near-Earth asteroids (NEAs) are near-Earth objects whose orbits brings them

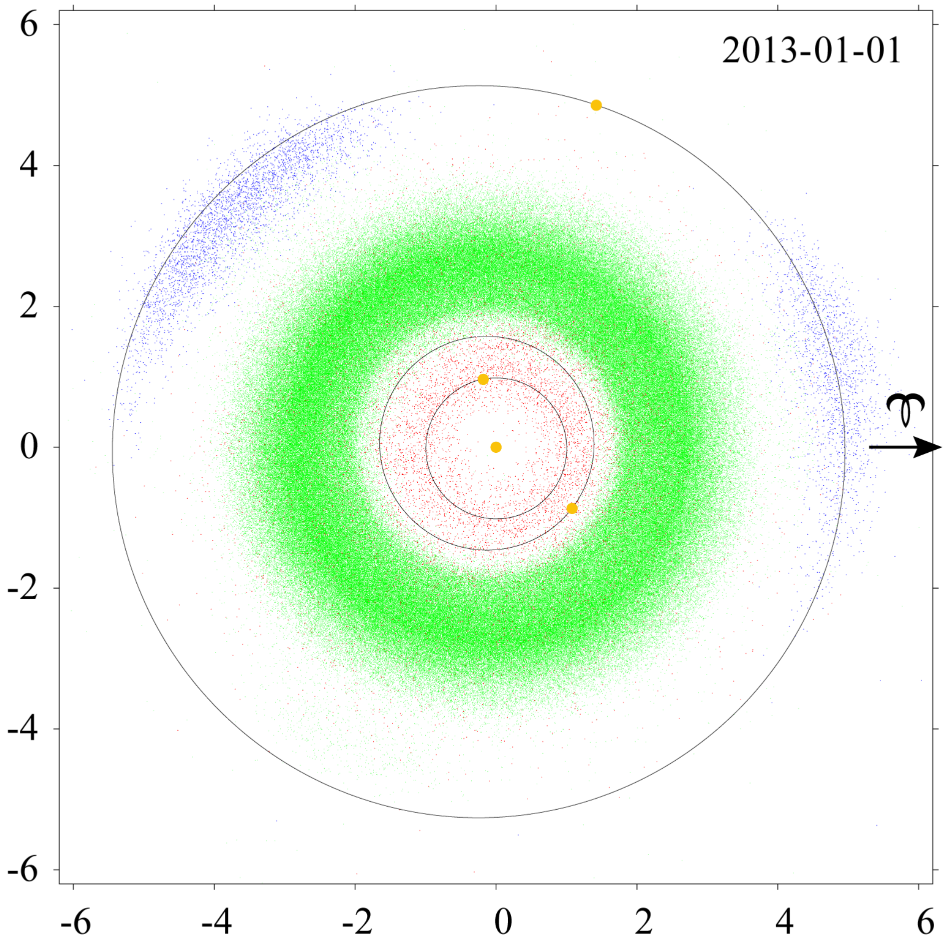

Figure 1.3 Distribution of 562,788 asteroids with known orbits projected onto the plane of the ecliptic as of January 1st 2013. Red, blue, and green dots denote the distribution of the near-Earth asteroids, the Jovian Trojans, and the other populations including mainly the main belt asteroids, respectively. From inside to outside, the circles depict the orbits of the Earth, Mars, and Jupiter. The arrow shows the direction of the vernal equinox.

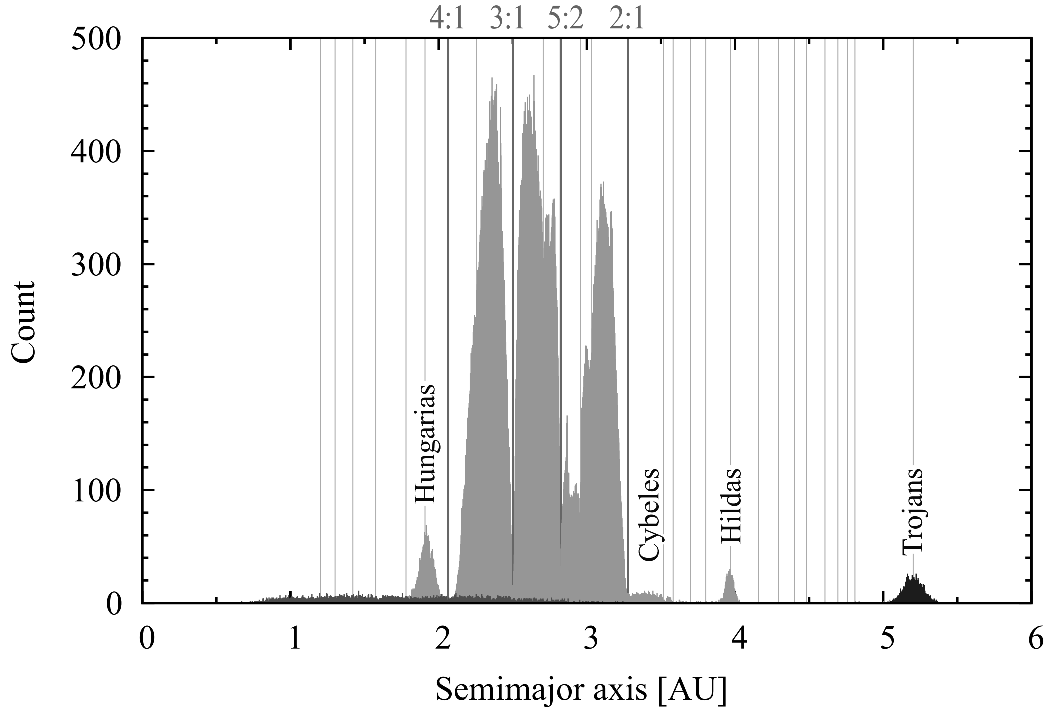

Figure 1.4 Histogram of the number density of asteroids (binned into 0.0005 AU intervals) plotted against semimajor axis. The histogram includes data for 562,788 asteroids with known orbits. Positions of the Jovian resonances (Yoshikawa 1989) are indicated as gray vertical lines. From inside to outside, the mean motion resonances of 4:1, 3:1, 5:2, and 2:1 (Kirkwood 1867) are shown as labeled thick gray lines. Some asteroidal families/groups are also labeled on the figure. Detailed classification is shown in Table 1.2.

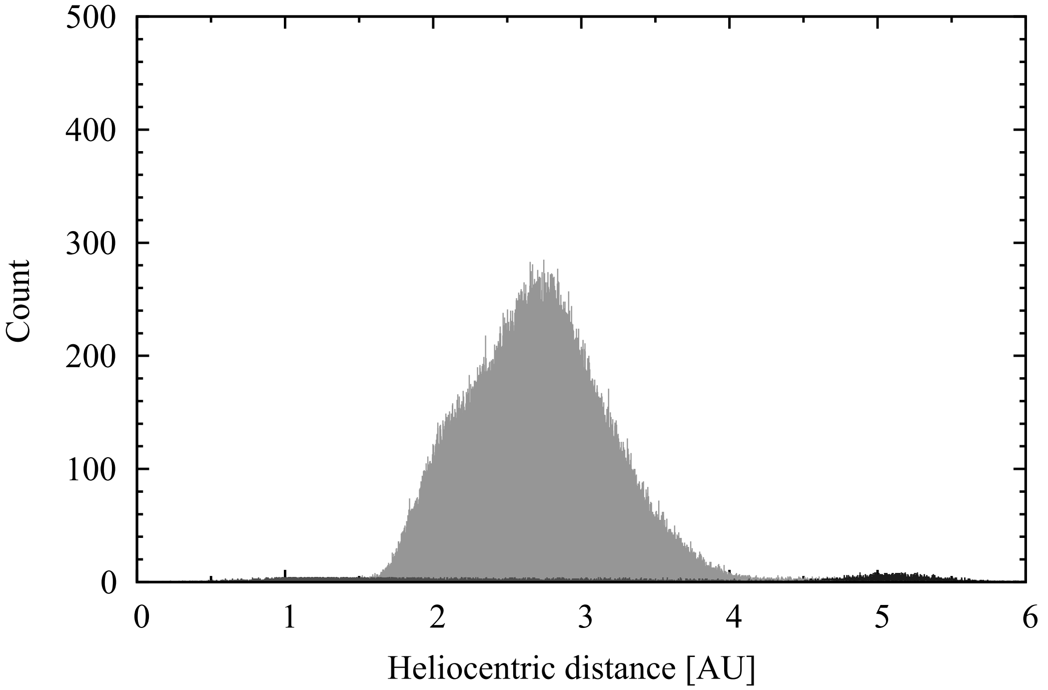

Figure 1.5 Same as Fig.1.4 but plotted against instantaneous heliocentric distance at January 1st 2013 (at the same moment as Fig.1.3).

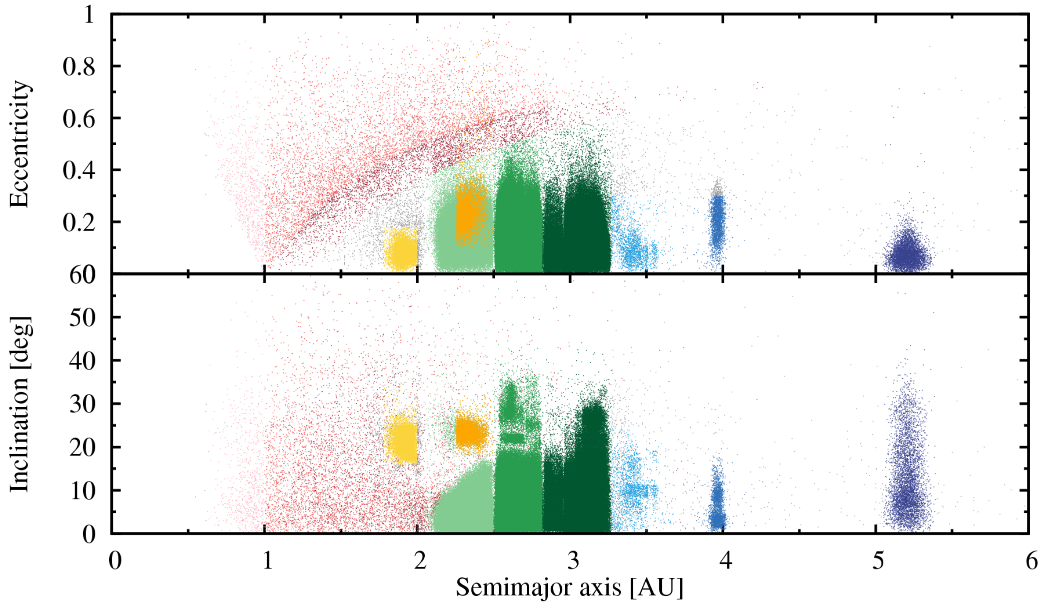

Figure 1.6 Distribution of orbital elements (semimajor axis, inclination, and eccentricity) of 562,788 asteroids with known orbits. Dots are classified by color into the groups described in Table 1.2: Apollos (red), Amors (dark red), Atens (light red), Hungarias (yellow), Phocaeas (orange), inner main belt (light green), middle main belt (green), outer main belt (dark green), Cybeles (light blue), Hildas (blue), and Trojans (dark blue). 3223 unclassified objects (gray) are also shown. In the middle main belt region, more than 1000 objects are found to be concentrated in lower panel ($2.54 \leq a \leq 2.72$ AU, $20.3° \leq i \leq 23.5°$), which correspond to the Hansa family.

Table 1.2 Orbital element groupings of asteroids*

Group	Number of asteroids*	Limits for a [AU]	Limits for e	Limits for i [°]
Apollos	4953	$a \geq 1.0$	$q \leq 1.017$	
Amors	3495	$a \geq 1.0$	$1.017 \leq q \leq 1.3$	
Atens	719	$a \leq 1.0$	$Q \geq 0.983$	
Hungarias	9751	$1.78 \leq a \leq 2.00$	$e \leq 0.18$	$16 \leq i \leq 34$
Inner MBAs†‡	180479	$2.06 < a \leq 2.50$	···	···
Middle MBAs†	195399	$2.50 < a \leq 2.82$	···	···
Outer MBAs†	155343	$2.82 < a \leq 3.27$	···	···
Cybeles	2028	$3.27 < a \leq 3.70$	$e \leq 0.30$	$i \leq 25$
Hildas	2474	$3.70 < a \leq 4.20$	$e \leq 0.30$	$i \leq 20$
Trojans	4924	$5.05 \leq a \leq 5.40$	···	···

[*] Numbers of asteroids classified into each category were taken from the Lowell Observatory (`ftp://ftp.lowell.edu/pub/elgb/astorb.html`) on December 28th 2012. Classification is based on Zellner et al. (1985a) but slightly modified.

[†] By strict definition, the Mars crossers with orbits that cross that of Mars ($q \leq 1.666$ AU) should be excluded from the MBAs, although this criterion is not applied in this work.

[‡] The Phocaea group ($2.25 \leq a \leq 2.5$ AU, $e \geq 0.10$, $18° \leq i \leq 32°$) is in the inner main belt region (and a small fraction in Apollos and Amors). The number of asteroids in the Phocaeas population is 4837, and we do not distinguish them from MBAs in this work.

into close proximity with the Earth (note that $q = 0.983$ AU and $Q = 1.017$ AU are the perihelion and aphelion distances of the Earth, respectively). NEAs are divided into three groups (Apollos, Amors, and Atens) based on their orbital elements. These objects have become of increased interest since the 1980s because of the increased awareness of the potential impact danger posed to the Earth. Little is known about a population of asteroids that are also expected to exist inside the Earth's orbit ($Q < 0.983$ AU), which are referred to as inner-Earth Objects (IEOs).

Main belt asteroids

Main Belt Asteroids (MBAs) represent the largest reservoir of asteroids in the main belt between the orbits of Mars and Jupiter. The MBAs are divided into three zones (inner, middle, and outer). The boundaries of the main belt regions at the semimajor axis $a = 2.06$, 2.50, 2.82, and 3.27 AU correspond to the 4:1, 3:1, 5:2, and 2:1 mean motion resonances of Jupiter, respectively (Kirkwood 1867). Formation of the MBAs is believed to be linked to planet formation.

Jovian Trojans

Jovian Trojans are locked into stable orbits by the 1:1 resonance with Jupiter and share the orbit of Jupiter liberated around Lagrangian points L4 (leading cloud) and L5 (trailing cloud). Much is still unknown about the origin and evolution of Trojan asteroids. Trojans potentially represent a reservoir of unaltered primordial material akin to cometary nuclei that constituted the building blocks of Jupiter and its moons.

Many clusters of asteroids in this distribution of orbital elements are evident, and these are called families as first recognized by Hirayama (1918).[2] It is considered that the members of a family shared a common origin, such as the break-up of a large parent body. In these early studies (Hirayama 1922, 1927; reviewed by Kozai 1994), seven asteroidal clusters were identified (Koronis, Eos, Themis, Maria, Flora, Phocaea, and Pallas). Many

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[2] From the end of the nineteenth century through to the twentieth century, there were two researchers named *Hirayama* who played important roles as astronomers in Japan; Makoto Hirayama (1867–1945) and Kiyotsugu Hirayama (1874–1943). Both made substantial advancements to Japanese modern astronomy, including not only observations and orbital determinations of asteroids, but also contributions to theoretical and observational astrophysics and geodesy, although they were not related by birth. Kiyotsugu Hirayama is the person who discovered that asteroidal families existed.

advances in the study of asteroidal families have taken place since the pioneering work of Hirayama, including the use of numerical methods and statistical techniques to search for and define asteroid groupings. Presently, 296 asteroidal families have been identified (Mothé-Diniz et al. 2012, Nesvorný 2012), including reliably documented families and other statistically significant asteroidal groups/clusters in terms of their orbital elements.

1.3 Size of asteroid

Size is one of the most basic physical quantities of an asteroid. By combining asteroidal size and mass, which are able to be precisely measured using modern techniques (Hilton 2002), the bulk density of an asteroid can be determined (Britt et al. 2002). Density enables the macroscopic porosity and inner structure of an asteroid to be investigated. As such, the total mass and size distribution of asteroids are key data for understanding the history of the solar system (Bottke et al. 2005).

The largest asteroid (1) Ceres is ca. 950 km in diameter, whereas the smallest asteroids measured to date are only ∼10 m and are a type of meteoroid. However, for several reasons it is not easy to determine the size of asteroids. Firstly, asteroid sizes are very small as compared with the resolution of telescopes. For example, the maximum size is $\sim 0.8''$, whereas most asteroids are smaller than $0.01''$. Secondly, the very large number of asteroids makes it difficult to obtain a census for the total population. Thirdly, the absolute magnitude, which is the magnitude of an asteroid at zero phase angle and at unit heliocentric and geocentric distance, is a function of size and albedo, which cannot be obtained independently. This relation can be written as:

$$d = \frac{1329}{\sqrt{p_{\mathrm{v}}}}\, 10^{-H/5}, \tag{1.1}$$

where d, p_{v}, and H are the the diameter in units of km, the geometric albedo, and the absolute magnitude, respectively. The derivation of Eq. (1.1) is shown in Appendix B.

1.3.1 Methods to determine asteroidal size and albedo

Several methods have been developed to measure the size and albedo of asteroids since their discovery.

Direct measurements in the early stages of asteroidal discoveries

The first attempt to measure the size of asteroids was made just after the first discovery of asteroids (Herschel 1802). Herschel used a 7-foot focal length, 6.3-inch aperture reflector, with a lucid disk micrometer, which consisted of a small illuminated disk that could be moved towards and away from the telescope. The telescope's eyepiece magnifier was such that the asteroid could be observed with one eye while the disk could be viewed with the other eye. These observations were performed with the disk placed 54 m from the observer's eye (see Hughes 1994 for a review). Using this technique, Herschel reported the angular diameter of (1) Ceres and (2) Pallas as less than $0''.35127$ and $0''.3199$, respectively. These angular diameters correspond to actual physical diameters of 260 km and 237 km, respectively (these are much smaller than the now known values for (1) Ceres and (2) Pallas).

Following Herschel's pioneering work, direct measurements of visible asteroidal disks were made in 1894 and 1895 using filar micrometers (e.g., Barnard 1895) with the 36-inch refractor of the Lick Observatory (University of California) and the 40-inch refractor of the Yerkes Observatory (University of Chicago, Wisconsin). The double-image micrometer (Dollfus 1971) is an improved version of this method. However, the micrometer measurements are difficult to make when the disks are only slightly larger than the image of the diffraction pattern blurred by atmospheric conditions, and it is also difficult to evaluate systematic errors with this method.

Polarimetric observations

Polarimetric observations are one of a number of techniques that can yield information about the mineralogical properties and structural textures of an asteroid surface. The degree of polarization changes as a function of phase angle and, as such, the variation of polarization is related to the nature of the asteroidal surface (e.g., Dollfus & Zellner 1979; Dollfus et al. 1989). The inverse correlation between geometric albedo and degree of polarization of light scattered from rough surfaces illuminated by unpolarized light, has been referred to as the Umov effect (Umov 1905). When integrated with laboratory studies, it is possible to quantitatively infer the albedo of individual asteroids from two characteristic parameters deduced from a polarization-phase angle curve (i.e., the curve minimum and slope). Using these parameters, the albedo of an asteroid can be estimated from the empirical relationships between albedo and slope or albedo and the curve minimum established by Lupishko & Mohamed (1996). Rigorous observations need be carried out when utilizing this approach as observations at various phase angles are needed to determine the albedo. Once the albedo has been derived from these empirical laws, the size of asteroid can also be computed from the absolute magnitude by using Eq. (1.1).

Radar observations

The Radar (an acronym for RAdio Detection And Ranging) is a unique source of information about asteroidal physical properties and orbits (Ostro et al. 2002). Radar has been used to study the asteroids in much the same fashion as it has been used to study the larger planets and their satellites (Pettengill 1978). Radar observations of asteroids use simple continuous-wave (CW) waveforms, with transmissions lasting for the duration of the round-trip delay. Measurements of the distribution of echo power in time delay (range) and Doppler frequency (radial velocity) constitute two-dimensional images that can provide spatial resolution finer than 10 m if the echoes are strong enough. With sufficient orientational coverage, such images can be used to construct geologically detailed three-dimensional models, precisely define the rotational state, and to constrain the object's internal density distribution. Given that radar coherently illuminates the target, surface scattering properties at radio wavelengths are a function of angle and polarization and can be directly determined. The 300-m telescope of the Arecibo Observatory (Puerto Rico) and the 70-m antenna of the Goldstone Deep Space Communications Complex (the Mojave Desert, California) have almost been entirely responsible for all asteroidal radar research to-date. The transmitter carrier frequencies are 2380 MHz for Arecibo and 8560 MHz for Goldstone, which are 12.6 cm and 3.5 cm in wavelength, respectively. When radar observations are combined with visible and infrared observational data, it is possible to determine asteroid size, shape, rotation rate, albedo, and spin vector. Such measurements can achieve a high level of accuracy, when observations with a high signal to noise ratio and high frequency resolution are obtained. The main limitation of radar observations is the distance of the target, rather than the size of target, because the echo power is inversely related to distance to the fourth power.

Speckle interferometry

Asteroids are too small for their size to be directly observed with ground-based telescopes. However, speckle interferometry, can dramatically increase the resolution of ground-based telescopes, making it possible to determine asteroid size and shape (Drummond & Hege 1989). Speckle interferometry was first proposed by Labeyrie (1970) as a process that deciphers the diffraction-limited Fourier spectrum and enables imaging of the features of stellar objects by taking a large number of very short exposure images of the same field. To overcome the limit to resolution imposed by the Earth's atmosphere (typically $\sim 1''$) and to approach the theoretical resolving power of large telescopes according to Rayleigh criterion, short exposure time ($\sim$10 ms) images of an object with narrowband (10–30 nm) filters are recorded. These photographs "freeze" the turbulence in the atmosphere and are a type of multiple aperture interferometry that provides information down to the resolution of the diffraction limit of the entire telescope aperture. Given that most asteroids are too faint to obtain a high-resolution image, a large aperture telescope is required for this method. Even with use of a large telescope, the speckle interferometry method can only be used to study bright objects (the apparent magnitude in V band brighter than $\sim$14). Thus, the diameters of some large asteroids can be obtained with this technique and the improving resolving power of modern telescopes will increasingly lead to more direct measurements of asteroid sizes and shapes using this method (Cellino et al. 2003).

Stellar occultations

Stellar occultations involving asteroids are the most direct ground-based technique for determining asteroid size and shape (Tanga & Delbó 2007). In the course of a stellar occultation, an asteroid crosses an observer's line of sight to a distant star. During this event, the asteroid is seen to approach the star, block it from view for a time period, and then move away from the other side of the star. Measurement of the time interval during which the star is occultated, provides an easy means to determine the length of one chord across the asteroid. Given that the star is very distant relative to the Earth-asteroid separation, the shadow cast by the asteroid is effectively parallel. Therefore, observers at different locations generally view the star passing behind different parts of the asteroid. As such, well-organized campaign observations involving many participants including amateur astronomers can map the apparent limb profile of the asteroid in as much detail as is desired. One advantage of stellar occultations is that very small minor planets can be studied. The occultation technique can also undertake a percentage measurement of an unspecific asteroid. With the availability of low-cost GPS equipment and CCD cameras, the accuracy of occultation timings has greatly improved over the past decade. Stellar occultation studies combined with the other types of measurements, such as lightcurve information, can provide detailed asteroid shape models (Ďurech et al. 2011). However, it is difficult to accurately prediction when occultation events will occur, and this method requires observations from many different points and, in practice, occultation is a relatively rare event, particularly with brighter stars.

Direct imaging with the Hubble Space Telescope

The most straightforward approach to study asteroids is by direct imaging of the asteroid with high resolution, space-borne telescopes, which do not suffer from atmospheric turbulence. One such space-borne telescope is the Hubble Space Telescope (HST), which was launched on April 24th 1990 by the NASA Space Shuttle Discovery (STS-31). The angular resolution of the Wide Field and Planetary Camera (WFPC) and its replacement, the Wide Field and Planetary Camera 2 (WFPC2), on the HST is $0.043''$, which has the diffraction-limited resolution of a 2.4-m telescope. The HST has carried out extensive observations of asteroids. For example, several major asteroids were observed as resolved disks (Storrs et al. 1999, 2005) and revealed their satellites. High-resolution images of (1) Ceres (Thomas et al. 2005; Li et al. 2006; Parker et al. 2002, 2006), (2) Pallas (Schmidt et al. 2009), and (4) Vesta (Zellner et al. 1997; Li et al. 2010; Thomas et al. 1997) were also obtained with WFPC/WFPC2, the Advanced Camera for Surveys (ACS), and/or the Faint Object Camera (FOC).

The Fine Guidance Sensor (FGS) on the HST is an optical interferometer. Although this instrument is designed for the attitude control system of the satellite and is not a dedicated scientific instrument, it has been used to measure the fringes patterns of asteroids to search for binaries (e.g., (15) Eunomia, (43) Ariadne, (44) Nysa, (63) Ausonia, (216) Kleopatra, and (624) Hektor; Hestroffer et al. 2002, Tanga et al. 2003).

Direct imaging with ground-based large telescopes

Even with the advent of space-borne telescopes, ground-based telescopes remain significant tools with which to study asteroids. Since the 1990s, large (8–10 m) telescopes equipped with adaptive optics (AO; Beckers 1993), have allowed diffraction-limited observations to be made. AO attempt to correct in real time phase perturbations induced by turbulence and provide stable imaging. Indeed, AO systems are an integral part of modern astronomy with large telescopes (Stecklum 1998) and the angular resolution necessary to resolve the apparent disk of an asteroid has been achieved. Small bodies such as asteroids are now an ideal target for AO observations as they permit on-target wavefront sensing. One of the main advantages of observing with AO is the much greater amount of available telescope time as compared with space telescopes. AO observations enable the determination of triaxial shapes (Drummond et al. 2009), topography (Conrad et al. 2007), and albedo mapping (Carry et al. 2010).

Ground-based interferometers yield high spatial resolution information. In general, the spatial resolution of interferometers is about one order of magnitude less than that directly measurable with single-dish telescopes. The Atacama Large Millimeter/submillimeter Array (ALMA) is the world's largest interferometric array, and has an angular resolution of $\sim$5 milliarcsec. ALMA operates in sub-millimeter to millimeter wavelengths where asteroids are faint, but has strong prospects for advancing our understanding of asteroids. For example, this technique has enabled imaging of large-scale surface features, surface temperature distributions, and the detection of binary systems of several hundred MBAs and about one hundred Trojans with thermal observations or high amplitude rotational lightcurves (Lovell 2008; Busch 2009). Optical interferometry technique using ground-based large telescopes has recently emerged (Li et al. 2011). Measurements of the sizes, shapes, and rotations of asteroids with the Very Large Telescope Interferometer (VLTI) of the European Southern

Observatory (ESO) has produced data that are in excellent agreement with the detailed shape models derived from spacecraft images (Delbó et al. 2009).

In situ measurements with spacecrafts

Spacecraft flyby, rendezvous, or sample return missions are undoubtedly the most direct and powerful tool for determining the size, shape, and albedo of asteroids. The first spacecraft to encounter an asteroid was Galileo (Johnson et al. 1992), which was launched on October 18th, 1989, by the NASA Space Shuttle Atlantis (STS-34). Galileo flied by (951) Gaspra and (243) Ida on its way to Jupiter, and imaged the detailed features of their surfaces (Helfenstein et al. 1994, 1996). Galileo discovered a satellite of (243) Ida (Dactyl), which

Table 1.3 Overview of asteroid studies by spacecrafts.

Spacecraft	Mission period†	Asteroid target	
Galileo[1]	1989–2003	(951) Gaspra (243) Ida/Dactyl	Flyby (1991) Flyby (1993)
NEAR Shoemaker[2]	1996–2001	(253) Mathilde (433) Eros	Flyby (1997) Rendezvous, landing (2000)
Cassini-Huygens[3]	1997–(in flight)	(2685) Masursky	Flyby (2000)
Deep Space 1[4]	1998–2001	(9969) Braille	Flyby (1999)
Stardust-NExT[5]	1999–2011	(5535) Annefrank	Flyby (2002)
Hayabusa[6]	2003–2010	(25143) Itokawa	Sample return (2005)
Rosetta[7]	2004–(in flight)	(2867) Steins (21) Lutetia	Flyby (2008) Flyby (2010)
New Horizons[8]	2006–(in flight)	(132524) APL	Flyby (2006)
Dawn[9]	2007–(in flight)	(4) Vesta (1) Ceres	Rendezvous (2011–2012) Rendezvous (2015, scheduled)

† Sizes of the asteroids listed in this table are shown in Fig.1.7.
[1] Johnson et al. (1992); [2] Cheng et al. (1997); [3] Matson et al. (2002); [4] Rayman (2003);
[5] Brownlee et al. (2003); [6] Fujiwara et al. (2006); [7] Glassmeier et al. (2007);
[8] Stern & Spencer (2003); [9] Russell et al. (2004).

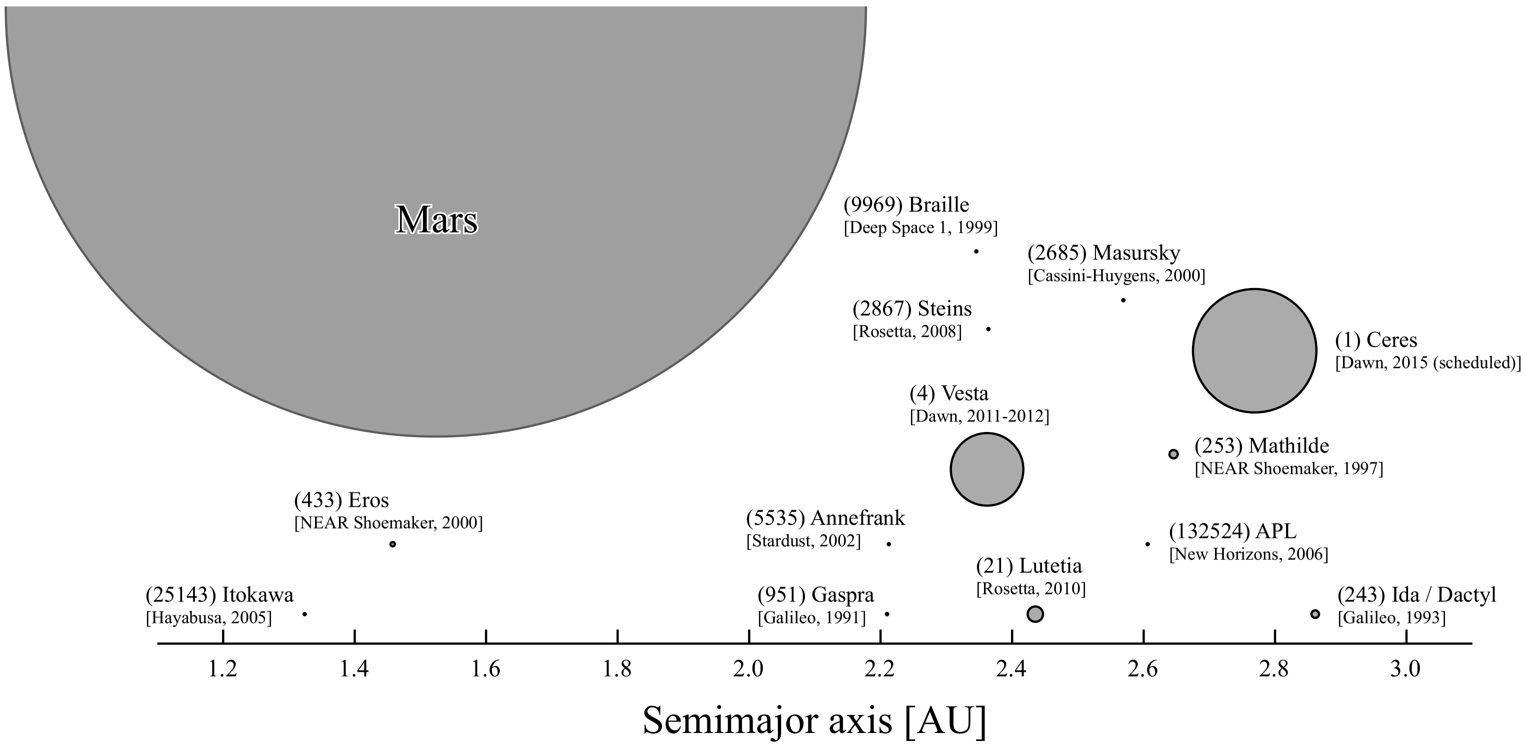

Figure 1.7 Sizes of asteroids that have been explored by spacecrafts (flyby, rendezvous, or sample return missions) plotted versus the heliocentric distance. Asteroids smaller than 10 km are shown at an exaggerated scale. For reference, the diameter of Mars: 6779 km, the Moon: 3475 km, the Galilean moons, Io: 3643 km, Europa: 3122 km, Ganymede: 5262 km, and Callisto: 4821 km.

was the first discovery of a natural satellite orbiting an asteroid (current estimates suggest that ∼15% of NEAs and ∼2% of MBAs, are binary systems; Richardson & Walsh 2006).

The spatial resolution of such spacecraft asteroid imaging is superior in quality to most other observational techniques and, therefore, size, shape, and albedo data obtained using this method are highly accurate. Moreover, detailed geological analysis of the asteroidal surface can only be carried out with this method. Overview of the spacecraft studies of asteroids are summarized in Table 1.3.

Although these aforementioned methods are all readily able to determine the size and albedo of asteroids, they all require the convergence of critical conditions, such as the selection of large targets with trajectories approaching the Earth and/or narrow observational windows. Most asteroids have maximum angular sizes below the resolution limits of the most powerful telescopes that currently exist. Even the HST can only undertake detailed mapping over the surface when the asteroid is in close approach to the Earth. Moreover, imaging from or near the Earth is prone to shadowing and phase effects that can make it difficult to resolve the true shape of an asteroid. Asteroid shapes are most reliably and definitively defined by spacecraft. However, the opportunities to closely encounter asteroids with spacecraft are unsurprisingly relatively infrequent given the technical challenge and cost of such missions. The vast number of asteroids poses yet another difficulty in their observation. As of 2012, the number of known asteroids was more than 600,000, which due to this large number of bodies precludes detailed observations being made of them all.

1.4 Thermal infrared observations of asteroids

One of the most effective indirect methods for determining the size and albedo of asteroids is through combining radiometric measurements at visible and thermal infrared wavelengths. Observations at infrared wavelengths are particularly suitable for studying asteroids inside the orbit of Jupiter, as these have surface temperatures greater than ∼150 K and are bright sources at mid-infrared wavelengths (∼5–20 μm) due to their thermal emissions (also referred to as “thermal infrared”). While spectroscopy in the infrared can be used to determine temperature, the radiometric method has thus far made its most important contribution as being the simplest and fastest way to determine the size and albedo of individual and entire populations of asteroids.

The principle of radiometry is based on the fact that the brightness of an object in the visible wavelengths is determined by reflected sunlight, which is proportional to the cross-sectional area and the albedo of the object (as Eq. (1.1)). The absorbed solar flux heats an asteroid, which re-radiates energy at infrared wavelengths. Therefore, the infrared brightness is proportional to an object's cross-sectional area and absorption, which is $(1 - A_{\mathrm{B}})$, where A_{B} is the bolometric Bond albedo (Bond 1861). Combining and balancing these visible and infrared measurements allows a *cold and large asteroid* to be distinguished from a *hot and small object*, and thus enables separate determination of size and albedo. The thermal balance on the surface of an object depends on its shape and rotational state. Thus, to determine the total energy that is absorbed and then re-radiated, the thermal behavior of an asteroid should be determined from some type of thermal model. Thermal models relate the measured total infrared flux to the global surface temperature distribution, and relates the equilibrium surface temperature distribution to size and albedo. If no direct physical data are available for an observed asteroid, the Standard Thermal Model (STM; Lebofsky et al. 1986) is the basic and most widely used model. The STM assumes that the asteroid has a spherical geometry, rotates slowly, and has a low thermal inertia so that each surface element can be considered to be in instantaneous thermal equilibrium with solar insolation. The temperature distribution is then a simple function of the angular distance from the sub-solar point at which the temperature distribution has its maximum. In real terms, the STM should be applicable to asteroids covered in a dusty regolith. However, in order to extend the applicability of the radiometry method, several other thermal models have been proposed that take into account factors such as significant thermal inertia, surface roughness, rapid rotation, and spin vector: the fast rotating (isothermal latitude) model (FRM or ILM; Lebofsky et al. 1978; Veeder et al. 1989; Lebofsky & Spencer 1989); the near-Earth asteroid thermal model (NEATM; Harris 1998). Comparisons of these different thermal models have been discussed in, for example, Harris & Lagerros (2002). If substantial observational data are available for an asteroid, then the thermophysical model (TPM; Lagerros 1996, 1997, 1998) can be used for more advanced and detailed studies including several physical properties (thermal inertia, surface roughness, shape, and spin state). The choice of the thermal model depends on the observational data available and the desired accuracy of the asteroidal model.

1.4.1 Radiometry with ground-based telescopes

The ground-based radiometric technique was first used to determine the size and albedo of the asteroid (4) Vesta with the 30-inch telescope of the O'Brien Observatory (University of Minnesota; 308 m altitude) at wavelengths of 8.5, 11.8, and 21.3 μm (Allen 1970). Allen (1971) also used this method to study (1) Ceres, (3) Juno, and (4) Vesta and estimated their sizes to be 1160 ± 80, 290 ± 20, and 570 ± 10 km, respectively (these estimations are now known to be 10–25% larger than the actual sizes). Systematic surveying was carried out by Matson (1971) using the 60-inch telescope of the Hale Observatory at Mt. Wilson (California; 1742 m altitude) at wavelengths of 8.5, 10.5, and 11.6 μm for 26 major main-belt asteroids. The size and albedo relationships of these asteroids were also discussed in the study of Matson (1971). During subsequent years, many further similar studies were undertaken and, in this respect, this period saw rapid advances in radiometry with ground-based observatories. Morrison & Zellner (1979) summarized the most widely used catalog of asteroids at that time, which contains size and albedo data for 197 asteroids.

Infrared observations using ground-based observatories, particularly in the mid-infrared range, are limited by the atmospheric transmission. More recently, mid-infrared observations have been entirely carried out at high-altitude observatories, such as the summit of Mauna Kea (Hawaii; 4200m) or the Atacama region (Chile; $\sim$5600 m). Even at these high-altitude, ground-based observations are restricted to the "atmospheric windows".

1.4.2 Radiometry with space telescopes

Infrared measurements using space-borne telescopes are completely free from the atmospheric absorption. Furthermore, recent advances in infrared astronomy have been driven by improvements in semiconductor technology, which utilize the internal photoelectric effect, and sensitive and large format detector arrays. The introduction of cryogenic systems has also been a key technological advance in this field, as it reduces the thermal emissions of the instruments themselves. Radiometric measurements from space allow a large number of objects to be observed in a short period of time, thus providing uniform data for large, relatively unbiased populations within the asteroid belt. Although radiometry requires careful calibration, once this has been achieved this method can obtain “wholescale” highly accurate measurements of the physical properties of large numbers of asteroids.

A pioneering asteroid survey with a space-borne telescope was made by the Infrared Astronomical Satellite (IRAS) launched on January 26th 1983, which was a joint mission by the United States, the United Kingdom and Netherlands (Neugebauer et al. 1984). The IRAS satellite had a near-polar, 900 km altitude orbit with an inclination of 99° with respect to the Earth’s equator and was precessed so that it remains close to the plane of the terminator (the plane containing the day-night boundary on the Earth’s surface). Scans of the sky were performed by rotating about the vector from IRAS to the Sun at fixed solar elongation ranging from 60° to 120°. In the survey scan mode, the boresight swept the sky at a rate of $3.85^{\circ}\mathrm{m}^{-1}$. IRAS had a liquid helium cryostat containing a cooled telescope with a 57 cm aperture. The focal plane assembly was cooled to less than 3 K. Thirty-two infrared detectors in the survey array were arranged so that every source crossing the field-of-view could be seen by at least two detectors in each of four wavelength bands. The effective wavelength of the four mid- and far-infrared band detectors was positioned to 12, 25, 60, and 100 μm. The detectors had rectangular forms with typical angular sizes projected onto the plane of the sky of $0.76'\times4.6'$ for 12 and 25 μm, $1.5'\times4.7'$ for 60 μm, and $3.0'\times5.0'$ for 100 μm. The IRAS survey observation began on February 9th 1983 and ended on November 22nd 1983 due to exhaustion of liquid helium. During the 10-month mission life, IRAS surveyed more than 96% of the sky, and detected 245,889 point sources at four infrared wavelengths. Ensuring the completeness and reliability of the data for point sources in the presence of potential contamination from space debris passing near the spacecraft and charged particle hit events, requires confirmation processes over timescales of seconds, hours, weeks, and months. The IRAS hours and weeks confirmation strategy was developed to discriminate against moving sources. Although sightings of solar system objects are both spatially offset in the sky and time, tracks of solar system objects detected with IRAS are defined as a series of sightings of the same objects. After a compilation process, data sets for 25 comets and 1811 known asteroids were obtained and published in the first version catalog entitled *the IRAS Asteroid and Comet Survey* (1986). About two decades later, a revised version of the asteroid size and albedo catalog was reissued that included 2460 asteroids and was named *the supplemental IRAS minor planet survey* (Tedesco et al. 2002a, 2004).

Another serendipitous survey was carried out by the Midcourse Space Experiment (MSX) launched in 1996 (Mill et al. 1994; Price et al. 2001). The MSX observed $\sim$ 10% of the sky at six infrared bands of 4.29, 4.35, 8.28, 12.13, 14.65, and 21.34 μm, and $\sim$160 asteroids were identified for which size and albedo were determined (Tedesco et al. 2002b). The Infrared Space Observatory (ISO) launched in 1995 (Kessler et al. 1996) made another part-of-sky survey, and observed several planets, satellites, comets, and asteroids at infrared wavelengths (Müller et al. 2002). Despite these extensive surveys, the proportion of asteroids for which size and albedo have been determined is still only 0.5% of those with known orbital elements.

1.5 Scope of this work

The primary aim of this work is to augment the number of asteroids for which size and albedo data are available. The distribution of asteroidal size and albedo, and its correlation with the taxonomic types is crucial for revealing the nature of asteroids. We place emphasis on those asteroids for which there is practically no information available, apart from the IRAS asteroid catalog. The size and albedo distribution of the total population of asteroids is therefore very uncertain at present, even for the larger asteroids, and relies on assumed values. One common method to estimate the size of asteroid is using Eq. (1.1) with a given absolute magnitude, based on the assumption that the geometric albedo is $p_{\rm v} = 0.1$. However, the assumed value for albedo is highly uncertain and it is necessary to increase the sample of asteroids for which the size and albedo have been determined by actual measurements. Only by such measurements, it is possible to construct a reliable database for the statistical study of the asteroid population. This requires extensive observations of the thermal emission of asteroids in the mid-infrared wavelength range, combined with observations of the reflected sunlight and a suitable thermal emission model. Space-borne infrared surveyors are one of the most effective methods for such measurements of the size and albedo of asteroids.

The Japanese space mission dedicated to infrared astronomy, AKARI (Murakami et al. 2007), carried out a second-generation infrared all-sky survey following on from the success of IRAS. AKARI surveyed more than 96% of the sky during the 16-month cryogenic mission phase in six wavelength bands at the mid- to far-infrared spectral range. The mid-infrared part of the All-Sky Survey was conducted at two broad bands with the Infrared Camera (IRC; Onaka et al. 2007) on board AKARI: $S9W$ (6.7–11.6 μm) and $L18W$ (13.9–25.6 μm). The AKARI survey had several advantages over the IRAS survey in detecting asteroids in terms of sensitivity and spatial resolution, which both were improved by an order of magnitude. The 16-month survey duration is also a key feature of AKARI (Nakagawa et al. 2007), which demonstrates the excellent performance of modern infrared satellites. The extended duration of the survey is important for surveying moving objects and results in an unbiased catalog with no gaps. As such, asteroids of a certain range of sizes that are above the detection limit are expected to be completely cataloged.

Herein, we present the results of the asteroid survey at mid-infrared wavelengths with AKARI. Asteroidal size and albedo were derived by the radiometric method. A slightly modified STM was adopted to make it suitable for our observational data. Combining the catalog data with known taxonomic information has resulted in the documentation of a wide variety of asteroids in the main belt regions. Chapter 2 details the methods by which this survey was conducted, data reduction processes, and the basic results. All of the catalog size and albedo data obtained with this survey, named *the Asteroid Catalog Using AKARI* or *AcuA*, are listed in Appendix E. A study of MBAs is the main objective of this work, and so we present a general survey rather than a detailed study of individual objects. The statistical trends of the MBA size and albedo data based on our new catalog are given in Chapter 3. Chapter 4 presents a summary of our conclusion.

2

AKARI/IRC Mid-Infrared Asteroid Survey [3]

We constructed an unbiased asteroid catalog from the mid-infrared part of the All-Sky Survey with the Infrared Camera (IRC) on board AKARI. This new catalog, named *the Asteroid Catalog Using AKARI*, or *AcuA* (/ǽkwə/), contains 5120 objects, about twice as many as the IRAS.

This chapter is organized as follows: In Sect.2.1, we briefly review the AKARI satellite and its All-Sky Survey observation. In Sect.2.2, we describe the data reduction and the creation procedure of the asteroid catalog from the All-Sky Survey data. In Sect.2.3, we describe characteristics of the obtained catalog. Scientific output from this catalog is discussed at length in Chapter 3.

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[3] An earlier version of this chapter has been published as :
Usui, F., et al. 2011, "Asteroid Catalog Using AKARI: AKARI/IRC Mid-Infrared Asteroid Survey", *Publications of the Astronomical Society of Japan*, Vol.63, No.5, pp.1117-1138.

2.1 Infrared astronomical satellite AKARI

2.1.1 AKARI overview

AKARI[4] (formerly known as ASTRO-F) is the Japanese satellite mission fully dedicated for infrared astronomy (Murakami et al. 2007). The primary purpose is to provide second-generation infrared catalog so as to obtain a better spatial resolution and a wider spectral coverage than the first catalog produced by IRAS (Neugebauer et al. 1984). AKARI was launched on February 21st 2006 (UT) from the Uchinoura Space Center on the M-V-8 rocket, which was developed by the Japan Aerospace Exploration Agency (JAXA). The satellite was inserted into a sun-synchronous polar orbit at an altitude of $\sim$700 km and an inclination of 98.2°.

Figure 2.1 shows the overall structure of the AKARI satellite. Photos of the AKARI satellite and its instrumentation are shown in Figs.2.2, 2.3, and 2.4. The size in orbit is $5.5 \times 1.9 \times 3.7$ m (without the aperture lid) and the launch weight mass of 952 kg. The telescope and the Focal-Plane Instruments (FPI) were stored in the cryostat and were maintained at cryogenic temperatures by combination of 170 litres of super-fluid liquid helium (LHe) and two sets of two-stage Stirling cycle mechanical coolers (Nakagawa et al. 2007). The telescope is a Ritchey-Chrétien type with an effective aperture size of 68.5 cm and a focal ratio of $f/6$ (Kaneda et al. 2005, 2007); its mirrors are made of silicon carbide (SiC) and the weight of the primary mirror is only 10.8 kg. FPI consists of two scientific instruments, namely the Far-Infrared Surveyor (FIS; Kawada et al. 2007) and the Infrared Camera (IRC; Onaka et al. 2007). FIS has two 2-dimensional detector arrays and observes in four far-infrared bands between 50–180 μm. IRC consists of three cameras covering 1.8–26 μm in nine bands with the fields-of-view (FoV) of approximately $10' \times 10'$. Specifications of these instruments are summarized in Table 2.1 and the configuration of the FoV on the sky is shown in Fig.2.5.

AKARI flied along the day-night boundary with an orbital period of $\sim$100 min. This orbit is similar to that of IRAS, and is the most suitable orbit for scanning the sky while

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[4] *AKARI* means "light" in Japanese and is not assigned a special acronym. Note that according to the international naming convention, the AKARI satellite is designated as the NSSDC ID: 2006-005A, or the NORAD Catalog Number: 28939. The ejected aperture lid is also indicated as 2006-005E or 29054.

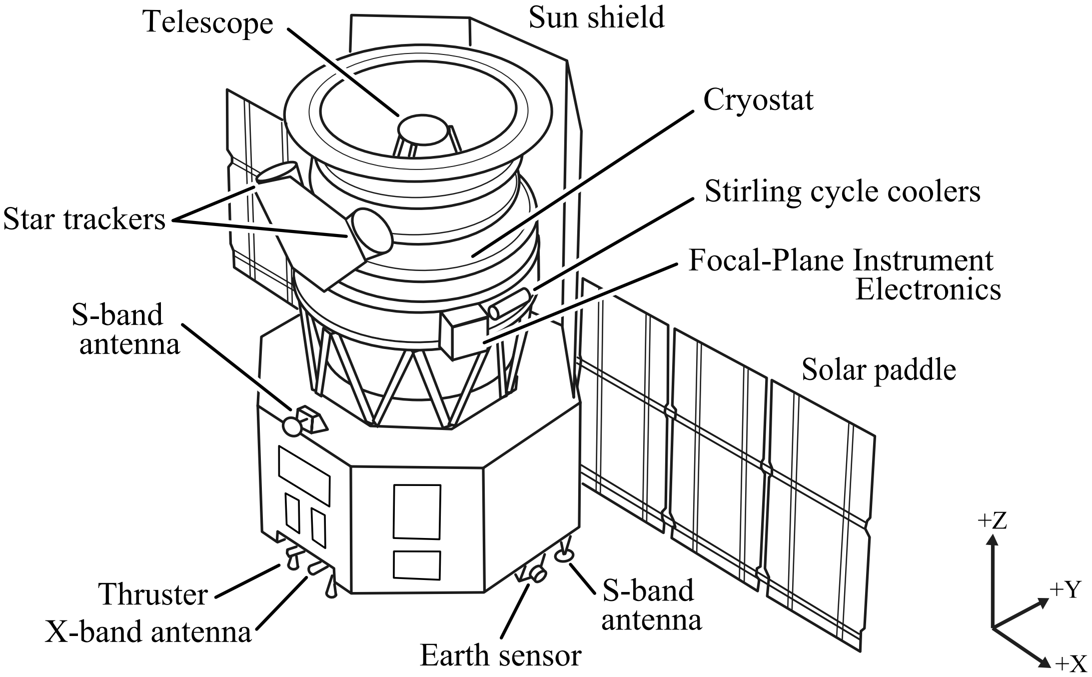


Figure 2.1 An overall view of AKARI in orbit. In the satellite body coordinate, the Sun is in the direction of "+Y", and the Earth is in "-Z". The telescope is observing toward "+Z" direction.

Table 2.1 Observation capabilities of AKARI.

	IRC (Infrared Camera)			FIS (Far-Infrared Surveyor)	
Channel	NIR	MIR-S	MIR-L	SW	LW
Band	$N2$, $N3$, $N4$, NP, NG	$S7$, $S9W$, $S11$, $SG1$, $SG2$	$L15$, $L18W$, $L24$ ($LG1^{\dagger}$), $LG2$	$N60$, *WIDE-S*	*WIDE-L*, $N160$
Wavelengths (μm)	1.7–5.0	5.8–13.0	12.4–25.0	50–110	110–180
Detector array (pixel^2)	InSb 512×412	Si:As 256×256	Si:As 256×256	Ge:Ga 20×2, 20×3	Stressed Ge:Ga 15×3, 15×2
FoV	$9.5' \times 10.0'$	$9.1' \times 10.0'$	$9.1' \times 10.0'$	$10' \times 1.0'$, $10' \times 1.5'$	$12' \times 2.5'$, $12' \times 1.6'$

† $LG1$ grism was degradated and disabled during the instrumental tests on ground.

Figure 2.2 Picture of the AKARI satellite.

Figure 2.3 Picture of the AKARI telescope system. The mirrors are made of gold-coated silicon carbide.

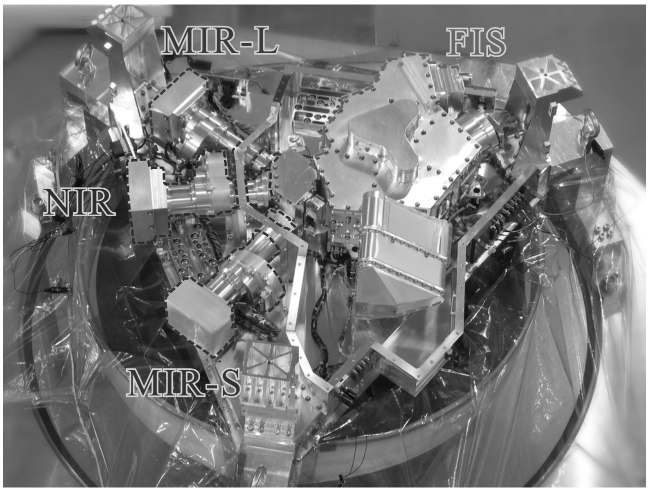


Figure 2.4 Picture of the the Focal-Plane Instruments on board AKARI, located at the backside of the prime mirror.

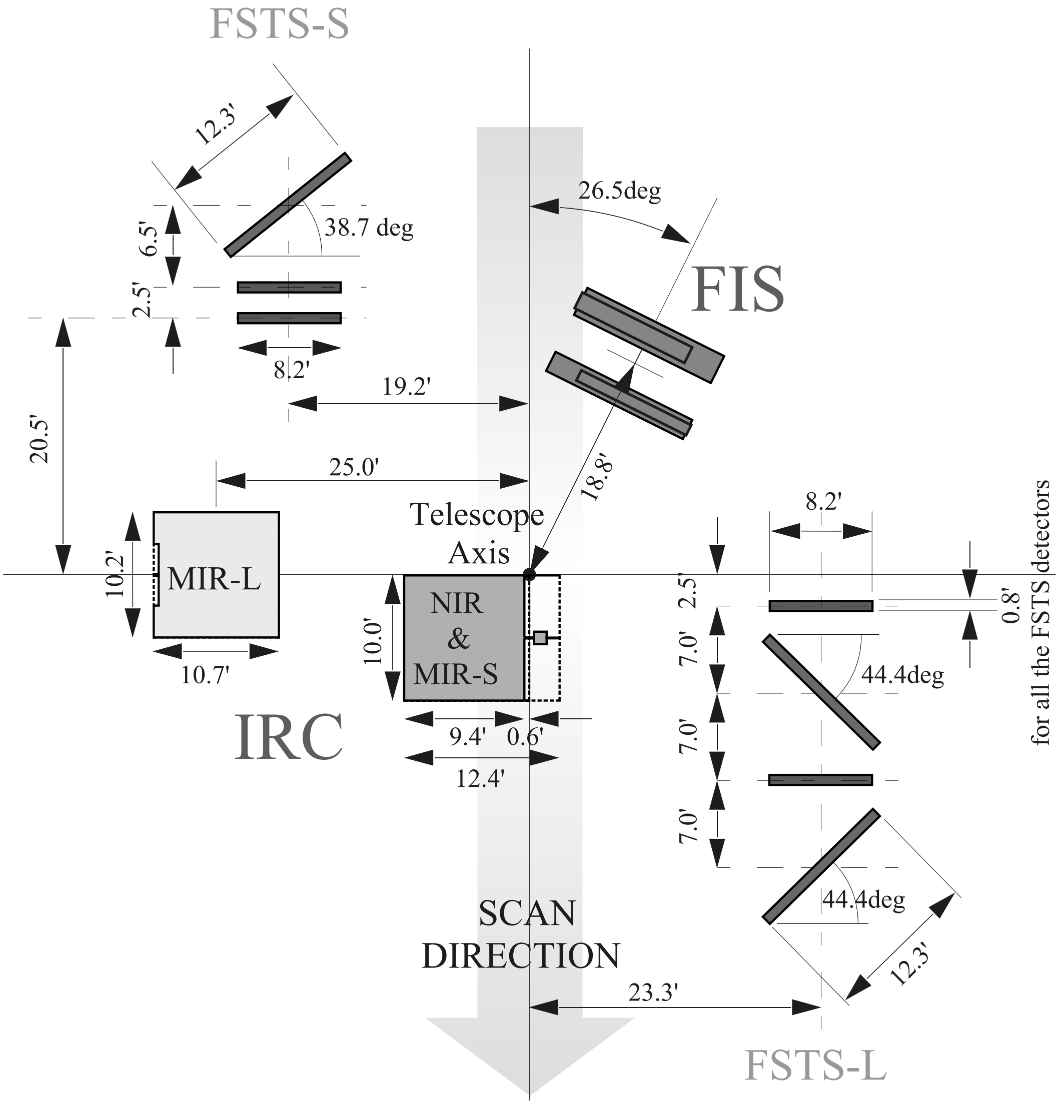


Figure 2.5 Layout of the FPI on board AKARI projected onto the sky. FSTS-S and FSTS-L are the focal-plane star sensors. The scan direction in the All-Sky Survey is in a sense that, in this figure, the FoV moves downward on the sky. FIS and IRC essentially can observe simultaneously, but they see different areas of the sky as shown in this figure. Therefore, observations of a sky position with different aperture have to be made on different orbits. Figure reproduced from Murakami et al. (2007).

keeping the telescope direction away from the Sun and the Earth, whose strong emission would be ruinous to the cooled telescope. In the survey mode, AKARI always points the telescope in the direction perpendicular to the Sun−Earth line, and rotates once every orbital revolution in a Sun-synchronous polar orbit at a rate of $3.6'\mathrm{s}^{-1}$ (see Fig.2.6). Thus the telescope beam continuously scans along a great circle perpendicular to the direction of the Sun. The survey paths are nearly aligned to the ecliptic lines of longitude, with approximately $4.10'$ spacing at the ecliptic plane between successive orbits. Since the cross-scan widths of the on-board detectors are $8.2' - 10'$, the single "hours confirmation" can be established at every point of the sky, and thus the whole sky can be covered in half a year, as long as successive orbits are available for observations without the presence of the South Atlantic Anomaly (SAA, see Fig.2.7) or the Moon. In addition to the survey mode, AKARI has a capability of making pointed observations for imaging and spectroscopy, in which the telescope stares at a given target for about 10 minutes. The pointed observations were occasionally inserted into a continuous survey operation.

Major events in the AKARI operation after launch are listed in Table 2.2. The mission lifetime of AKARI is divided into three observational phases as:

Phase 1

The first half year, or 186 days, during which AKARI scanned the entire ecliptic longitude is referred to as Phase 1. The most primarily is for the All-Sky Survey. Due to the constraint of the orbit, the sky visibility for AKARI is strongly weighted toward the ecliptic poles. Hence, the deep surveys for the North Ecliptic Pole (NEP) and the Large Magellanic Cloud (LMC; near the South Ecliptic Pole) with the pointed observations were also carried out with higher priority. Some other pointed observations with time critical conditions were also performed. In total, 1100 pointed observations were done in Phase 1.

Phase 2

Following Phase1, Phase 2 continued 289 days until all LHe evaporated. Various pointed observations were performed as well as supplemental scan observations to complete the All-Sky Survey. Since AKARI is not an observatory but a sky surveyor, detailed observational scheduling in advance was performed to balance the time al-

Table 2.2 Major events in the AKARI operation.

Date [UT]		Event
2006 February 21	21:28	Launch from Uchinoura Space Center
2006 April 13	07:55	Aperture lid ejection†, Start of performance-verification (PV) phase
2006 May 8	00:00	Start of Phase 1 observation
2006 November 10	00:00	Start of Phase 2 observation
2007 August 26	08:32	Liquid helium exhaustion‡ (end of Phase 2 observation; start of 2nd PV phase)
2007 December 4 2007 December 7		Orbit control operation (readjusted to a nearly ideal Sun-synchronous polar orbit)
2008 June 1	00:00	Start of Phase 3 observation
2010 February 15		Cryocooler degradation occurred
2011 May 23		Battery trouble occurred
2011 November 24	08:23	Turned off of onboard transmitters (end of operation)

† The opening of the aperture lid was delayed about one month due to trouble of the on board Sun aspect sensors after launch.

‡ The cryogenic mission life was 550 days after launch.

location of the All-Sky Survey and pointed observations (Matsuhara et al. 2005). In total, 3988 pointed observations were done in Phase 2.

Phase 3

After the boil-off of LHe, the mechanical cooler kept the FPI temperature below 50 K, which is low enough to observe with the NIR channel of IRC (Onaka et al. 2010). In Phase 3, only the near-infrared observations were continued until the mechanical coolers cease to function. This phase lasted 624 days with valid observational data till February 2010. 12,802 times pointed observations were made in this phase and $\sim$70% of them were for spectroscopy in 2.5–5 μm.

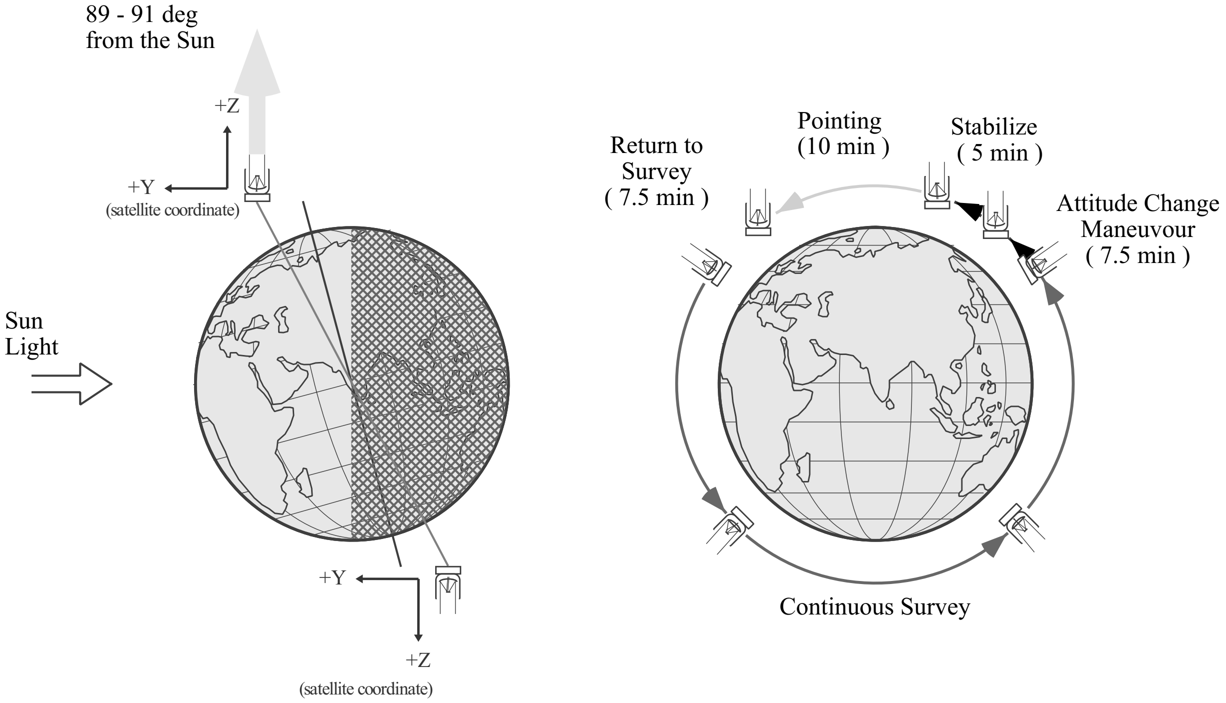


Figure 2.6 Schematic view of AKARI attitude control. In the survey mode, the satellite rotates uniformly around the axis directed toward the Sun once every orbital revolution, resulting in a continuous scan of the sky with a constant speed ($3.6' \mathrm{s}^{-1}$). The whole sky can be covered in half a year.

For the pointed observation, telescope can be slewed to a certain direction for imaging and spectroscopy. Due to the limit imposed by the earthshine illumination to the telescope baffle, the duration of the pointed observation is limited to ∼10 min. The pointing direction can be freely chosen in the telescope orbital plane given by the survey mode attitude, however, is restricted to within ±1° in the direction perpendicular to the orbital plane (cross-scan direction). Figure reproduced from Murakami et al. (2007).

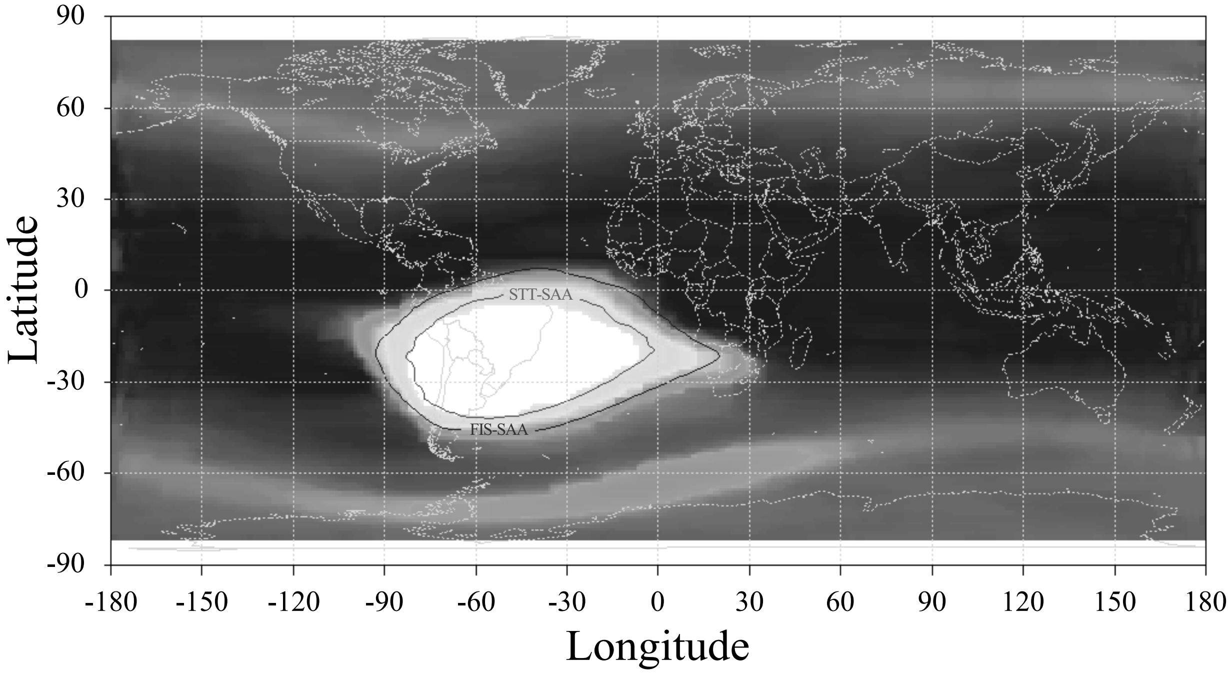


Figure 2.7 It is known that of the geomagnetic field plays a dominant role in the radiation damage occurring satellites (and also the space activities of humankind) near Earth orbits. The South Atlantic Anomaly (SAA) is caused by the displacement of the Earth's magnetic dipole axis relative to the Earth's rotation axis. Due to this displacement, the Earth's magnetic field has a local minimum over the South Atlantic Ocean, that allows trapped charged particles (mainly protons) of the inner Van Allen radiation belt to penetrate to lower altitudes. Satellites orbiting at several hundred km altitudes are exposed to higher than usual levels of radiation while passing through the SAA.

This figure shows the distribution of the "glitch" rate (Kaneda et al. 2008) on the world map created by counting spiky signals in the in-orbit data of FIS/SW detector (Y. Doi, private communication). The region encircled by solid lines are recognized as the SAA sensed with the star trackers (STT) and that with FIS, respectively. STT shows a similar behavior towards the SAA with IRC. This SAA information is referred not only for the satellite operation, but also for the data reduction.

2.1.2 AKARI IRC All-Sky Survey

The AKARI All-Sky Survey observation started on April 24th 2006 as part of performance verifications of the instruments prior to the nominal observation of Phase 1, which started on May 8th 2006. During the 16-month course of the AKARI LHe mission, a given area of the sky was observed three or more times on average, depending on the ecliptic latitude. A large number of scan observations were made in the ecliptic polar regions, while only two scan observations (overlapping halves of the FoV of each detector in contiguous scans) were possible in half a year for given spots on the ecliptic plane. In this regard, solar system objects near the ecliptic give few observation opportunities with AKARI. In addition to the low visibility, other conditions further limit the observation opportunities near the ecliptic, including the disturbances such as the Moon and the SAA. Another complication arose as to the operation in Phase 2, which was called the offset survey. It was an “aggressive” operation to swing the scan path to complement imperfect scan observations in Phase 1, which had been made in a “passive” survey mode. The Phase 1 survey left many regions of the sky unobserved due to the Moon and the SAA, to conflicts with pointed observations, and to telemetry data downlink failures. To make up observations of these regions and to increase the completeness of the sky coverage, the scan path was shifted from the nominal direction to fill the gaps on almost every orbit in Phase 2. For observations of solar-system objects, the offset survey operation has both positive and negative effects. Some objects may lose observation opportunities completely, while others may increase the number of detections drastically.

Since solar-system objects have their orbital motions, detection cannot be confirmed in principle by the position on the sky. Moreover, IRC two bands worked in the All-Sky Survey, namely $S9W$ and $L18W$, observed different sky regions of $\sim 25'$ apart in the cross-scan direction from each other because of the configuration on the focal plane (Figs. 2.5, 2.8), and an object was not observed with the two bands in the same scan orbit. Therefore, a single event of a point source needs to be examined without stacking the detection of asteroids. It should be noted that the IRC All-Sky Survey has advantage over the IRAS survey in the sensitivity and spatial resolution, both of which have been improved by an order of magnitude. The detector sensitivities of AKARI and IRAS are

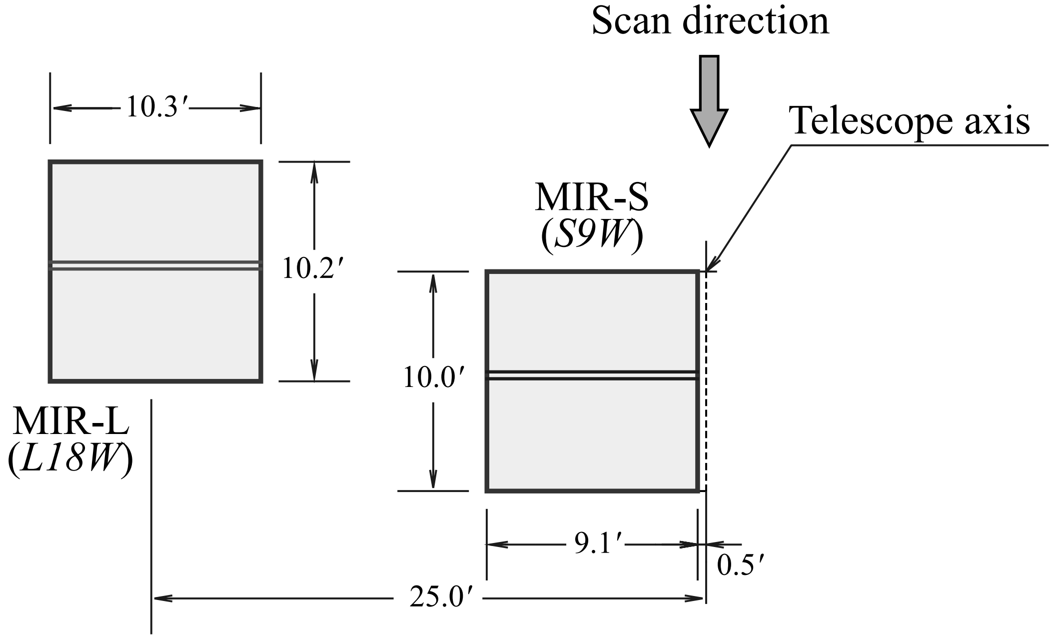


Figure 2.8 Schematic view of the focal plane layout of IRC $S9W$ (MIR-S) and $L18W$ (MIR-L) detectors. Whole view of the focal plane is shown in Fig.2.5. The two solid lines in each detector denote the positions of the operating pixel rows (the 117th and 125th of the total 256 rows) for the All-Sky Survey observation mode. The separation between the two rows is exaggerated in figure. Combining these two rows in the data processing, we remove false signals due to cosmic ray hits (millisecond confirmation; Ishihara et al. 2010). Figure reproduced from Onaka et al. (2007).

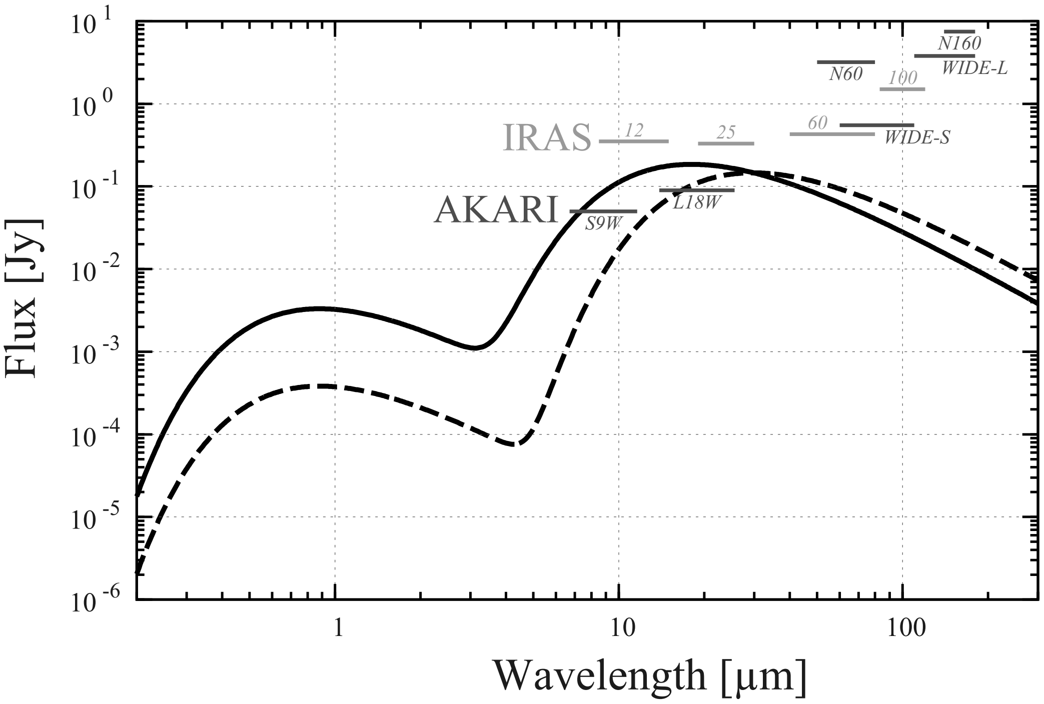


Figure 2.9 Model spectra of asteroids including the reflected sunlight and the thermal emission are shown. The solid line indicates the model flux of an asteroid (representative for a small inner main-belt object) with d = 5 km, p_v = 0.3, and R_h = 1.56 AU, where d, p_v, and R_h are the diameter of the object, its geometric albedo, and the heliocentric distance, respectively. The Standard Thermal Model (Lebofsky et al. 1986) is used for the calculation. The dashed line indicates another model flux with d = 33 km, p_v = 0.08, and R_h = 4.6 AU, representative for a small Trojan asteroid. Each of the two asteroids represents near a lower limit in the size at the corresponding distance in the AKARI survey. The horizontal bars indicate the detection limits of IRAS (Neugebauer et al. 1984; Beichman et al. 1988) and AKARI (Ishihara et al. 2010; Yamamura et al. 2010).

shown in Fig.2.9. Also as seen in Fig.2.9, asteroids inside the orbit of Jupiter are bright at the mid-infrared due to their thermal emission. These spectral features allow us to detect asteroids efficiently with the IRC All-Sky Survey.

In the following, we describe how asteroid events are extracted and identified in the All-Sky Survey observation, and how their size and albedo are derived.

2.2 Data processing and catalog creation

An outline of data processing to extract asteroid events is summarized in the following (see also Fig.2.10):

1. Point sources are extracted by pipeline processing from the IRC All-Sky Survey image data. The positions of extracted sources are matched with each other, and the sources detected more than twice are regarded as being confirmed ones and cataloged in the IRC-PSC. The detected sources not cataloged in the IRC-PSC are considered to consist of extended sources, signals due to high-energy particles, geostationary satellites, and solar-system objects such as asteroids and comets (Sect.2.2.1). Hereafter, individual extracted point sources in the All-Sky Survey are called "events", and a summary of the events is called an "event list". The physical flux of each event is derived in the pipeline processing.

2. Identification of an event with an asteroid is made based on the predicted position of the asteroid with known orbital elements (Sect.2.2.2).

3. Color corrections are applied to the fluxes of those events identified as asteroids, while taking into account the heliocentric distance of the object. Events with large errors, or those with very small fluxes are struck out from the list at this stage (Sect.2.2.3).

4. The size and albedo of asteroids associated with each identified event are calculated based on the Standard Thermal Model (Sect.2.2.4).

5. Further screening of the sources is performed and the final catalog is prepared (Sect.2.2.5).

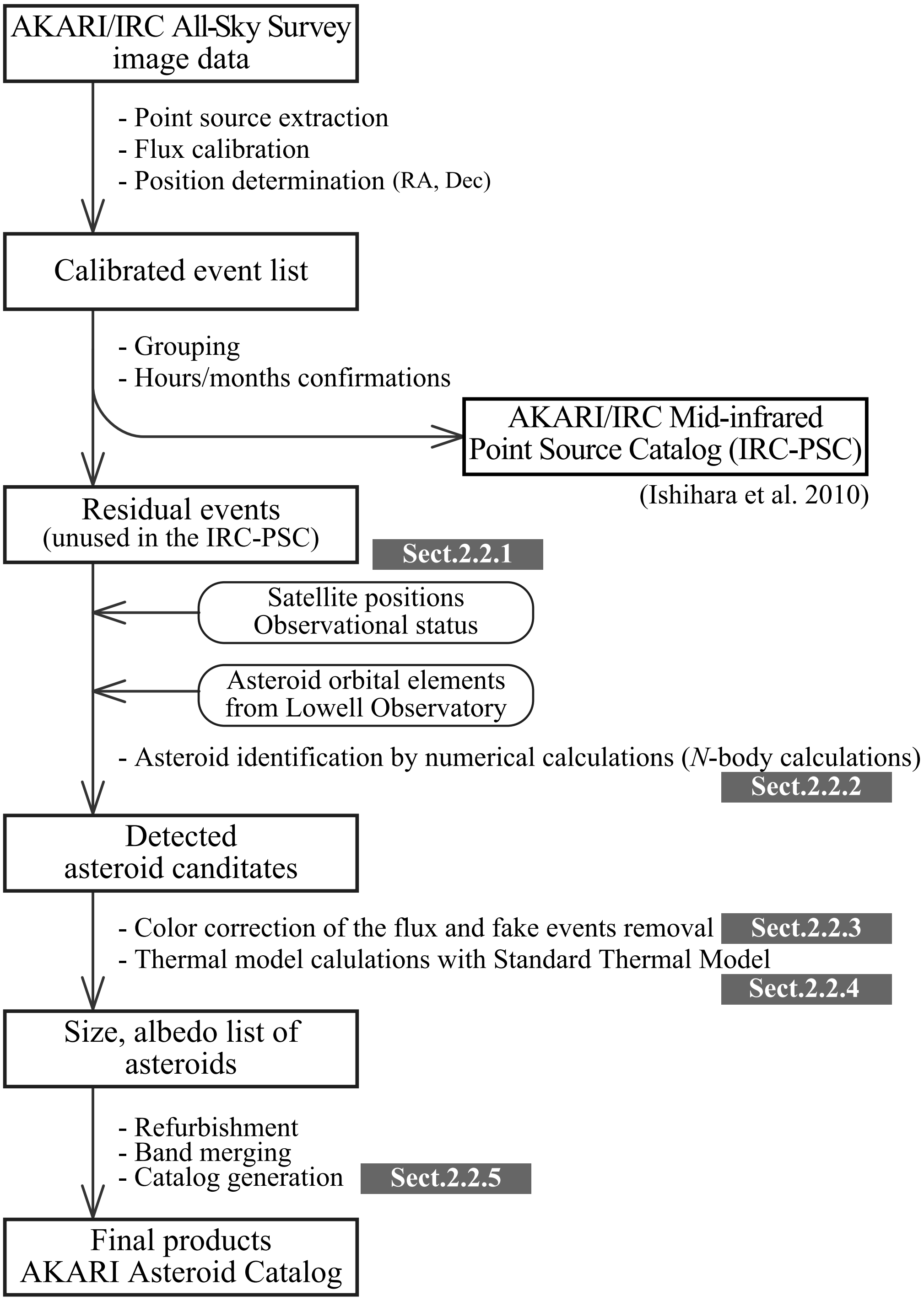


Figure 2.10 Outline of data processing to create the asteroid catalog.

Table 2.3 Number of events for each processing step *.

	Event	*S9W*	*L18W*
(a)	All events	4,762,074	1,244,249
(b)	Events employed in the IRC-PSC	3,882,122	936,231
(c)	Residual events	879,952	308,018
(d)	Events identified as asteroids	6,924	13,760
(e)	Asteroids in the final catalog	2,507	5,010
(f)	Asteroids detected overall	5,120	

* (a) *"Event"* indicates an individual detection of a point source in the All-Sky Survey data. (b) Events confirmed as a point source by multiple detections at the same celestial position (Ishihara et al. 2010). (c) Unused events in the IRC-PSC: (c) = (a)−(b). (d) Events identified as asteroids by the estimated positions. False identifications are excluded. (e) Asteroids in the final catalog. (f) Asteroids detected with either *S9W* or *L18W* or both.

2.2.1 Event list for asteroid identification

The present asteroid catalog is a secondary product of the IRC-PSC. Thus, corrections for detector anomalies, image reconstruction, point-source extraction, pointing reconstruction, and flux calibration are applied in the same manner as in the IRC-PSC processing (Ishihara et al. 2010). About 25% (*S9W*) and 18% (*L18W*) of the total events are not used for the IRC-PSC, and are analyzed in the present process (Table 2.3).

2.2.2 Asteroid identification

Identifying events as asteroids is made based on the orbital calculation of the asteroids with known orbital elements. The geometry of the Sun, observer, and asteroid is assumed as Fig.2.11. N-body simulations including gravitational perturbations with the Moon, eight planets, (1) Ceres, (2) Pallas, (4) Vesta, and Pluto are employed for the calculation. We regard the other asteroids as massless particles. The orbital elements of the asteroids are taken from the Asteroid Orbital Elements Database (Bowell et al. 1994) distributed at the Lowell Observatory (`ftp://ftp.lowell.edu/pub/elgb/astorb.html`) at the epoch of April 14th 2010. It has 503,681 entries, which consist of 233,968 numbered and 269,713 unnumbered asteroids. Objects with large uncertainties in the orbital pa-

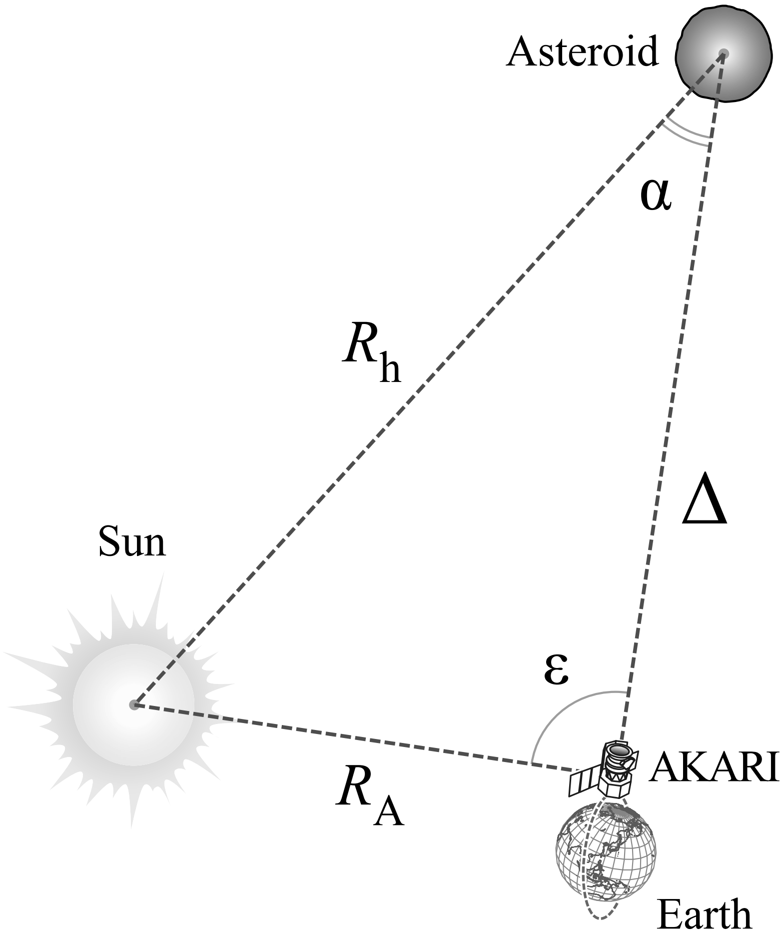


Figure 2.11 Schematic view of the geometry of asteroid observations with AKARI. The solar elongation angle (ε) is the Sun-observer-asteroid angle which is 90° ± 1° due to the strict restriction of the Sun avoidance. The phase angle (α) is the Sun-asteroid-observer angle. R_{h}, Δ, and R_{A} mean the heliocentric distance of asteroid, the observer-asteroid distance, and the Sun-observer distance, respectively. It is noted that the observed flux of an asteroid is proportional to Δ^{-2}, while temperature is proportional to ${R_{\mathrm{h}}}^{-2}$. The observer's position is set as the AKARI position, which is in a Sun-synchronous polar orbit at an altitude of 700 km.

rameters, indicated as non-zero integer flag for the orbit computation in the database, are excluded. They include 19 numbered asteroids and 8759 unnumbered. The positions of the Sun, planets, Moon, and Pluto are taken from DE405 JPL Planetary and Lunar Ephemerides in the J2000.0 equatorial coordinates at the NASA Jet Propulsion Laboratory (`ftp://ssd.jpl.nasa.gov/pub/eph/planets/`). A Runge–Kutta–Nystrom 12(10) method (Dormand et al. 1987) is used for the time integration with a variable time step.

The asteroid identification process is performed in the following steps:

(i) A two-body (i.e., the Sun and a given asteroid) problem is solved at the epoch of the orbital elements of the asteroid to estimate the velocity and acceleration.

(ii) Given the observation time of an event detected by AKARI, the position of an asteroid is calculated back to that observation time by an N-body simulation. The integration time step is initially set as 1 day, and varied appropriately later in the following calculation. The calculated position is converted to the J2000.0 astrometric coordinates (i.e., the coordinates are revised with the correction for the light-time) since the positions of the events in the All-Sky Survey are given in the J2000.0 coordinates.

AKARI has a Sun-synchronous polar orbit at an altitude of 700 km. The parallax between the geocenter and the satellite is not negligible particularly if an object is one of near-Earth asteroids. The parallax amounts to an order of $30''$ at maximum. Thus, the apparent position relative to the AKARI satellite needs to be calculated. The satellite position is obtained by interpolation of the data from the AKARI observational scheduling tool, which is based on the mean orbital elements of the satellite derived by the Tracking and Control Center, JAXA, and serves for present purposes with sufficient accuracy.

(iii) The calculated positions are compared with those of events detected in the All-Sky Survey. If the predicted position of an asteroid is located within $2.5'$ of the position of an event, the process goes to the next step.

(iv) The apparent position of the asteroid is recalculated with a higher accuracy, taking account of the correction for the light-time, the gravitational deflection of light, the stellar aberration, and the precession and nutation of the Earth's rotational axis. It takes a long computation time to use this process, and thus the calculation is made only for events tentatively associated with an asteroid in the previous step.

(v) The revised position of the asteroid is compared again with the position of the corresponding event. If the asteroid is located within $7.5''$, the position match is regarded as being sufficient and the process goes to the next step.

(vi) Then, we check the predicted V band magnitude (M_V) of the asteroid at the observation epoch. If the predicted M_V is too faint, the asteroid should not have been detected with AKARI and the identification is regarded as being false. M_V is calculated by using the formulation of Bowell et al. (1989) with the calculated heliocentric distance, "AKARI-centric" distance, the absolute magnitude (H), and the slope parameter (G), shown in Appendix A. H and G are taken from the data set of the Lowell Observatory as the same file as the orbital elements.

At the same time, the rate of change in right ascension and declination seen from AKARI, the elongations of the Sun and the Moon, the phase angle, and the galactic latitude are calculated for later processes.

If the object is brighter than $M_V < 23$, the event is concluded to be associated with an asteroid. Otherwise the event is discarded.

It should be noted that the $2.5'$ threshold of the position difference in step (iii) is determined as the maximum value of the correction for the light-time (δ), assuming a virtual asteroid with the moving speed of $v = 11000''\,\mathrm{hr}^{-1}$ at $\Delta = 0.1$ AU from the observer, as:

$$\begin{aligned}\delta &= v \cdot \Delta \cdot \tau_{\mathrm{A}} \\ &= \frac{11000}{3600}\,[''\,\mathrm{s}^{-1}] \times 0.1\,[\mathrm{AU}] \times 499.004782\,[\mathrm{s\,AU}^{-1}] \;\sim\; 2.5'\;,\end{aligned}$$

where τ_{A} is the light-time for unit distance. The $7.5''$ threshold in step (v) is determined as covering the signal shifted by 1 pixel on the detector by chance, where the pixel scale of the detector is $2.3''$; the FWHM of the point source is $5.5''$ (Kataza et al. 2010), and the position uncertainty including the corrections in step (iv) is assumed to be less than $1''$.

Table 2.4 Coefficients of the color correction factors of Eq. (2.2).

Band	a_0	a_1	a_2	a_3
$S9W$	0.984	-0.068	0.031	-0.0019
$L18W$	0.956	-0.024	0.007	-0.0003

2.2.3 Color correction and removal of spurious identification

Differences in color between asteroids and the calibration stars used in the IRC-PSC (mainly K- and M-giants; Ishihara et al. 2010) are not negligible because of the wide bandwidths of $S9W$ and $L18W$ and the continuum spectra in asteroids that cannot be assumed as being perfect blackbody or graybodies. Therefore, we empirically and approximately express the color-correction factor as a polynomial function of the heliocentric distance of the object, as:

$$F_{\mathrm{cc}} = \frac{F_{\mathrm{raw}}}{E_{\mathrm{ccf}}} , \tag{2.1}$$

and

$$E_{\mathrm{ccf}} = a_0 + a_1 R_{\mathrm{h}} + a_2 {R_{\mathrm{h}}}^2 + a_3 {R_{\mathrm{h}}}^3 , \tag{2.2}$$

where F_{cc}, F_{raw}, E_{ccf} and R_{h} are the color-corrected monochromatic flux at 9 or 18 μm, the raw in-band flux, the color correction factor, and the heliocentric distance, respectively. This formula is evaluated using the predicted thermal flux and the relative spectral response functions of the $S9W$ and $L18W$ bands. The predicted thermal flux is calculated assuming that a virtual asteroid with $d = 100$ km and $p_{\mathrm{v}} = 0.1$ is located at a heliocentric distance of between 1–6 AU with a step of 0.05 AU, where d and p_{v} are the diameter and geometric albedo, respectively. We determined the coefficients a_0, a_1, a_2, and a_3, as listed in Table 2.4. The fitting errors of Eq. (2.2) to the calculated-model flux are 6% for $S9W$ and 2.5% for $L18W$ at most. The actual values of $1/E_{\mathrm{ccf}}$ are in ranges of 1.06–0.80 for $S9W$ and 1.07–0.99 for $L18W$ for a heliocentric distance of 1–6 AU.

Up to this stage, the flux level of each event has not been taken into account in the identification procedure. We discard false identifications in the following steps based on the flux level as:

- Events with extremely large uncertainties in the flux are discarded. Here, we set the threshold of the flux uncertainty at 70.9 Jy for $S9W$ and at 95.5 Jy for $L18W$. These threshold values are determined by 5σ clipping method; i.e., the standard deviation (σ) of distribution of flux uncertainties for all events is determined and the event of the outside of the 5σ value is discarded; 47 events at $S9W$ and 101 at $L18W$ are discarded on these criteria. In fact, this step efficiently excludes events affected by the stray light near the Moon.

- The faintest sources in the IRC-PSC have fluxes of 0.045 Jy at $S9W$ and 0.06 Jy at $L18W$ (Ishihara et al. 2010). These values correspond to signal-to-noise ratios (S/N) of 6 and 3, respectively. There are a few events of which fluxes are fainter than these values in the event list. Because of the low S/N of the fluxes, it is difficult to accurately derive the size and albedo of these objects. Thus, these events are also excluded.

2.2.4 Thermal model calculation

Radiometric analysis of the identified events was carried out with the calibrated, color-corrected monochromatic fluxes described in Sect.2.2.3. We used a modified version of the Standard Thermal Model (STM: Lebofsky et al. 1986). As shown in Fig.2.11, the geometry is given by the heliocentric distance (R_h), the AKARI-centric distance (Δ), and the phase angle (α). Note that R_h and Δ are measured in unit of AU. In the STM, it is assumed that an asteroid is a nonrotating spherical body with zero thermal inertia.

The energy balance between incoming and outgoing radiation at the surface of an asteroid is written as:

$$\pi(\frac{d}{2})^2 \cdot (1 - A_\mathrm{B})\frac{S_\mathrm{s}}{{R_\mathrm{h}}^2} = \eta\epsilon\sigma(\frac{d}{2})^2 \int_{-\pi}^{\pi} \int_{-\pi/2}^{\pi/2} T^4(\theta, \varphi) \cos\varphi \, d\varphi \, d\theta \ , \qquad (2.3)$$

where d is the diameter of an asteroid, A_B is the Bond albedo, S_s is the solar flux at 1 AU, i.e., the solar constant, η is the beaming parameter, ϵ is the infrared emissivity, σ is the Stefan-Boltzmann constant, and $T(\theta, \varphi)$ is the model temperature at longitude θ and latitude φ.

In the absence of thermal inertia, temperatures are in instantaneous equilibrium with insolation, and hence the temperature distribution is simply assumed to be symmetric with respect to the subsolar point as:

$$T(\theta,\varphi) \;=\; T(\Omega) \;=\; \begin{cases} T_{\mathrm{SS}} \cdot \cos^{1/4}\Omega \ , & \text{for} \quad \Omega < \pi/2 \ , \\ 0 \ , & \text{for} \quad \Omega \geq \pi/2 \ , \end{cases} \tag{2.4}$$

where T_{SS} is the subsolar temperature, and Ω is the angular distance from the subsolar point, i.e., the solar zenith angle. In the latter case of Eq. (2.4), the Sun is below the local horizon and thus the temperature on the nightside is assumed as zero. From Eqs. (2.3) and (2.4), the subsolar temperature is given by:

$$T_{\mathrm{SS}} \;=\; \left\{ \frac{(1-A_{\mathrm{B}})S_{\mathrm{s}}}{\eta\epsilon\sigma {R_{\mathrm{h}}}^2} \right\}^{1/4} \ . \tag{2.5}$$

The Bond albedo (Bond 1861) is usually assumed as:

$$A_{\mathrm{B}} \;=\; q\, p_{\mathrm{v}} \ , \tag{2.6}$$

where q and p_{v} are the phase integral and the visible geometric albedo[5]. Based on the *H*–*G* magnitude system (see Appendix A), the phase integral is given by:

$$q = 0.290 + 0.684\, G \ , \tag{2.7}$$

where G is the slope parameter. Once the temperature distribution is determined, the emitted infrared flux at a given wavelength (λ) is calculated by numerically integrating the contribution of each surface element as:

$$F_{\lambda} \;=\; \frac{\pi}{2}\frac{\epsilon d^2}{\Delta^2} \int_0^{\pi/2} B_{\lambda}(T)\cos\Omega\, \sin\Omega\, d\Omega \ , \tag{2.8}$$

where $B_{\lambda}(T)$ is the Planck function as:

$$B_{\lambda}(T) \;=\; \frac{2hc^2}{\lambda^5} \frac{1}{\exp\left(\dfrac{hc}{\lambda k T(\Omega)}\right) - 1} \ , \tag{2.9}$$

---

[5] Objects with $p_{\mathrm{v}} > 1$ are by no means unphysical, while A_{B} is restricted to lie between 0 and 1. Indeed, some trans-Neptunian objects with extremely high geometric albedo are reported (Stansberry et al. 2008).

where c, h, and k are the the velocity of light, the Planck constant, and the Boltzmann constant, respectively.

The absolute magnitude (H) of an asteroid, which corresponds to the scattered sunlight at visible wavelengths, is related to the diameter and albedo (see Eq. (1.1) and Appendix B) by:

$$d \;=\; \frac{1329}{\sqrt{p_{\rm v}}}\,10^{-H/5}\;. \tag{2.10}$$

In applying the STM, the parameters H and G, which are used in the identification process (Sect.2.2.2), are also employed as a visible flux. The infrared emissivity is assumed to be a constant of $\epsilon = 0.9$ as a standard value for the mid-infrared (e.g., Lebofsky et al. 1986). The observed flux should be corrected to zero phase angle using the phase coefficient, which describe the decrease in brightness of an asteroid with increasing phase angle. We assume a thermal infrared phase coefficient of $\beta_{\rm E} = 0.01$ mag deg^{-1} as specified for the STM (see Appendix A). The beaming parameter (η) is used just as an empirical scaling factor, while it was originally introduced by Jones & Morrison (1974) to account for the departures from the assumption of zero thermal inertia and the anisotropy of the thermal emission towards the Sun direction. The latter is commonly recognized as “beaming” like the well-known optical opposition effect, which is considered due to surface roughness. The thermal flux of the model is calculated from Eq. (2.8) under the condition of Eq. (2.10). The process is iteratively examined until the model flux converges on the observed value by adjusting the variables, d and $p_{\rm v}$.

In the first analysis we concentrated on 55 selected, well-studied main-belt asteroids (Müller et al. 2005), whose size, shape, rotational property, and albedo are known from different measurements (occultation, direct imaging, flybys, and radiometric technique based on large thermal data sets) as listed in Table 2.10. These samples included asteroids having sizes of between $\sim$ 70 and 1000 km and albedos of from 0.03 to 0.4. The verification of the STM approach for a given AKARI asteroid is examined with this data set. Lebofsky et al. (1986) did a similar exercise for (1) Ceres and (2) Pallas and derived a beaming parameter of $\eta = 0.756$ to obtain an acceptable match between the radiometrically derived size and albedo from N band (10.6 μm) and Q band (20.2 μm) fluxes of ground-based observations and the published occultation diameters. For the AKARI data set of $S9W$ and $L18W$, we adjusted the beaming parameter to obtain the best fit in the size and albedo between the values derived from the AKARI 2-band data and the known values. The best fit was obtained with $\eta = 0.87$ for $S9W$ and 0.77 for $L18W$. We also attempted to fit the 2-band data simultaneously with a single η for those objects for which both data were available at the same epoch. However the overall match became significantly worse. We therefore decided to use different values of η for each band.

2.2.5 Final adjustment and creation of the catalog

Thermal model calculations provide unreasonable values (either too bright or too dark) for some asteroids. They are regarded as false identification. We set the threshold of albedo at $0.01 < p_\mathrm{v} < 0.9$ and those being outside the range were discarded. The number of the discarded events at this stage was 178 for $S9W$ and 53 for $L18W$, ~ 1 % of the total identified events.

To obtain the final product, we took means of the size and albedo with the weight of the S/N for each object. For the IRC All-Sky Survey data, the S/N is given as a function of the measured flux (see Fig.15 in Ishihara et al. 2010). For the asteroids, $\sim 68\%$ of $S9W$ and 74% of $L18W$ events reach the maximum S/N values, $S/N = 15$ for $S9W$ and $S/N = 18$ for $L18W$. The corresponding flux is ~ 0.6 Jy at $S9W$ and ~ 1.0 Jy at $L18W$. If all the fluxes of an asteroid are above these values, the weighted mean is equal to a simple arithmetic mean.

Finally, a total of 5120 objects (5092 numbered and 28 unnumbered asteroids) were included in the catalog of the AKARI asteroid survey, named *the Asteroid Catalog Using AKARI*, or *AcuA*.

2.3 Evaluation of the asteroid catalog

2.3.1 Uncertainty of the catalog data

One of the major contributions that cause uncertainties in the size and albedo is the uncertainty of the observed fluxes of the asteroids. It is expressed in terms of the S/N of the fluxes of the events in the IRC-PSC. As mentioned in Sect.2.2.5, the S/N reached a plateau at $S/N = 15$ for $S9W$ and $S/N = 18$ for $L18W$. Thus, even for the best cases the uncertainties in the fluxes for $S9W$ and $L18W$ are 6.7% and 5.6%, respectively. These directly resulted in uncertainties in the size of 3.3% and 2.8% and in the albedo of 6.7% and 5.6%. It was inherent component in this work.

The absolute magnitude (H) was adopted from the same data set of the Lowell Observatory, as the orbital elements described in Sect.2.2.2. The uncertainty in H is given as three levels: 0.5, 0.05, and 0.005 mag in the dataset. We suspect that H has a large uncertainty, and is probably larger than those cataloged in some cases. Thus, we decided to give a constant uncertainty of 0.05 mag for those objects listed with uncertainties of 0.005mag (963 asteroids) and 0.05 mag (4157 asteroids) of our 5120 cataloged asteroids, rather than using the original uncertainties in the data set. This corresponds to a 4.6% uncertainty in albedo and less in size. The slope parameter (G) was also taken from the data set of the Lowell Observatory. In our cataloged asteroids, 5015 objects were assumed as $G = 0.15$, and others were provided severally. The uncertainty of G was assumed to be 0.02 uniformly. It has a small influence on the derived size and albedo, as expected in Eq. (2.7).

In our catalog, these three parameters, i.e., the observed fluxes, H and G are considered as the contributed factors for the uncertainties in the size and albedo. From these combinations, a typical value of uncertainties in size is 4.7%, and that in albedo is 10.1%. The other components discussed below were not used for the uncertainty calculation, because they were not appropriately quantified in this work.

In this work, we applied the STM (Sect.2.2.4) to derive the size and albedo. It is assumed that an asteroid is a nonrotating, spherical body at a limit of zero thermal inertia. Thus, the flux variation due to rotation of an object was neglected (it is reasonably a good assumption for larger asteroids to have a flat surface and no thermal inertia; Delbó et al. 2007). Detailed investigations require further information on the object, such as the individual shape model, the direction of the spin vector, and so forth. Since continuous observations with AKARI have at least a 100 min interval (one orbital period of the satellite) inevitably, lightcurves with fine time resolution cannot be obtained (one example is shown in Sect.2.3.9). Therefore, it is difficult to determine the detailed model parameters solely by the AKARI observations. It is known that many asteroids have large amplitude (~ 30 %) in the lightcurves (Warner et al. 2009a). This adds $\sim$ 3–10% uncertainties in size, especially for asteroids with a small number of detections. Therefore, the uncertainties in the size and albedo originating from the flux uncertainty could be larger for those asteroids.

The model parameters in the STM are the emissivity (ϵ), the thermal infrared phase coefficient ($\beta_{\rm E}$), and the beaming parameter (η). The first two parameters are given as fixed values in advance. Because of a severe constraint on the solar elongation, it is difficult to make observations with AKARI from several different phase angles. For this reason, the phase coefficient was fixed as $\beta_{\rm E} = 0.01$ mag deg^{-1} in the present analysis. Different values were used for the beaming parameter (η) for $S9W$ and $L18W$. The different values were chosen to adjust the derived size and albedo to those reported in previous works (Sect.2.2.4 and Table 2.10). The failure of the single value of η to provide good results in previous works may stem from the invalid assumptions in the STM. The beaming parameter is in fact not a physical quantity, but rather introduced to account for the observation empirically. AKARI did not observe an asteroid with the two bands simultaneously, which could affect the way of the adjustment of η at the two bands. The uncertainty of η, a 5% change in η, leads to $\sim$ 4% at $S9W$ and $\sim$ 2% at $L18W$ in size and $\sim$ 8% at $S9W$ and $\sim$ 5% at $L18W$ in albedo, depending slightly on the albedo of the object.

The geometry is given by the heliocentric distance, the AKARI-centric distance, and the phase angle (Fig.2.11) . These are dependent on the position accuracy of the IRC-PSC (less than $2''$, Ishihara et al. 2010), and the uncertainties of the obtained catalog values are negligible.

Based on more recent studies, the uncertainties of the thermal model calculation can be reevaluated. Pravec et al. (2012) calculated the absolute magnitudes for 583 asteroids from their dedicated photometric observations over thirty years. When compared with the existing database, the difference in absolute magnitude between the database values and their new estimation is about 0.08 within the range of $H < 10.3$. The divergence of the slope parameter is also given in Pravec et al. (2012) as about 0.083, though this has little influence on the infrared fluxes, at less than one percent. The variation of the beaming parameter is given as 0.157 from Masiero et al. (2011). These lead to new estimates in the typical uncertainties of AcuA in the diameters to 13.6%, and those in the albedo to 28.1%.

2.3.2 Total number and spatial distribution

The number of asteroids identified in the AKARI All-Sky Survey is summarized in Table 2.3. The distribution of events in the sky for each processing step described in Sect.2.2 is shown in Fig.2.12. The net number of asteroids detected with $S9W$ and $L18W$ in total is 5120. The number of the asteroids detected at $L18W$ is larger than that at $S9W$ by about twice. The number of the point sources detected at $S9W$ in the IRC-PSC is approximately four-times as many as that at $L18W$. The opposite trend can be explained by the different spectral energy distribution of the objects; asteroids have typical effective temperatures of around 150 K and radiate thermal emission with a peak wavelength of $\sim$15 μm, which can preferentially be detected at $L18W$, even if the difference in the sensitivity is taken account (Fig.2.9). Stellar sources emit radiation with the peak wavelength at UV to visible, and are thus detected with a higher probability at $S9W$. This color trend can be found also in Fig.2.12; Fig.2.12 (b) seems bluish because the stellar and galactic sources dominate in the IRC-PSC (the major contribution is the sources detected at $S9W$), while Fig.2.12 (d) seems reddish. A significant fraction of asteroids, particularly in the main-belt rather than the near-Earth, are detected only at $L18W$, but undetected at $S9W$ because of the steep decrease in the thermal radiation in Wien's domain.

Figure 2.13 shows the distribution of the identified asteroids projected on the ecliptic (i.e., the face-on view). NEAs, MBAs, and the Jovian Trojans are included, while Centaurs and trans-Neptune objects were not detected in our survey. Among the AcuA asteroids, the closest approach to the Earth during the All-Sky Survey is 2007 AG on December 29th 2006, at the geocentric distance of 0.037193 AU (14.5 times of the distance between the Earth and the Moon). The closest approach to the Sun is (3200) Phaethon on August 8th 2006, at the heliocentric distance of 0.140831 AU (0.37 times of the semimajor axis of Mercury). Figure 2.13 displays the location of the 5120 asteroids at the epoch of August 27th 2007. It shows the distribution of asteroids without any bias or survey gap.

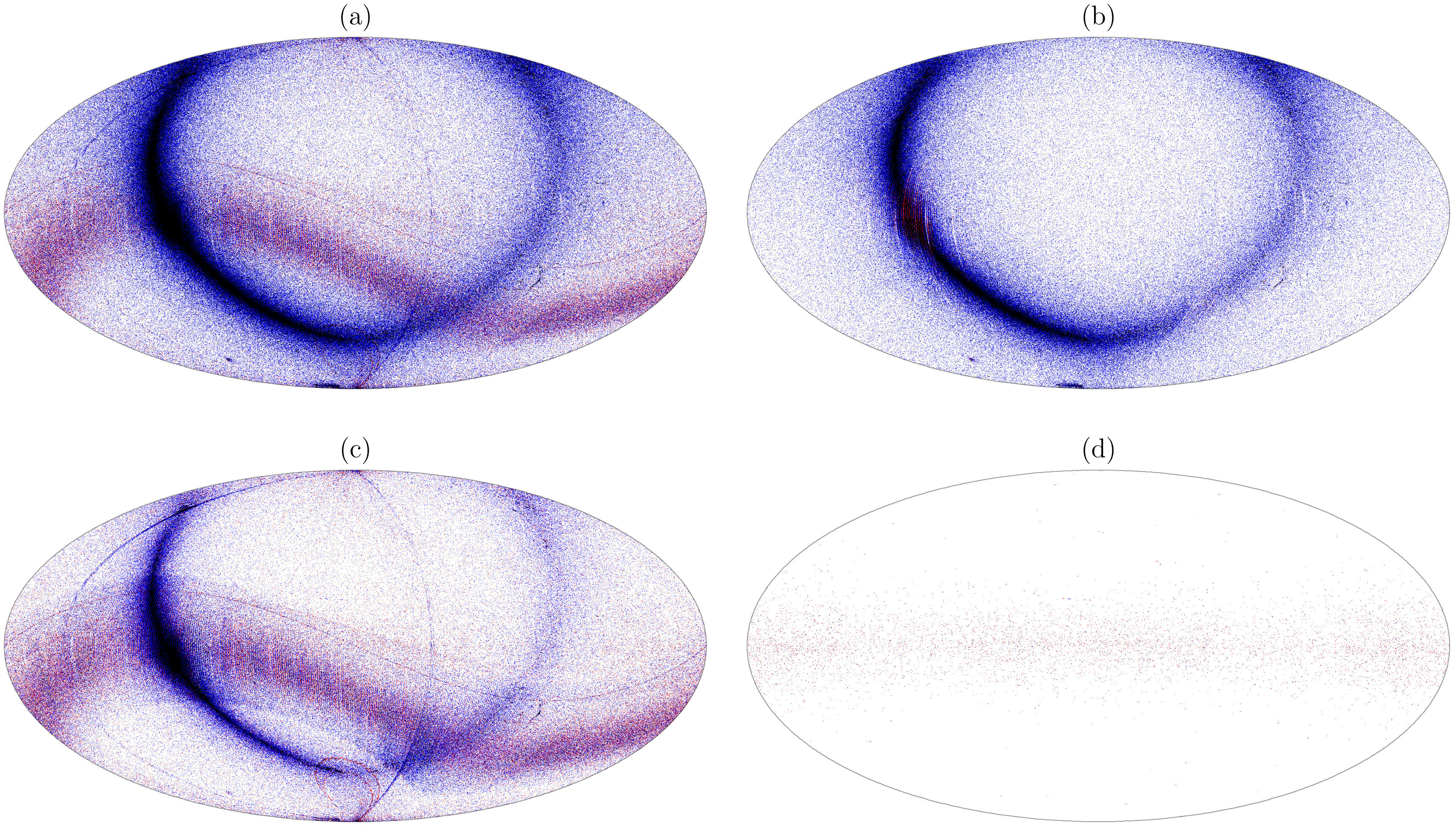


Figure 2.12 Distribution of the events in the whole sky in the ecliptic coordinate with the Hammer-Aitoff projection. Blue and red dots denote the events at $S9W$ and $L18W$, respectively. (a) all events detected with the All-Sky Survey, (b) the events employed in the IRC-PSC, (c) the residual events, (d) the events identified with asteroids. Number of events plotted in each panel is summarized in Table 2.3. Note that 20,684 dots in total are plotted in panel (d), while it is too faint for printing.

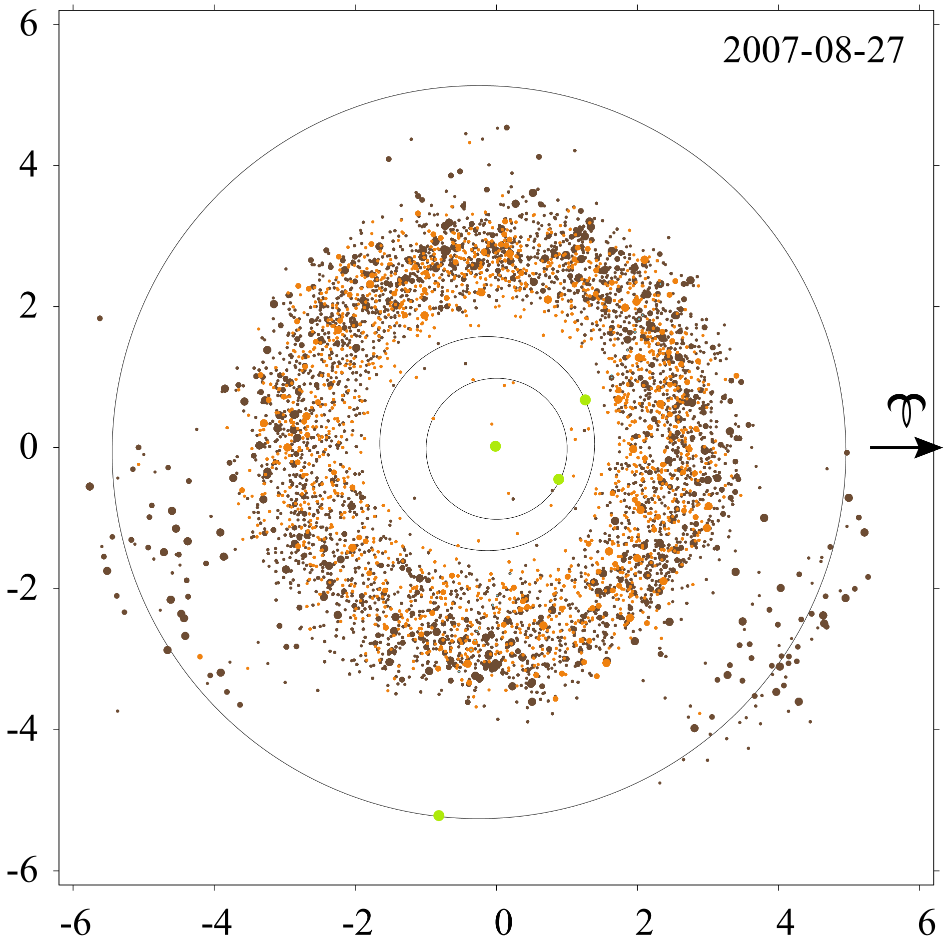


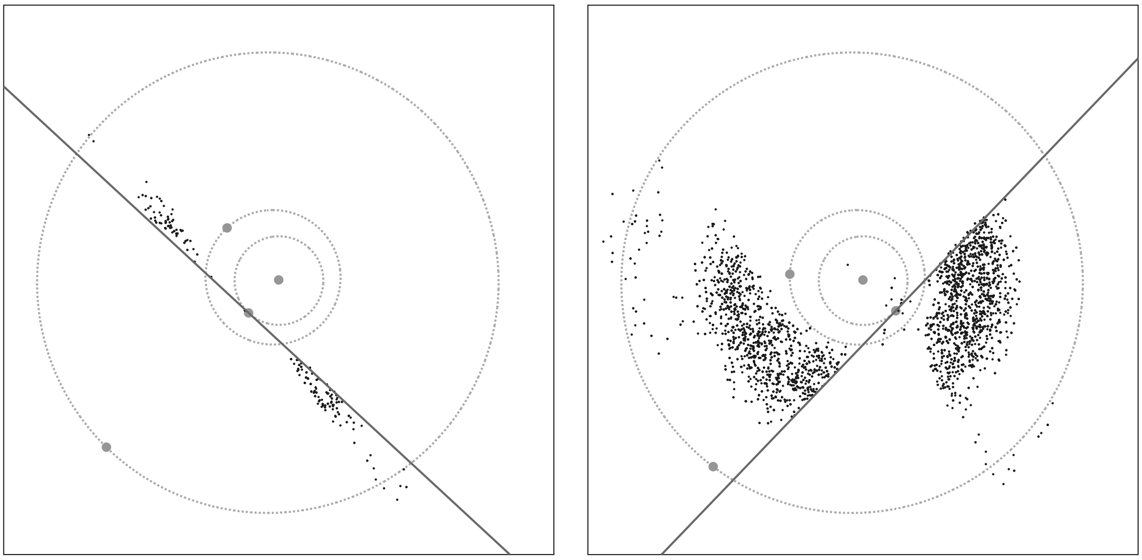
Figure 2.13 Distribution of the identified asteroids projected on the plane of the ecliptic as of August 27th 2007. The circles indicate the orbits of the Earth, Mars, and Jupiter from inside to outside. The size and albedo of asteroids are distinguished by different sizes and colors of dots (orange: $p_{\mathrm{v}} > 0.1$; brown: $p_{\mathrm{v}} \leq 0.1$). The arrow shows the direction of the vernal equinox.

2.3.3 Completeness of the survey

Geometrical completeness

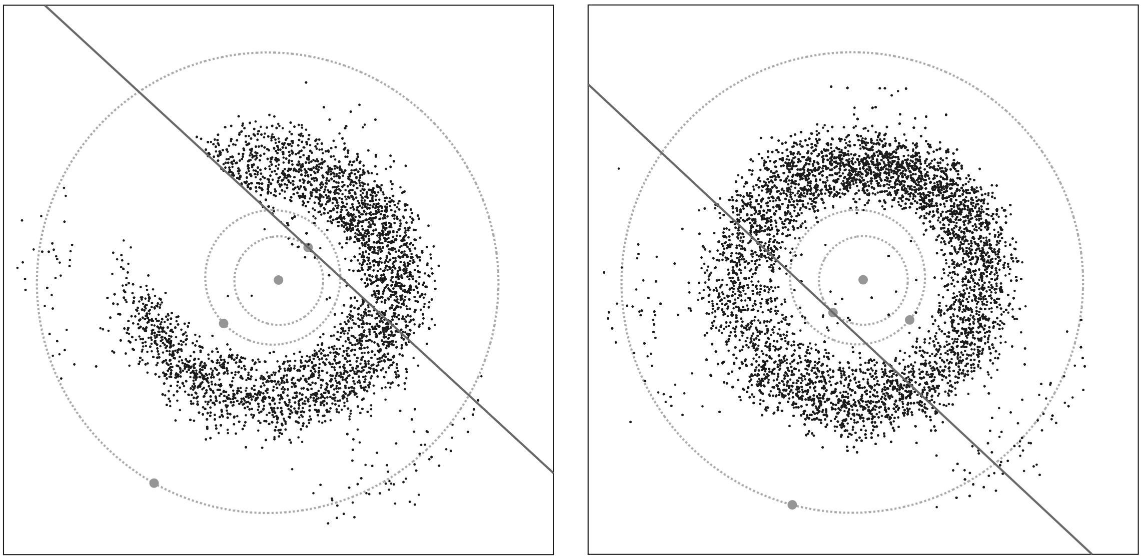
There is no significant survey gap seen in Fig.2.13, which is provided by the 16-month All-Sky Survey. In general, thanks to the property of the Sun-synchronous polar orbit, the whole sky can in principle be covered in half a year with AKARI. Solar system objects, however, cannot be fully covered in half a year due to their orbital motions. The progress of the survey is shown in Fig.2.14. Even half a year after the beginning of the survey (Fig.2.14 (c)), the distribution of detected asteroids is seen as an inverse "C" shape, and still has an undetected gap in the main belt region. This gap is filled after a year passed (Fig.2.14 (d)).

For a quantitative discussion about the geometrical completeness of AKARI asteroid survey, we employ a simple calculation. Let us assume an asteroid has a prograde and perfectly circular orbit on the ecliptic, i.e., an orbit with zero inclination and zero eccentricity. The viewing direction of AKARI is fixed at a solar elongation of 90°, which means that asteroids are observed at the quadrature point (note that all asteroids detectable with AKARI are obviously in superior orbits). As seen in Fig.2.15, orbital path of an asteroid is divided into two arcs; one is from the western quadrature, passing the conjunction, and reaching the eastern quadrature, and the other is from the eastern quadrature, passing the opposition, and reaching the western quadrature. The former is longer than the latter. The elapsed time between two passages through the quadratures is calculated numerically. The result is shown in Fig.2.16. Considering the maximum time of which an asteroid was swept at least once by the sighting of the All-Sky Survey of AKARI, the longer elapsed time (the western quadrature – the conjunction – the eastern quadrature; red line in Fig.2.16) is examined. It takes more than years to cover an asteroid near the Earth, while the elapsed time decreases with the increase of the heliocentric distance, and asymptotically approaches to half a year. For the innermost MBAs ($a \sim 2.0$ AU), it can be detected with at least one year survey. The 16-month cryogenic phase of AKARI is enough to cover the MBAs and further objects. The same study was done for the IRAS asteroid survey (Tedesco 1994) and was resulted that their survey completeness around $a = 2.0$–3.0 AU is 94.4%, while the situation of the IRAS survey is much complicated because IRAS had a freedom of the



(a) 2006/05/08

(b) 2006/08/09



(c) 2006/11/10

(d) 2007/05/09

Figure 2.14 Distribution of identified asteroids projected on the ecliptic as of some epochs. The orientation is the same as in Fig.2.13. Four panels shows (a) the beginning of the nominal observation, (b) three months after the beginning, (c) six months after, and (d) 12 months after. At the end of the survey, 16 months after, the distribution is shown in Fig.2.13. Gray straight line denotes the direction of AKARI survey at that moment. It is noted that there are already several asteroids appeared at the initial phase in panel (a), because data taken in the PV phase (see Table 2.2) prior to the nominal observation are included.

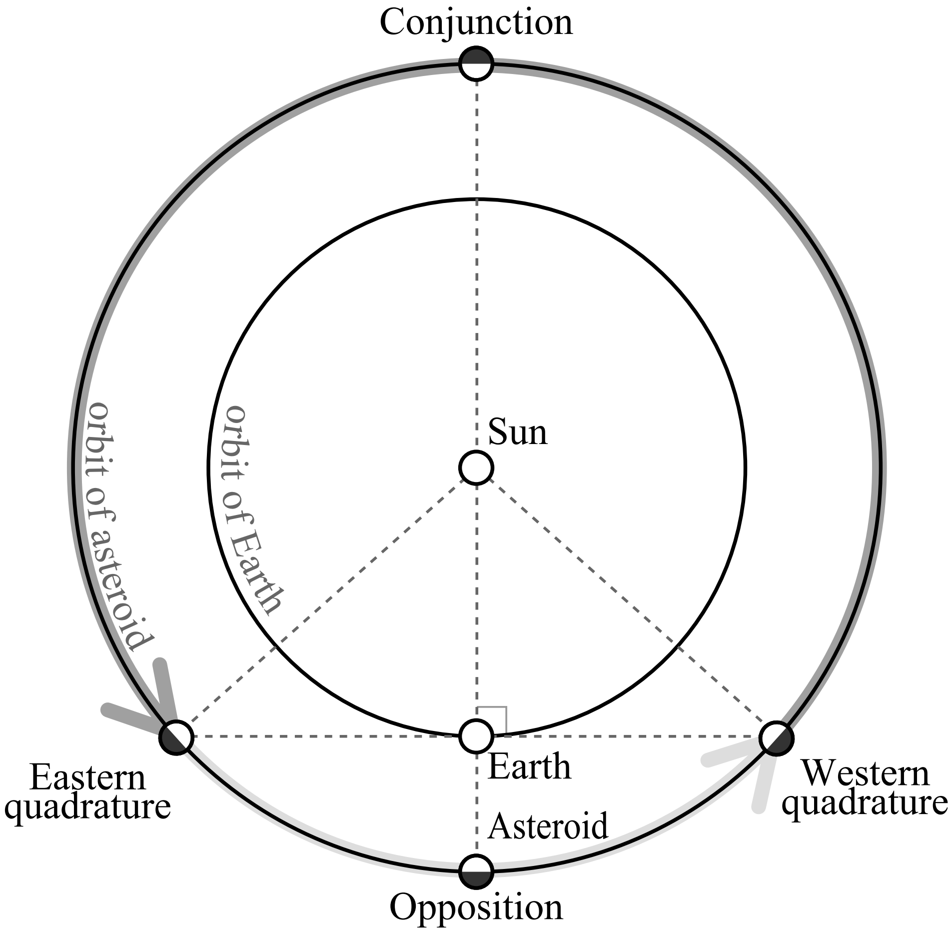


Figure 2.15 Schematic view of the geometry of the Earth and an asteroid motions. For a simple calculation, a perfectly circular orbit of asteroid is assumed (see text).

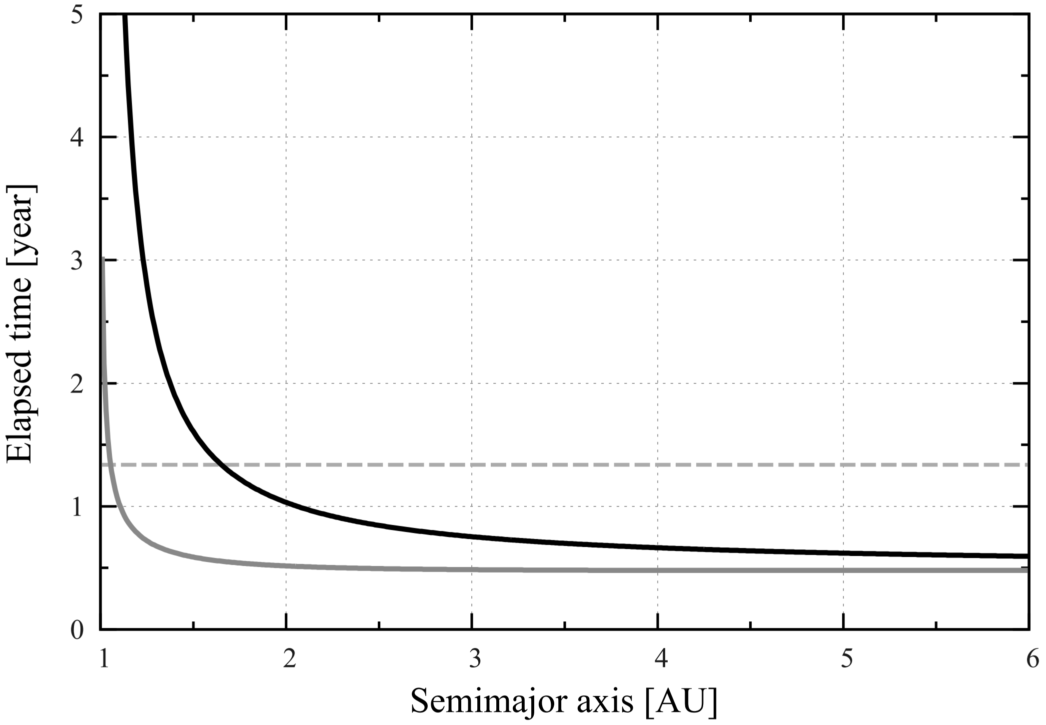


Figure 2.16 The elapsed time between two passages of the quadratures of asteroid shown in Fig.2.15 against its semimajor axis. Black line denotes the time from the western quadrature to the eastern quadrature, and gray one denotes that from the eastern quadrature to the western quadrature. Gray horizontal line indicated the 16 months of the AKARI cryogenic phase.

solar elongation angle ranging from 60° to 120°.

Completeness of detection

Figure 2.17 shows the distribution of H for the AcuA asteroids. This figure can be interpreted as reflecting the completeness of detections of known asteroids with size and albedo data. AcuA, which was constructed based on 16 months of the All-Sky Survey data, provides a complete data set of all asteroids brighter than absolute magnitude of $H < 9$ within the semimajor axis of $a < 6$ AU, and $H < 10.3$ for all MBAs. $H < 10.3$ for MBAs corresponds to $d > 20$ km in size.

Actually, there is one asteroid with $H < 9$ that was not detected wit AKARI: 1927 LA ($H = 8.81$). This belongs to the outer MBAs and has an expected size of $d = 77$ km, assuming $p_{\rm v} = 0.09$. The discovery of 1927 LA was reported in 1927 by Albrecht Kahrstedt at the Heidelberg-Königstuhl Observatory, Germany, but it was a single-apparition with only three observations, and one of them was noted as being in question (refer to Astronomische Nachrichten 232, 257 (1928) and also to the Minor Planet Center). No further observational study has identified 1927 LA since these studies and, as such, we consider its existence is doubtful at present.

Then, another aspect arises: Is there no any other asteroid, which is brighter than $H < 9$? It is a kind of the *"evidence of absence"* problem. Here one approach is taken to examine the existence of undiscovered asteroid as the relation between the absolute magnitude of asteroid and the time of its discovery, shown in Fig.2.18. For the numbered asteroids, the discovered dates are found in the database of the minor planet center (`http://www.minorplanetcenter.net/iau/lists/NumberedMPs.txt`). For the unnumbered, the discovered times are inferred from their provisional designations. From this figure, it it clearly found that the discoveries of asteroids are getting deeper and the number of fainter objects is growing. Focused on the objects around $H \sim 9$ of the enlarged panel in Fig.2.18, the latest discovery of object brighter than $H < 9$ is (5144) Achates, discovered on December 2nd 1991 by Shoemaker, C. S. (refer to the Minor Planet Circular 19621). The second one, just below of $H = 9$ is (15436), discovered on November 10th 1998 by LINEAR (the Minor Planet Circulars Supplement 3163). Both of these two are the

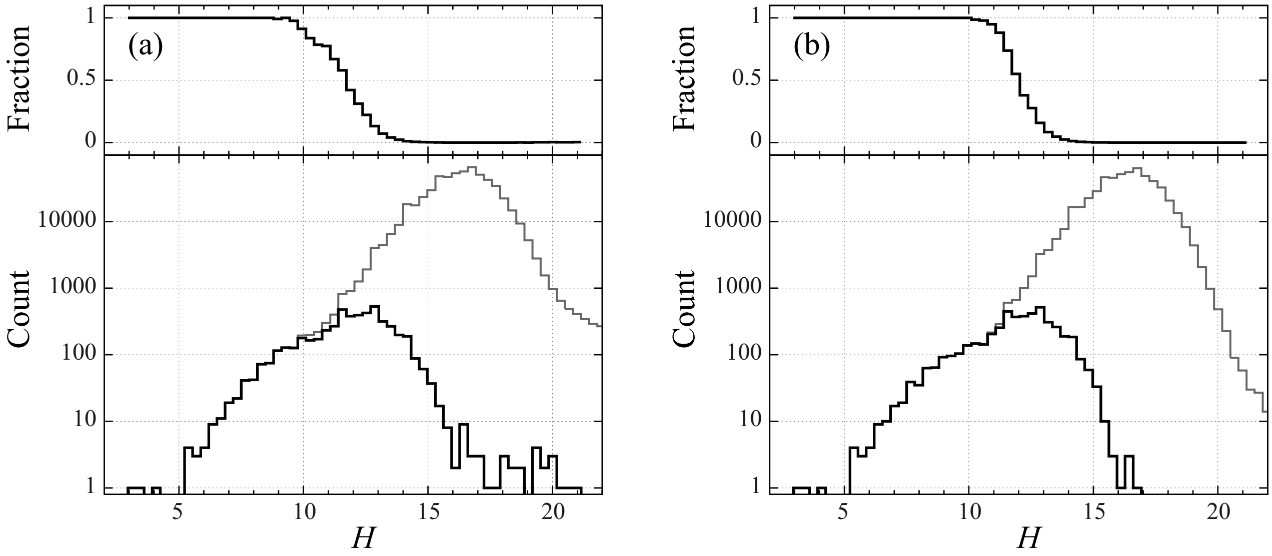


Figure 2.17 Distribution of absolute magnitude (H) for asteroids detected by AKARI with known orbits; (a) total asteroids within $a < 6$ AU, (b) total MBAs. The upper panel of each figure shows the fraction of detected asteroids of the total known asteroids, and the lower panel shows the distribution of detected asteroids (black line) and that of total asteroids with known orbits (gray line). The bin size is set to 60 segments for H range of 2–22.

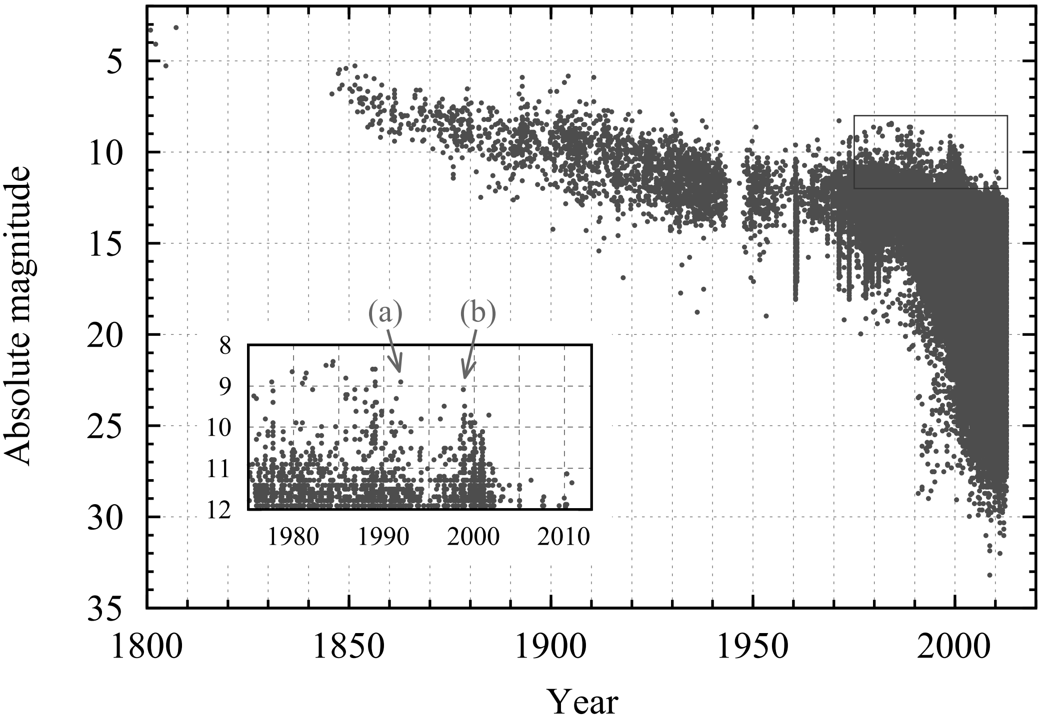


Figure 2.18 Distribution of the absolute magnitude of discovered asteroids against the time of their discovery. (a) is (5144) Achates ($H = 8.9$), and (b) is (15436) ($H = 9.1$). It should be recalled the chronology of discovered asteroids in Fig.1.1.

Trojans. During the following 15–20 years, no asteroid brighter than $H < 9$ is discovered, in spite of the recent active and dedicated survey programs (see Table 1.1). For the reason, we conclude that the sample in AcuA asteroids with an absolute magnitude brighter than $H < 9$ is indeed complete.

2.3.4 Number of detections per asteroid

Figure 2.19 illustrates the number of detections of each asteroid with the AKARI All-Sky Survey. For comparison, we also plotted the number of detections for the point sources in the IRC-PSC around the plane of the ecliptic, which included galactic and extragalactic objects. AKARI basically observed a given portion of the sky at least twice in contiguous scans. Hence, a point source should have been observed four times at $S9W$ and $L18W$ in total. Because the lifetime of the AKARI cryogenic mission phase was 16 months, it observed a given portion of the sky at three different seasons. Accordingly, AKARI should have observed a point source on the ecliptic 12 times. The number could decrease because of the disturbance due to the SAA and the Moon or increase by the offset survey described in Sect.2.1.2. For the solar-system objects, the situation becomes complicated due to their orbital motions. Considering the rate of change in the ecliptic longitude ($d\lambda/dt$), there are only five objects in the AKARI catalog of $1.8'\,\mathrm{hr}^{-1} < d\lambda/dt < 4.0'\,\mathrm{hr}^{-1}$; (137805) ($2.96'\,\mathrm{hr}^{-1}$), P/2006 HR30 ($3.50'\,\mathrm{hr}^{-1}$), (85709) ($2.95'\,\mathrm{hr}^{-1}$), (7096) Napier ($1.93'\,\mathrm{hr}^{-1}$), and (7977) ($2.66'\,\mathrm{hr}^{-1}$), while the scan path of the All-Sky Survey shifts $\sim 2.47'$ hr^{-1} ($= 360^\circ\,\mathrm{yr}^{-1}$) in the ecliptic longitude (i.e., in the cross-scan direction). The orbits of these objects are illustrated in Fig.2.20. These objects, except for (7977), have a large number of detections, e.g., more than 15 times, suggesting that they keep up with the scan direction: 33 times for (137805), 23 times for P/2006 HR30, 22 times for (85709), and 15 times for (7096). Although P/2006 HR30 is classified as a Halley-type comet (Hicks & Bauer 2007) and its cometary activity is reported (Lowry et al. 2006), we include this object as an asteroid in this work; (7977) has only 3 detections at $S9W$, due to interference with pointed observations as well as to the "negative" effect of the offset survey. (366) has $d\lambda/dt = 0.49'\,\mathrm{hr}^{-1}$, which is out of the range of the “keep up” speed mentioned above, but it was observed 16 times. It has three seasons to be observed, and at one of them

(November 2006) the number of detections increased by the "positive" effect of the offset survey.

The present catalog contains only asteroids orbiting in the same direction as the Earth and no asteroids with retrograde motion (see Sect.1.2.3) are included . The sources with multiple detections are generally more reliable in terms of the confirmation. The IRC-PSC only includes objects that are detected at the same position at least twice. The present catalog has 5120 asteroids with $N_{\rm ID} \geq 1$, and 3771 asteroids with $N_{\rm ID} \geq 2$, where $N_{\rm ID}$ is the number of events with $S9W$ and $L18W$ in total. It should be noted that the catalog includes asteroids with single detection ($N_{\rm ID} = 1$). The number of detections is listed in the catalog (Appendix E).

2.3.5 Size and albedo distribution

Figure 2.21 shows the distribution of albedos as a function of the diameter for the AcuA asteroids. An outstanding feature is the bimodal distribution in the albedo. It is also suggested that the albedo increases as the size decreases for small asteroids ($d < 5$ km), although the number of asteroids with a size of $d < 5$ km is not large. In the catalog, the smallest asteroid is 2006 LD1, whose size is $d = 0.12 \pm 0.01$ km, $p_{\rm v} = 0.51 \pm 0.09$. The largest one is naturally (1) Ceres of $d = 970 \pm 13$ km, $p_{\rm v} = 0.09 \pm 0.01$.

Figure 2.22 illustrates histograms of the AcuA asteroids as a function of the size or the albedo. For comparison, the results of the IRAS observations are also plotted. The IRAS catalog consists of 2228 objects with multiple detections and 242 objects with single detection (at 12 μm band). It clearly indicates that the AKARI All-Sky Survey is more sensitive to small asteroids than IRAS. Concerning with the size distribution of asteroids, the number is supposed to increase monotonically with the decrease of the size. Figure 2.22 (a), however, shows maxima at $d = 15$ km for AKARI and 30 km for IRAS. The profiles of the histogram are similar to each other for those larger than 30 km, suggesting that AKARI and IRAS exhaustively detect asteroids of size $d > 30$ km and $d > 15$ km, respectively, but that the completeness rapidly drops for asteroids smaller than these values. We discuss further the size distribution in the following section. Figure 2.22 (b) clearly indicates that the albedo of the asteroids has the well-known bimodal distribution (e.g., Chapman et al.

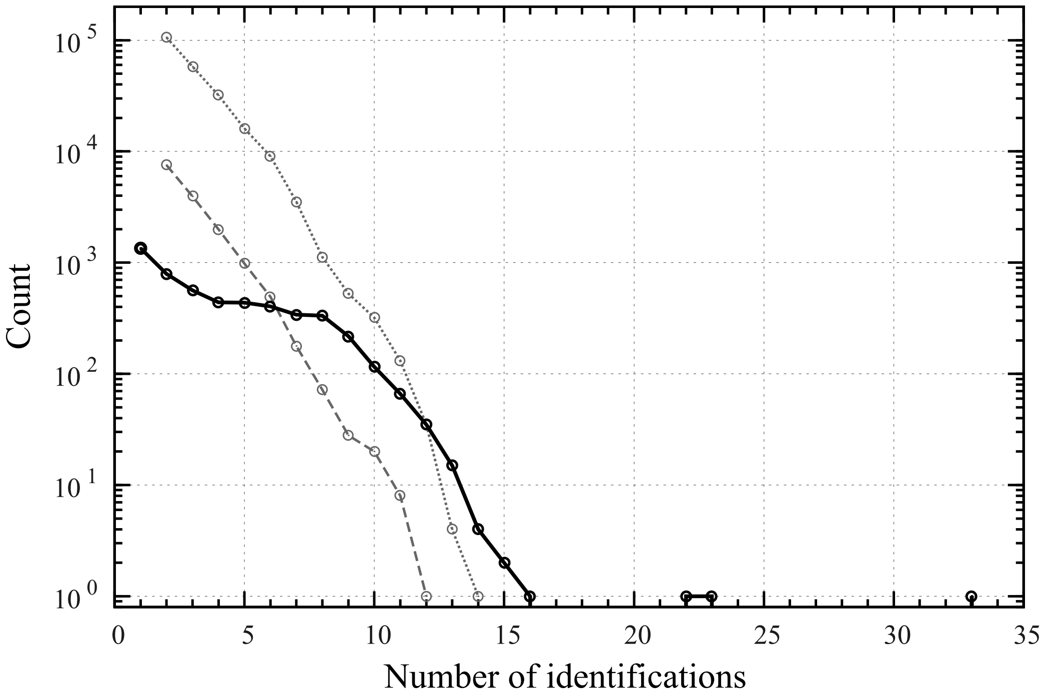
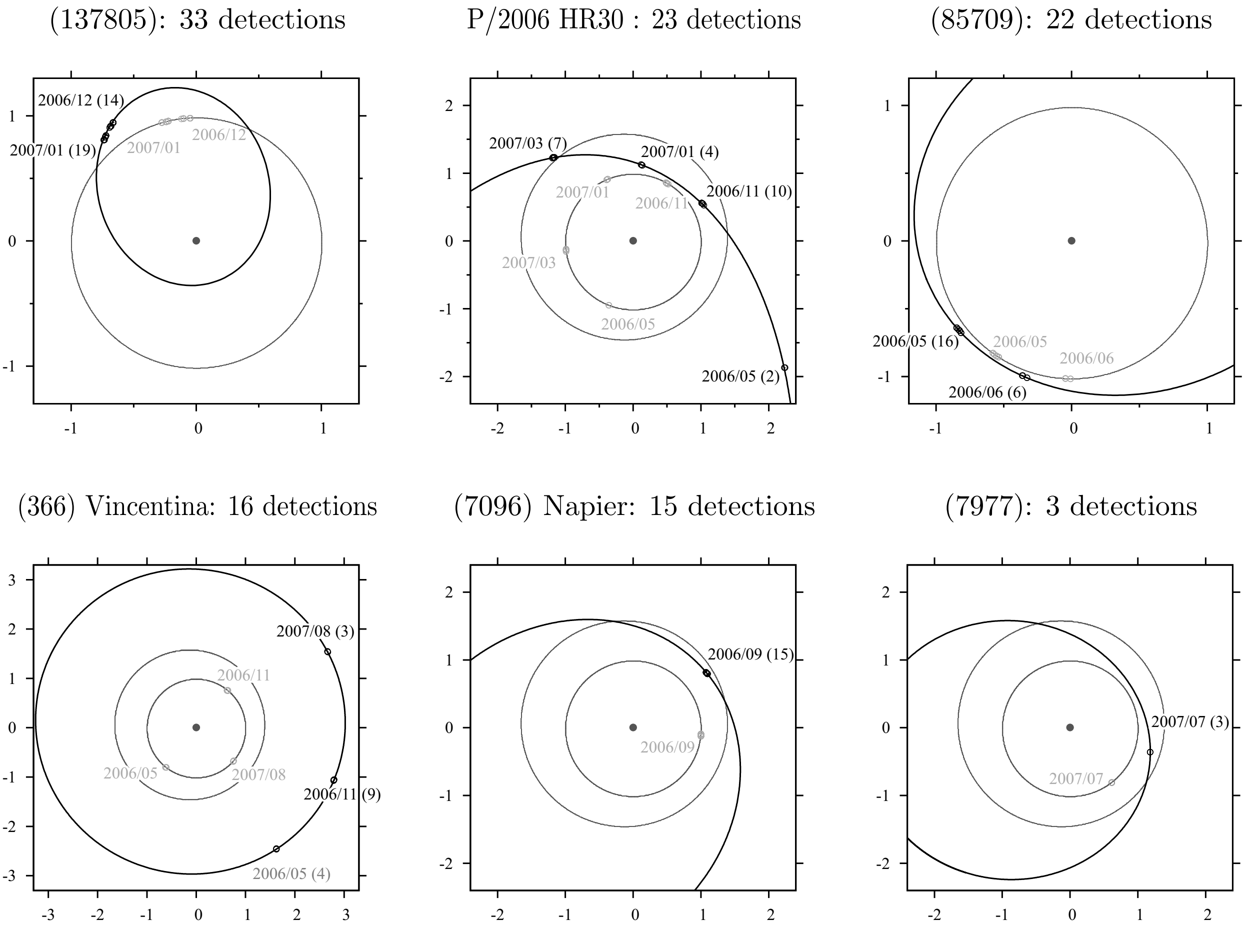


Figure 2.19 Histogram of the number of detections of the asteroids identified with the AKARI All-Sky Survey (solid line). The objects with extremely large numbers are (137805) with 33 detections, P/2006 HR30 with 23, (85709) with 22, and (366) Vincentina with 16. The gray dashed and dotted lines show the numbers of events with the sum of $S9W$ and $L18W$, which are used as input to the IRC-PSC (Kataza et al. 2010), for $|\beta| < 1°$ and $|\beta| < 15°$, respectively, where β is the ecliptic latitude of the source.


(137805): 33 detections

P/2006 HR30 : 23 detections

(85709): 22 detections

(366) Vincentina: 16 detections

(7096) Napier: 15 detections

(7977): 3 detections

Figure 2.20 Orbits of asteroids with a large number of detections projected on the ecliptic; (7977) is an exceptional case in this figure (only 3 detections, see text). The black and gray open circles indicate the positions of the asteroids as of their detection date, and those of the Earth, respectively. The numbers of detections are given in the parentheses following the year/month of the observations. The orientation is the same as in Fig.2.13, but the scale is different.

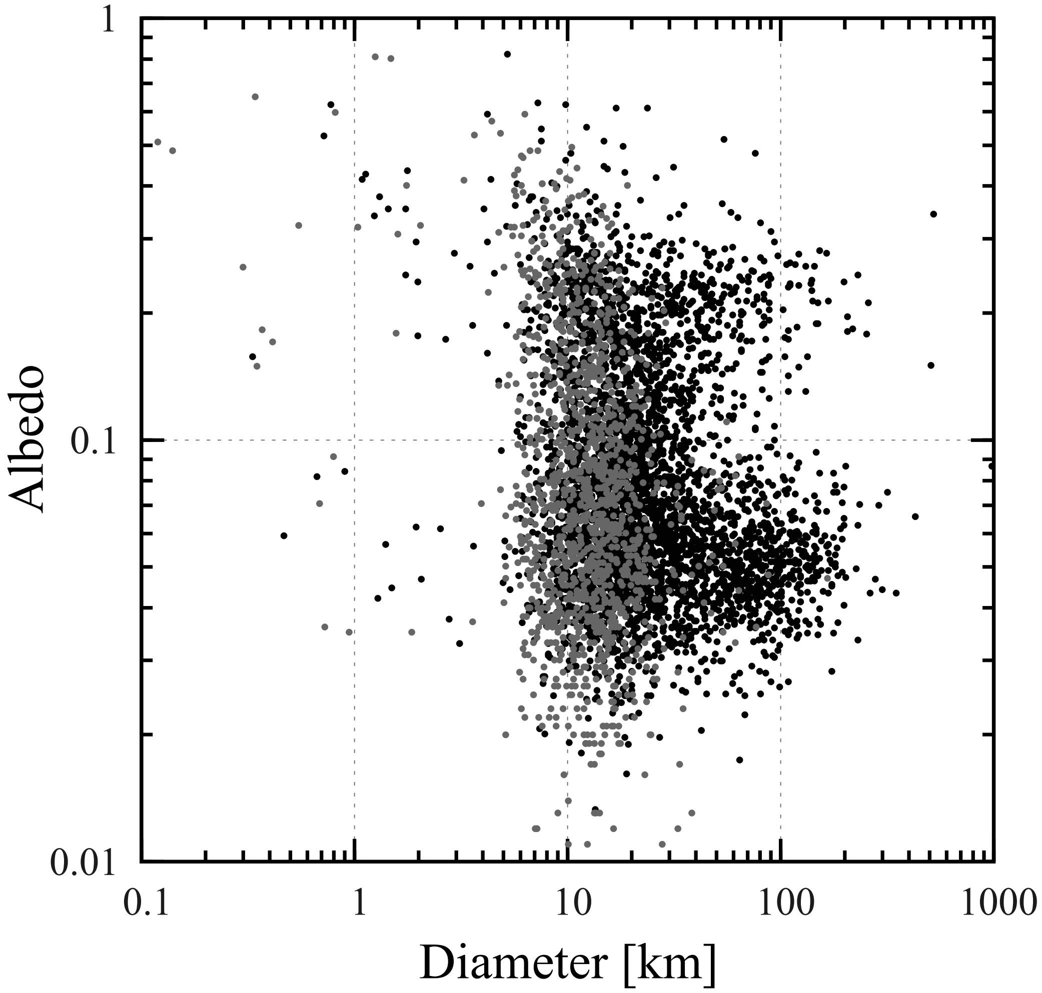


Figure 2.21 Distribution of the diameter and albedo of all the 5120 identified asteroids. Black dots show those with more than two events, and gray ones indicate those with single-event detection.

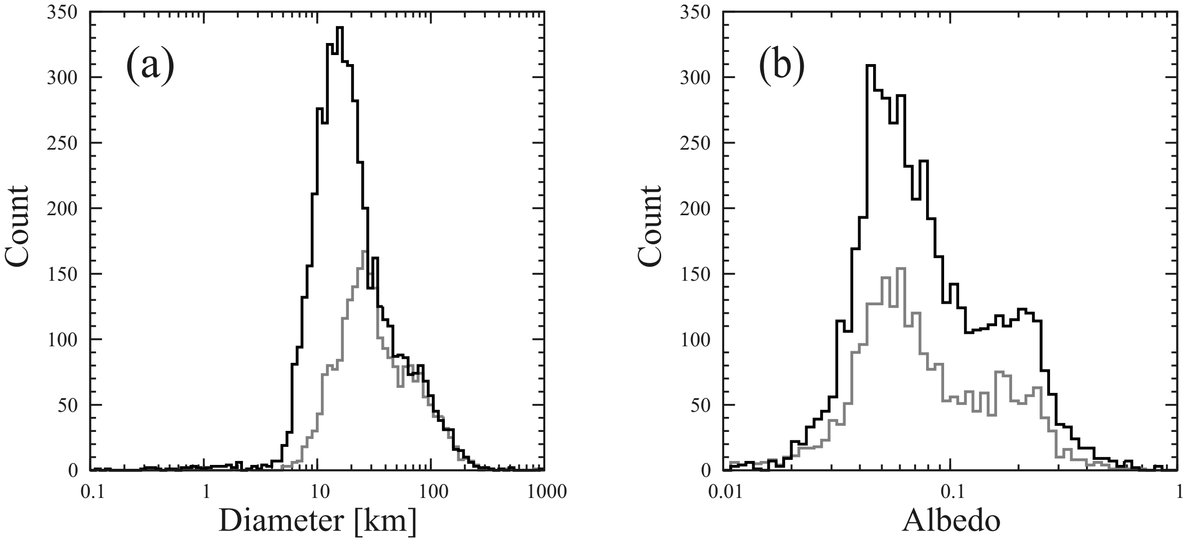


Figure 2.22 Histograms of (a) the size and (b) the albedo. Black and gray lines indicate the results from the AKARI and IRAS observations (Tedesco et al. 2002a), respectively. The bin size is set at 100 segments for the range of 0.1 km to 1000 km in the logarithmic scale for (a) and 100 segments for the range of 0.01 to 1.0 in the logarithmic scale for (b).

1975). The bimodal distribution can be attributed to two groups of taxonomic types of asteroids. The primary peak at around $p_{\rm v} = 0.06$ is associated with C and other low-albedo types, and the secondary peak at around $p_{\rm v} = 0.2$ with S and other types with moderate albedo. Further discussion concerning about the taxonomic types is presented in Chapter 3.

2.3.6 *V* band magnitude of the identified asteroids

Figure 2.23 shows the calculated V band magnitude (M_V) against the color-corrected monochromatic flux of those events identified as asteroids; 3771 asteroids have multiple events in the AKARI All-Sky Survey. For example, (4) Vesta was observed with flux values of 134–139 Jy at $S9W$ (2 times) and 474–604 Jy at $L18W$ (3 times) with $M_V = 7.3$; (1) Ceres was observed with flux values of 127–142 Jy at $S9W$ (3 times) and 497–853 Jy at $L18W$ (4 times) with $M_V = 8.9 - 9.0$; (7) Iris was observed with flux values of 37–96 Jy at $S9W$ (3 times) and 238–254 Jy at $L18W$ (4 times) with $M_V = 9.3 - 9.4$. The bimodal characteristic is also seen in Fig.2.23. A sharp cutoff of the flux below ~0.1 Jy is the result of rejection of faint objects in the catalog processing (Sect.2.2.3).

We set a threshold for M_V in the identification process (in step (vi) in Sect.2.2.2). Those objects of faintest M_V in Fig.2.23 are (67999) 2000 XC32 with $M_V = 19.8$ at $S9W$ and (102136) 1999 RO182 with $M_V = 20.3$ at $L18W$. It should be noted that both objects were observed only once. This result confirms that the threshold of $M_V = 23$ in Sect.2.2.2 is reasonable to select real asteroids.

2.3.7 Detection limit of the size of asteroids

Figure 2.24 shows the estimated size of the asteroids as a function of the heliocentric distance at the epoch of the AKARI observation. It is reasonable that smaller asteroids were detected more in near-Earth orbits. No asteroids were detected inside of the Earth orbit, because the viewing direction of AKARI was fixed at a solar elongation of 90° ± 1°. The smallest asteroids detected around the Earth orbit, the outer main-belt (3.27 AU), and Jupiter's orbit (5.2AU, Trojans) were 0.1 km, 15 km, and 40 km, respectively.

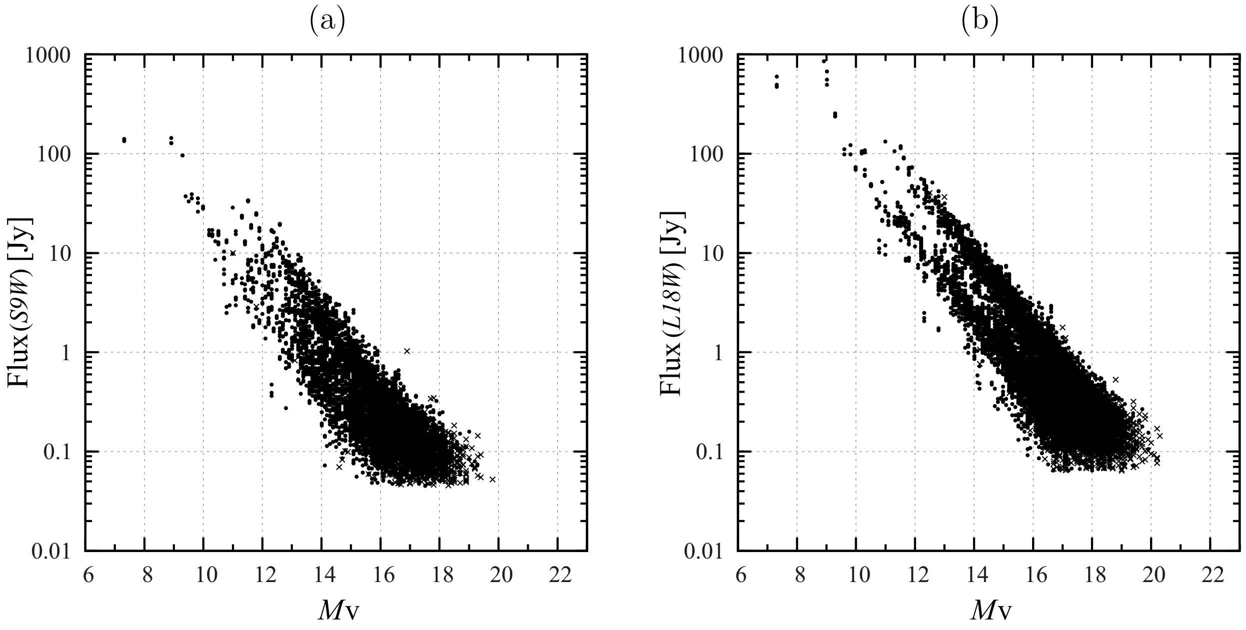


Figure 2.23 Calculated V band magnitude (M_V) vs. color-corrected monochromatic flux of the events identified as asteroids at (a) $S9W$ and (b) $L18W$.

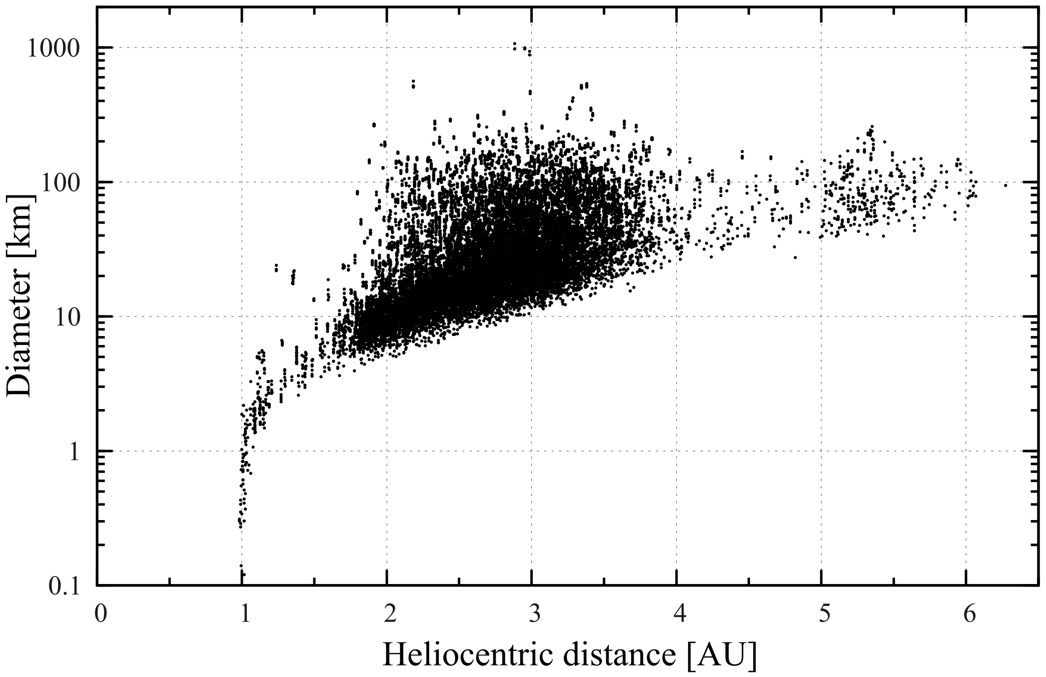


Figure 2.24 Distribution of the estimated size vs. the heliocentric distance of the detected asteroids at the epoch of the observation with AKARI.

2.3.8 Possibility of discovery of new asteroids

In the asteroid catalog processing, we did not take into account the detection of new asteroids whose orbital parameters are not known. Reliable detection of unknown moving objects requires a high redundancy in the observations, which the AKARI All-Sky Survey did not provide. Unfortunately, the low visibility for observations around the ecliptic plane makes it difficult to reliably detect new asteroids solely by AKARI. However, it is also very likely that the AKARI All-Sky Survey database contains signals of undiscovered asteroids. In fact, we belatedly found that some asteroids had been detected with AKARI before their discovery. For instance, 2006 SA6, which was discovered on September 16th 2006 (McMillan et al. 2006), had been detected on June 25th 2006 with AKARI, and 2007 FM3, which was discovered on March 19th 2007 (McGaha et al. 2007), had been observed on February 16th 2007 with AKARI (discoveries of these two were done by the Catalina Sky Survey). Thus, whenever a new asteroid was discovered, we could check the detection in the AKARI All-Sky Survey database.

2.3.9 Comparison with the previous works

Comparison with the estimated size by the radar observations

As described in Sect.2.2.4, the model parameters in our STM calculation are adjusted to provide the best fit in the estimated size and albedo with the previous values in the literatures (Table 2.10). We focus on the other example, (216) Kleopatra, which was not used for our calibration. This asteroid has received a lot of attention over the last decades because of its significant brightness variations (up to 1.2 mag) over a short period of time (e.g., Zappalà et al. 1983). Its rotation period is 5.385 hr (Magnusson 1990).

Ostro et al. (2000) performed comprehensive radar observations of this object. From their results, a peculiar bilobate shape of this object was reconstructed, which is similar to a “dog-bone” shape as seen in Fig.2.25. The inferred triaxial ellipsoid has a dimension of $217 \times 94 \times 81$ km, which is an equivalent diameter of 118 ± 14 km (diameter of a sphere with the same volume as the shape model).

AKARI detected this asteroid seven times; six (three in $S9W$, and the other three in $L18W$) were taken in June–July 2006 and the other one was in March 2007. Based on

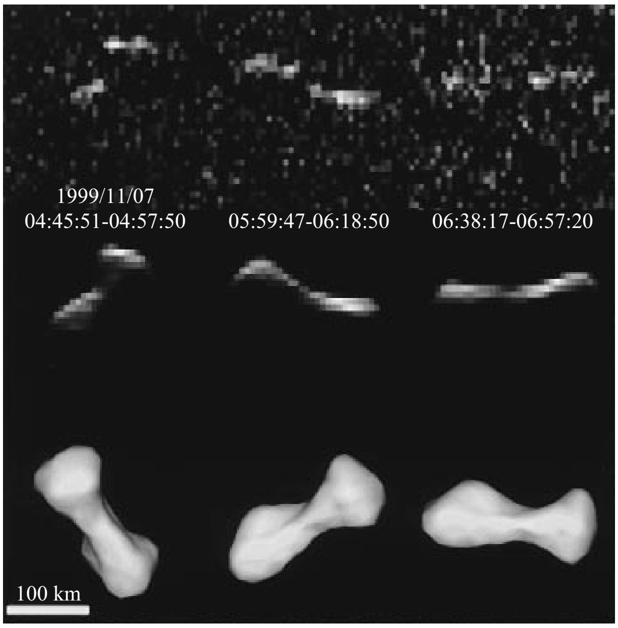


Figure 2.25 Shape reconstruction results of the observations for (216) Kleopatra with the S-band radar on the Arecibo Observatory (Ostro et al. 2000). The radar images (top), corresponding images calculated from the shape model (middle), and corresponding plane-of-sky views of the model (bottom). Figure reproduced from Ostro et al. (2000).

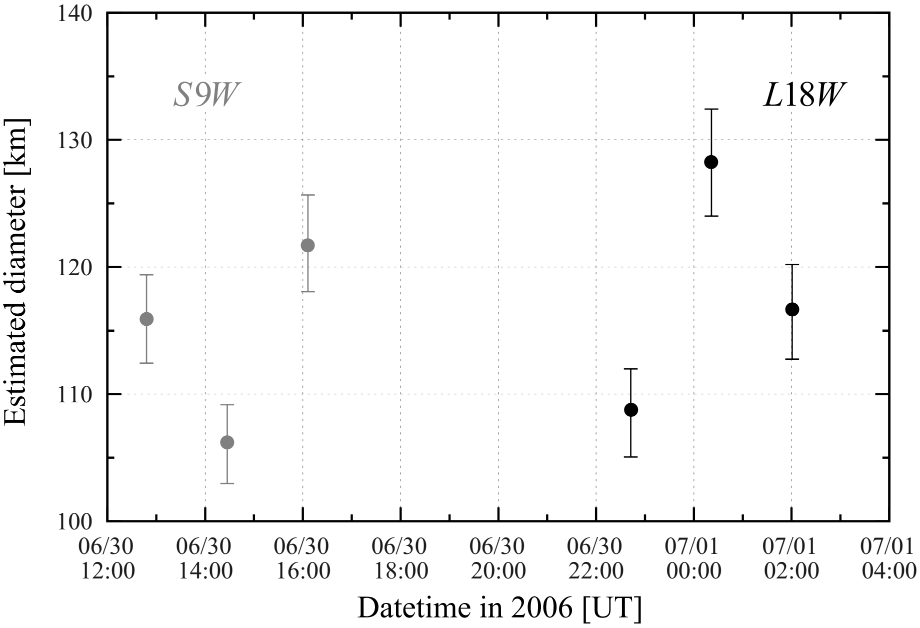


Figure 2.26 Time variation of the estimated diameter of (216) Kleopatra based on AKARI observations. Black and gray dots denote the observations in $L18W$ and $S9W$, respectively. It should be noted that continuous observations with AKARI have at least a 100 min interval by the orbital period of AKARI, and that *S9W* and *L18W* did not observe the same region of the sky simultaneously (see Fig.2.8). For the reason, sparse observations for an object are only made with AKARI.

Table 2.5 Number of asteroids with derived radiometric size/albedo information.

	AKARI	IRAS	MSX	SST	Others
Asteroids with AKARI observations	5120	2103	160	7	288
Asteroids without AKARI observations	···	367	8	211	97
Total	5120	2470	168	218	385

Note: The references are summarized in Table 2.11.

these seven, the radiometric diameter is estimated as $d = 122 \pm 2$ km, $p_{\rm v} = 0.15 \pm 0.01$. This measurement closely agrees with that of the above radar observation. In addition, as seen in Fig.2.26, the sparse data points of AKARI also show the time variation. Although detailed lightcurve analysis is needed, it seems that this variation is due to the asteroid rotation.

In this sense, the diameter measured with AKARI can be considered as the equivalent spherical diameter, even if a body is irregularly-shaped.

Total number of detections

The total numbers of the detected asteroids with AKARI and previous works are summarized in Table 2.5. The detected asteroids with AKARI are about twice as many as that with IRAS. A few hundred of asteroids were not detected with AKARI, which had been observed previously. Figure 2.27 shows the size distribution of the asteroids undetected with AKARI. Most observations of these asteroids were made with the Spitzer Space Telescope (SST) and with ground-based telescopes in programs to detect small asteroids. Figure 2.27 indicates that AKARI All-Sky Survey did not detect hundreds of small asteroids of $d < 20$ km due to the sensitivity limit.

Comparison with IRAS

Figure 2.28 shows a histogram of the asteroids detected with AKARI, without the IRAS detection. A clear peak appears at around a size of $d \sim 15$ km, indicating that the AKARI All-Sky Survey extends the asteroid database down to $d \sim 15$ km. Table 2.6 lists large ($d > 100$ km) asteroids detected with AKARI, but undetected with IRAS. Out of

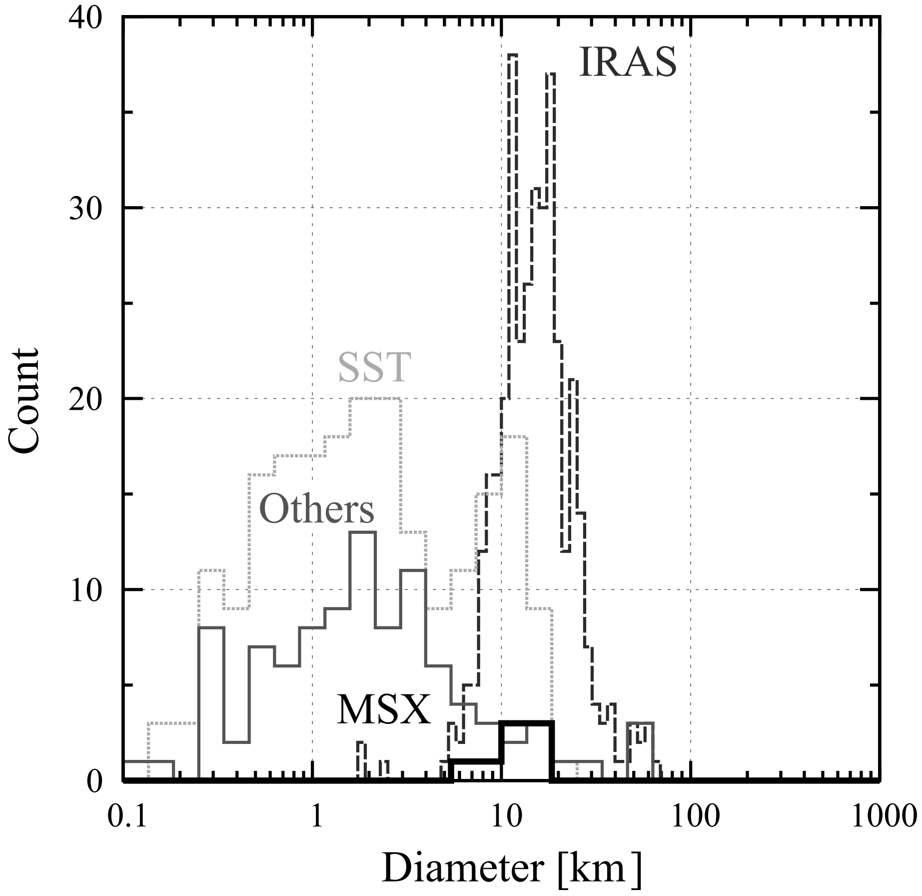


Figure 2.27 Histogram of the asteroids with the previously determined diameter without AKARI observations. Gray dashed, black solid, gray dotted, and gray solid lines indicate the data with IRAS, MSX, SST, and other observatories, respectively. The references are summarized in Table 2.11. The bin size is set to 30 segments for the diameter range of 0.1–1000 km in the logarithmic scale, except for data with IRAS, for which the bin size is set to 100 segments.

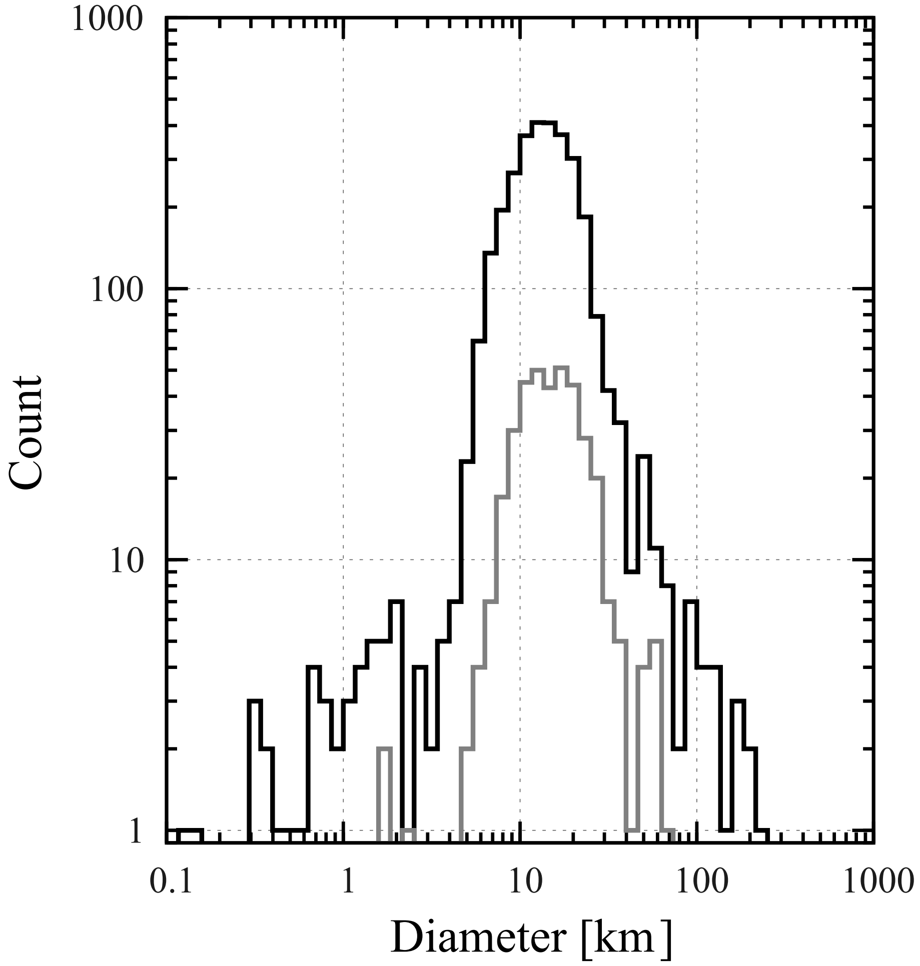


Figure 2.28 Histogram of the size of the asteroids determined by either AKARI or IRAS observations. Black and gray lines indicate the numbers of the asteroids that are detected with AKARI but undetected with IRAS, and vice versa. The bin size is set to 60 segments for the diameter range of 0.1–1000 km in the logarithmic scale.

fifteen asteroids in this list, the size and the albedo of the three asteroids, (190) Ismene, (275) Sapientia, and (375) Ursula, were determined by our measurements for the first time. The size and albedo of the other twelve asteroids had been estimated with ground-based and/or space-borne telescopes previously. AcuA does not contain several very large ($d > 40$ km) asteroids detected with IRAS (Table 2.7). All of these asteroids are out of MBAs: the Hildas and the Jovian Trojans; the semimajor axes of these objects are larger than 3.9 AU.

We examined the original scan data for these undetected large asteroids, and confirmed that two asteroids, (22180) and (4317), can be seen in raw images of the All-Sky Survey data at $L18W$ only once. They were, however, rejected because they were detected near to the edge of the detector which has a relatively high flux uncertainty due to flat-fielding error. The other two asteroids, (14268) and (11542), are confused with stellar objects, since they are located at galactic latitudes of less than 1° at the epoch of the AKARI observation. For the other asteroids, no particular reasons for nondetection were found. Some of them may lose observation opportunities due to the offset survey operation mentioned in Sect.2.1.2. Deformed shapes, if any, may account for the nondetection with AKARI.

Figure 2.29 shows a comparison of the size and albedo of 2221 asteroids estimated from the AKARI and IRAS observations (Table 2.8). The AKARI measurement is fairly in agreement with the IRAS one. The correlation coefficients are 0.9895 for the size and 0.8978 for the albedo of the asteroids observed twice or more (1961 objects). However, there are large discrepancies in the estimated size and albedo between several asteroids (Table 2.9). The albedo of (1166) Sakuntala is estimated to be 0.65 from IRAS and 0.19 ± 0.01 from AKARI observations. Because this asteroid is classified as S-type, whose typical albedo is 0.208 (Table 3.2 in Chapter 3), an AKARI estimate is more likely to be correct. Two asteroids, (1384) Kniertje and (1444) Pannonia, have albedo values larger than 0.3 from IRAS, but $\sim$0.07 from AKARI. Since these two asteroids are of C-type (the mean albedo of 0.071 in Table 3.2), the IRAS observations seem to overestimate the albedo. The albedo of (5661) Hildebrand is estimated to be 0.14 from IRAS and 0.049 ± 0.003 from AKARI observations. Since this asteroid is a member of the Hildas, mainly composed of D-type asteroids (Dahlgren & Lagerkvist 1995), which suggests the low albedo, the AKARI result

Table 2.6 List of asteroids that were detected with AKARI, but undetected with IRAS ($d > 100$ km).

		AKARI		Previous work		
Asteroid	a [AU]	d [km]	p_v	d [km]	p_v	References
(624) Hektor	5.237495	230.99 ± 3.94	0.034 ± 0.001	239.20	0.041	D45, D58
(19) Fortuna	2.442360	199.66 ± 3.02	0.063 ± 0.002	201.70	0.064	D3, D5, D7, D16, D55
(375) Ursula	3.122683	193.63 ± 2.52	0.049 ± 0.001	···	···	(*)
(190) Ismene	3.981579	179.89 ± 3.64	0.051 ± 0.003	···	···	(*)
(24) Themis	3.128721	176.81 ± 2.30	0.084 ± 0.003	176.20	0.084	D52, D55
(9) Metis	2.386479	166.48 ± 2.08	0.213 ± 0.007	154.67	0.228	B1, D3, D5, D42, D52, D55
(14) Irene	2.585717	144.09 ± 1.94	0.257 ± 0.009	155.00	0.170	D3, D5
(884) Priamus	5.166168	119.99 ± 2.13	0.037 ± 0.001	138.00	0.034	D45
(129) Antigone	2.867779	119.55 ± 1.42	0.185 ± 0.005	115.00	0.187	D7
(275) Sapientia	2.778462	118.86 ± 1.76	0.036 ± 0.001	···	···	(*)
(3451) Mentor	5.103033	117.91 ± 3.19	0.075 ± 0.005	122.20	0.052	D45
(127) Johanna	2.754630	114.19 ± 1.52	0.065 ± 0.002	123.33	0.056	B1
(27) Euterpe	2.345967	109.79 ± 1.54	0.234 ± 0.008	118.00	0.110	D3, D5
(481) Emita	2.740519	103.53 ± 1.90	0.061 ± 0.003	113.23	0.050	B1
(505) Cava	2.685273	100.55 ± 1.24	0.063 ± 0.002	115.80	0.040	D55

Note: The references are summarized in Table 2.11. The cited data refer to the underlined reference in the list. (*) AKARI data provides the first determination of the size and albedo.

Table 2.7 List of the asteroids that were detected with IRAS, and not with AKARI ($d > 40$ km).

Asteroid	a [AU]	d [km]	p_v	
(22180)	5.194971	64.18	0.052	Trojan (L5)
(18137)	5.138902	60.71	0.013	Trojan (L5)
(5027) Androgeos	5.301957	57.86	0.092	Trojan (L4)
(5025)	5.205473	57.83	0.064	Trojan (L4)
(14268)	5.269809	57.54	0.037	Trojan (L4)
(6545)	5.127774	56.96	0.055	Trojan (L4)
(11542) Solikamsk	3.950300	49.72	0.022	Hilda
(4317) Garibaldi	3.987545	49.50	0.050	Hilda
(13362)	5.209354	48.21	0.048	Trojan (L4)
(13035)	3.974170	47.40	0.018	Hilda
(11351)	5.261205	42.16	0.063	Trojan (L4)

Note: d and p_v are the diameter and albedo of asteroid measured by IRAS (Tedesco et al. 2002a).

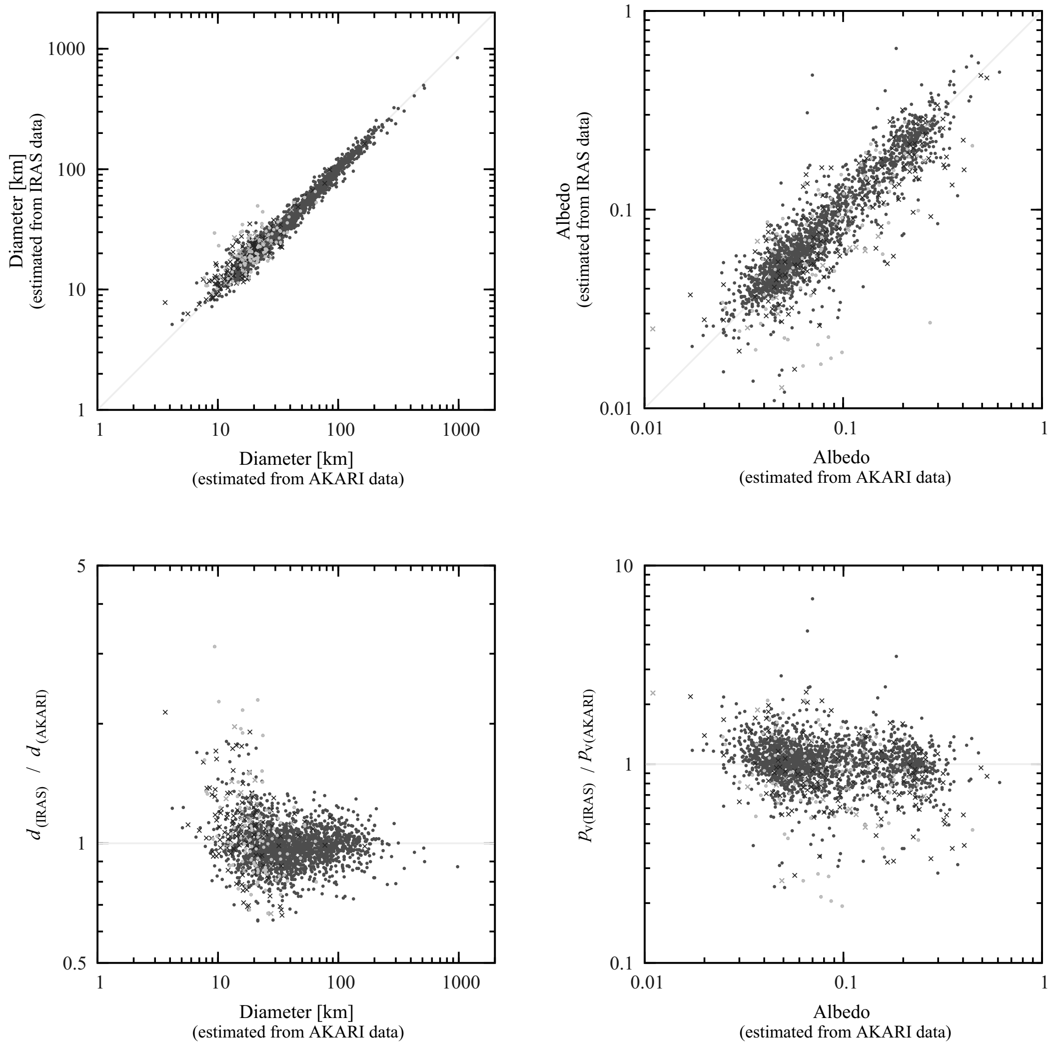


Figure 2.29 Comparison between the estimates of AKARI and IRAS. The number of objects for each observation is shown in Table 2.8. Black dot, gray dot, black cross, and gray cross indicate the asteroids of (a), (b), (c), and (d) in Table 2.8, respectively.

seems to be more likely than the IRAS.

The discrepancy in the size estimate demands more detailed investigation. For (1) Ceres, IRAS and AKARI estimate the size to be 850 km and 970 ± 13 km, respectively. It should be noted that Lebofsky (1989) reported the possibility of saturation in the IRAS 25 μm and 60 μm bands for (1) Ceres and (4) Vesta, while it does not affect the estimation of the size of other objects with IRAS. The Hubble Space Telescope observations (Thomas et al. 2005) derive the size of (1) Ceres as 974.6 × 909.4 km, supporting the AKARI estimate. The other five asteroids listed in upper rows of Table 2.9 only have sizes determined differently with IRAS and AKARI, and thus it is difficult to conclude which of the observations would be more accurate. Further observations and measurements are needed to understand the discrepancy in size between IRAS and AKARI.

Table 2.8 Number of the asteroids for which the size and albedo were estimated with the AKARI and IRAS observations.

	IRAS $N_{\mathrm{ID}} \geq 2$	IRAS $N_{\mathrm{ID}} = 1$
AKARI $N_{\mathrm{ID}} \geq 2$	1961 (a)	97 (b)
AKARI $N_{\mathrm{ID}} = 1$	142 (c)	21 (d)

Note: N_{ID} means the number of the observations. Asteroids are divided into four categories by $N_{\mathrm{ID}} = 1$ or more with AKARI and IRAS (a, b, c, and d) as shown in Fig.2.29.

Table 2.9 Asteroids that show large discrepancy in the size and albedo estimated from the AKARI and IRAS observations

	IRAS data			AKARI data			
Asteroid	d [km]	p_{V}	$N_{\mathrm{ID}}{}^{*}$	d [km]	p_{V}	$N_{\mathrm{ID}}{}^{\dagger}$	Type
(with discrepant size)							
(1293) Sonja	7.80	0.460	3	3.65 ± 0.45	0.529 ± 0.133	1	S
(5356)	29.37	0.027	1	9.39 ± 0.70	0.273 ± 0.044	2	···
(7875)	34.58	0.018	1	15.95 ± 0.45	0.087 ± 0.005	5	···
(14409)	49.31	0.017	1	21.45 ± 0.88	0.077 ± 0.007	3	P
(16447) Vauban	23.10	0.019	1	10.17 ± 0.70	0.098 ± 0.014	2	···
(with discrepant albedo)							
(1166) Sakuntala	28.74	0.646	5	26.32 ± 0.39	0.185 ± 0.006	8	S
(1384) Kniertje	27.51	0.308	8	26.14 ± 0.56	0.066 ± 0.003	7	C
(1444) Pannonia	29.20	0.475	2	30.48 ± 0.53	0.070 ± 0.003	7	B
(5661) Hildebrand	34.37	0.136	2	42.29 ± 1.26	0.049 ± 0.003	5	···

* The number of the observations used in the estimate of the albedo.

† The number of the detections with $S9W$ and $L18W$.

Table 2.10 Results of the STM calculation for the 55 selected asteroids.

		Detection with AKARI					Previous work		
Asteroid	Type	N_{ID} *S9W*	N_{ID} *L18W*	N_{ID} Total	d [km]	p_{v}	d [km]	p_{v}	References
(1) Ceres	C	3	4	7	973.89	0.087	959.60	0.096	A1, D2, D4, D5, D7, D8, D10, D16, D20, D26, D29, D33, D34, D42, D52, D67
(2) Pallas	C	6	6	12	512.59	0.150	534.40	0.142	A1, D2, D5, D7, D15, D16, D20, D22, D26, D33, D42, D52, D67
(3) Juno	S	4	4	8	231.09	0.246	233.92	0.238	A1, D2, D5, D26, D33, D42, D52
(4) Vesta	V	2	3	5	521.74	0.342	548.50	0.317	A1, D1, D2, D3, D4, D5, D7, D8, D22, D25, D26, D33, D34, D42, D52, D67
(6) Hebe	S	6	5	11	197.15	0.238	185.18	0.268	A1, D2, D16, D26,
(7) Iris	S	3	4	7	254.20	0.179	199.83	0.277	A1, D3, D5, D15, D16, D34, D26, D34, D42
(8) Flora	S	4	6	10	138.31	0.235	135.89	0.243	A1, D3, D5, D26
(9) Metis	D	4	3	7	166.48	0.213	154.67	0.228	B1, D3, D5, D42, D52, D55
(10) Hygiea	C	3	3	6	428.46	0.066	469.30	0.056	A1, D3, D5, D16, D18, D22, D26, D33, D52, D67
(12) Victoria	S	3	2	5	131.51	0.130	112.77	0.176	A1, D5, D7
(17) Thetis	S	4	2	6	74.59	0.251	90.04	0.172	A1, D3, D5
(18) Melpomene	S	3	3	6	139.95	0.225	140.57	0.223	A1, D3, D5, D34, D52

Table 2.10 (Continued.)

		Detection with AKARI					Previous work		
Asteroid	Type	N_{ID} *S9W*	N_{ID} *L18W*	N_{ID} Total	d [km]	p_{v}	d [km]	p_{v}	References
(19) Fortuna	C	3	3	6	199.66	0.063	201.70	0.064	D3, D5, D7, D16, D55
(20) Massalia	S	6	6	12	131.56	0.258	145.50	0.210	A1, D5, D7, D52
(21) Lutetia	X	4	4	8	108.38	0.181	95.76	0.221	A1, D3, D5, D7, D59, D63
(23) Thalia	S	1	3	4	106.21	0.260	107.53	0.254	A1, B1, D3, D5
(24) Themis	C	4	4	8	176.81	0.084	176.20	0.084	D52, D55
(28) Bellona	S	4	1	5	97.40	0.273	120.90	0.176	A1, B1, D5
(29) Amphitrite	S	3	4	7	206.86	0.195	212.22	0.179	A1, D3, D5, D26
(31) Euphrosyne	C	6	6	12	276.49	0.047	255.90	0.054	A1
(37) Fides	S	3	3	6	103.23	0.204	108.35	0.183	A1, D3, D5
(40) Harmonia	S	3	5	8	110.30	0.233	107.62	0.242	A1, D3, D5, D52
(41) Daphne	C	3	4	7	179.61	0.078	174.00	0.083	A1, D7
(42) Isis	S	4	3	7	104.50	0.158	100.20	0.171	A1, D7
(47) Aglaja	C	2	1	3	147.05	0.060	126.96	0.080	A1, D5
(48) Doris	C	3	4	7	200.27	0.077	221.80	0.062	A1
(52) Europa	C	4	3	7	350.36	0.043	302.50	0.058	A1, D5, D7, D26
(54) Alexandra	C	3	5	8	144.46	0.074	165.75	0.056	A1, D5, D7, D33, D52
(56) Melete	X	4	6	10	105.22	0.076	113.24	0.065	A1, D5, D16
(65) Cybele	X	4	2	6	300.54	0.044	237.26	0.071	A1, D16, D26, D33
(69) Hesperia	X	5	4	9	132.74	0.157	138.13	0.140	A1
(85) Io	C	4	4	8	150.66	0.071	154.79	0.067	A1, D7
(88) Thisbe	C	3	4	7	195.59	0.071	200.58	0.067	A1
(93) Minerva	C	3	3	6	147.10	0.068	141.55	0.073	A1, B1
(94) Aurora	C	2	2	4	179.15	0.053	204.89	0.040	A1, D5, D7
(106) Dione	C	3	3	6	153.42	0.084	146.59	0.089	A1, D7, D33

Table 2.10 (Continued.)

		Detection with AKARI					Previous work		
Asteroid	Type	N_{ID} *S9W*	N_{ID} *L18W*	N_{ID} Total	d [km]	p_{v}	d [km]	p_{v}	References
(165) Loreley	C	4	2	6	173.66	0.051	154.78	0.064	A1
(173) Ino	X	3	1	4	160.61	0.059	154.10	0.064	A1
(196) Philomela	S	2	4	6	141.78	0.213	136.39	0.230	A1, D5, D7
(230) Athamantis	S	4	5	9	108.28	0.173	108.99	0.171	A1, D3, D5, D7
(241) Germania	C	3	3	6	181.57	0.050	168.90	0.058	A1, D5
(283) Emma	C	4	8	12	122.07	0.039	148.06	0.026	A1
(313) Chaldaea	C	4	4	8	94.93	0.054	96.34	0.052	A1, D5, D8, D33
(334) Chicago	C	4	5	9	167.21	0.057	158.55	0.062	A1
(360) Carlova	C	4	4	8	121.52	0.049	115.76	0.053	A1, D5, D7
(372) Palma	C	2	4	6	177.21	0.075	188.62	0.066	A1
(423) Diotima	C	5	1	6	226.91	0.049	208.77	0.051	A1
(451) Patientia	C	5	5	10	234.91	0.071	224.96	0.076	A1, D5, D7, D16
(471) Papagena	S	3	3	6	117.44	0.261	134.19	0.199	A1, D3
(505) Cava	C	5	4	9	100.55	0.063	115.80	0.040	D55
(511) Davida	C	4	3	7	290.98	0.070	326.06	0.054	A1, D2, D3, D7, D52
(532) Herculina	S	4	2	6	216.77	0.184	222.39	0.169	A1, D3, D5, D8, D33, D42
(690) Wratislavia	C	2	4	6	158.11	0.044	134.65	0.060	A1
(704) Interamnia	C	7	4	11	316.25	0.075	316.62	0.074	A1, D5, D7,D52
(776) Berbericia	C	4	5	9	149.76	0.067	151.17	0.066	A1

Note: We employed 55 well-studied main-belt asteroids (Müller et al. 2005) to derive the best value for the beaming parameter (see Sect.2.2.4). This table summarizes the calculation results of these 55 asteroids. The references of previous work are given in Table 2.11. The cited data refer to the underlined reference in the list.

Table 2.11 Reference list of previous works of the size and albedo of asteroids.

Infrared Astronomy Satellite (IRAS):
(A1) Tedesco et al. 2002a

Midcourse Space Experiment (MSX):
(B1) Tedesco et al. 2002b

Spitzer Space Telescope (SST):
(C1) Stansberry et al. 2008
(C2) Trilling et al. 2008
(C3) Ryan et al. 2009
(C4) Campins et al. 2009a
(C5) Campins et al. 2009b
(C6) Fernández et al. 2009
(C7) Harris et al. 2009
(C8) Licandro et al. 2009
(C9) Bhattacharya et al. 2010
(C10) Trilling et al. 2010

Other work including the Infrared Space Observatory (ISO) and ground-based observatories in the chronological order:

1970–1979
(D1) Allen 1970
(D2) Cruikshank & Morrison 1973
(D3) Morrison 1974
(D4) Gillett & Merrill 1975
(D5) Hansen 1976
(D6) Cruikshank & Jones 1977
(D7) Morrison 1977
(D8) Gradie 1978
(D9) Lebofsky et al. 1978
(D10) Stier et al. 1978
(D11) Lebofsky & Rieke 1979

1980–1989
(D12) Lebofsky et al. 1981
(D13) H. Brown & Morrison 1984
(D14) Lebofsky et al. 1984
(D15) Levan & Price 1984
(D16) Green et al. 1985a
(D17) Green et al. 1985b
(D18) Lebofsky et al. 1985
(D19) Vilas et al. 1985
(D20) Lebofsky et al. 1986
(D21) Tedesco & Gradie 1987
(D22) Johnston et al. 1989
(D23) Veeder et al. 1989

1990–1999
(D24) Cruikshank et al. 1991
(D25) Redman et al. 1992
(D26) Altenhoff et al. 1994
(D27) Altenhoff & Stumpff 1995
(D28) Campins et al. 1995
(D29) Altenhoff et al. 1996
(D30) Mottola et al. 1997
(D31) Harris et al. 1998
(D32) Jewitt & Kalas 1998
(D33) Müller & Lagerros 1998
(D34) Redman et al. 1998
(D35) Harris & Davies 1999

2000–2009
(D36) Thomas et al. 2000
(D37) Altenhoff et al. 2001
(D38) Fernández et al. 2001
(D39) Harris et al. 2001
(D40) Jewitt et al. 2001
(D41) Fernández et al. 2002
(D42) Müller et al. 2002
(D43) Tedesco & Desert 2002
(D44) Delbó et al. 2003
(D45) Fernández et al. 2003
(D46) Delbó 2004
(D47) Müller et al. 2004
(D48) Cruikshank et al. 2005
(D49) Fernández et al. 2005
(D50) Harris et al. 2005
(D51) Kraemer et al. 2005
(D52) Lim et al. 2005
(D53) Müller et al. 2005
(D54) Rivkin et al. 2005
(D55) Tedesco et al. 2005
(D56) Wolters et al. 2005
(D57) Delbó et al. 2006
(D58) Emery et al. 2006
(D59) Mueller et al. 2006
(D60) Harris et al. 2007
(D61) Mueller et al. 2007
(D62) Trilling et al. 2007
(D63) Carvano et al. 2008
(D64) Hasegawa et al. 2008
(D65) Wolters et al. 2008
(D66) Delbó et al. 2009
(D67) Hormuth & Müller 2009

3

Albedo Properties of Main Belt Asteroids Based on AKARI Asteroid Catalog [6]

In this chapter, the size dependencies, frequency distributions, and heliocentric distributions of the albedos of the main belt asteroids (MBAs) are examined based on the AKARI asteroid catalog, AcuA. As described in the previous chapter (Chapter 2, Sect.2.3.3), AcuA has a complete data set of all asteroids brighter than the absolute magnitude of $H < 9$, and $H < 10.3$ for all MBAs. $H < 10.3$ for MBAs corresponds to $d > 20$ km in size. Thus all AcuA MBAs with values of $d > 20$ km (a total of 1974) are mainly used in the following discussion.

This chapter is organized as follows: In Sect.3.1, we review the taxonomic classification of asteroids. In Sect.3.2, we present the features of the AcuA MBAs and the division of the main belt into three regions: inner, middle, and outer. In Sect.3.3, we describe investigations of albedo properties of MBAs in the context of taxonomic classification. In Sect.3.4, we discuss the reasons for the albedo varieties which are found in Sect.3.3.

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[6] The original version of this chapter has been published as :
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3.1 Taxonomic classifications and albedo of asteroids

Studies of the physical properties of asteroids are of fundamental importance to our understanding of the origin, evolution, and structure of the solar system. In order to investigate the compositions of asteroids and the chemical and thermal processes of alternations, it is essential to examine detailed mineralogical characterizations of individual asteroids (e.g., Gaffey et al. 2002). On the other hand, asteroids can be assigned taxonomic type based on their spectral shape and color. These types are thought to correspond to surface composition of asteroids. In this sense, taxonomic classifications of asteroids represent a broader, alternative approach for appraising the compositions and surface conditions for large numbers of asteroids. As is commonly accepted (and first explicitly described by Chapman et al. 1975), most asteroids can be classified as either C- or S-type. C-type asteroids are historically associated with carbonaceous chondrites, and S-type asteroids with stony-iron meteorites.

Several outstanding works have defined methodologies for the taxonomic classification of asteroids based on the features observed at visible and near-infrared wavelengths, as described below:

- Tholen (1984) developed the classification based on the spectrophotometric data (0.3–1.1 μm) obtained during the Eight-Color Asteroid Survey (ECAS; Zellner et al. 1985b, Zellner et al. 2009), which was done at the Steward Observatory, Arizona, between 1979 and 1980. 589 asteroids are classified into 14 types with the majority of asteroids falling into either C, S, or X types, and several smaller types. In the reproduced version (Tholen 1989; Tholen & Barucci 1989), 978 asteroids are included.

- Bus (1999), and also Bus & Binzel (2002b) introduced a more recent taxonomy based on the Small Main-Belt Asteroid Spectroscopic Survey II (SMASSII) at the MDM Observatory, Arizona, between 1993 and 1999 (Bus & Binzel 2002a). This survey produced spectra of higher resolution than ECAS, and was able to resolve a variety of narrow spectral features, although smaller range of wavelengths (0.44–0.92 μm) was covered. 1447 asteroids were sorted into the 24 types; the majority fall also into the broad C, S, and X types, with a few unusual bodies categorized into several smaller types.

- Lazzaro et al. (2004) made another visible (0.49–0.92 μm) spectroscopic survey, named the Small Solar System Objects Spectroscopic Survey (S^3OS^2), at the European Southern Observatory, La Silla (Chile). The Tholen and the Bus schemes are used for classification. 820 asteroids are contained in this catalog.
- Carvano et al. (2010) provided a large data set based on multi-band photometric data of the Sloan Digital Sky Survey Moving Object Catalog (SDSS-MOC; Ivezić et al. 2010). SDSS (Gunn et al. 1998) is an imaging and spectroscopic survey at the Apache Point Observatory, New Mexico, in five filter bands (u′, g′, r′, i′, z′; central wavelengths of 0.354, 0.477, 0.6230, 0.7630 and 0.913 μm, respectively; Fukugita et al. 1996). 63,468 asteroids are classified into nine classes, of which scheme is compatible with the Bus taxonomy.

Besides these surveys, various taxonomic information determined from individual observations are available, which are based on the Tholen or Bus scheme (see Table 3.5).

One of the notable results of these taxonomic classifications, as presented by Bus & Binzel (2002b) (and also by Mothé-Diniz et al. 2003) is the non-uniform heliocentric clustering of taxonomic types in main belt regions; asteroids of each taxonomic type, namely, C, S, X, D, and V, are shown as the bias-corrected distributions at heliocentric distances of 2.1–3.3 AU. The interpretation of these results is that S-, C-, and D-type asteroids are distributed progressively further from the Sun in that order, and that the bodies located further from the Sun are less affected by metamorphism and contain a greater proportion of primitive materials than those closer to the Sun (i.e., S-type asteroids are the most metamorphosed and contain the least amount of primitive material and D-type asteroids are the least metamorphosed and contain the greatest proportion of volatile material).

Albedo data, along with taxonomic classifications of asteroids, also contribute to our understanding of the large-scale distribution of asteroid compositions. Albedo values are strongly dependent on the surface conditions and compositions of asteroids. The relationship between taxonomic types and albedo is, on the other hand, complex, and type determinations cannot be made on the basis of albedo values alone; the albedos of C- and

S-type asteroids vary widely, even though the albedo of C-types is generally low and the albedo of S-types is generally high (e.g., Zellner & Gradie 1976).

In this chapter, we focus on the albedos of the main belt asteroids (MBAs) measured by AKARI. The spatial distribution of compositions among MBAs is of particular interest, because the main belt is the largest reservoir of asteroids in the solar system; more than 94% of asteroids with known orbital elements are classified as MBAs (Table 1.2). Asteroids are thought to be the remnants of planetesimals formed in the early solar system (Bottke et al. 2002a). Some were formed near to their current locations, and others have migrated from their original birthplaces in conjunction with the migrations of giant planets (e.g., Levison et al. 2009). Because of cataclysmic events in the history of the solar system, present-day asteroids, especially MBAs, are well mixed and represent multiple origins; they are confined to certain regions on account of resonance effects, and/or have been broken or segmented by mutual collisions. Some asteroids originally formed in volatile-poor regions (the inner parts of the solar system), whereas others formed in volatile-rich regions (the outer parts of the solar system, beyond the snow line at the times of formation). Processes of dynamical evolution and chemical processing may have affected the physical conditions, and hence the albedo properties, of asteroid surfaces.

The main purpose of this study is to examine the size dependencies, frequency distributions, and heliocentric distributions of the albedos of AcuA MBAs, by comparing to recent taxonomic classifications. Famed results about the heliocentric distribution of taxonomic types are presented in Bus & Binzel (2002b) and Mothé-Diniz et al. (2003). They performed a bias correction method based on Zellner (1979) and Bus (1999), that is, asteroids are divided into several zones according to the semimajor axis and the absolute magnitude, and the ratio between the total number of asteroids and the number of classified asteroids in each zone are determined, then this ratio is used as the bias correction factor for estimating the fraction of taxonomies of unclassified objects under the assumption of size and albedo based on the IRAS data set. As described in Sect.2.3.3, AcuA, which is based on the All-Sky Survey that lasted 16 months, provides a complete data set of all known asteroids brighter than the absolute magnitude of $H < 10.3$ for MBAs, which correspond to the size for $d > 20$ km. When the objects larger than 20 km are used for analysis, no assumptions about size or albedo are needed. Thus we have carried out no bias correction for the magnitude incompleteness in our examination of the albedo properties of MBAs.

3.2 AcuA main belt asteroids

All AcuA MBAs with values of $d > 20$ km (a total of 1974) are mainly used in the following discussion. The number of asteroids inventoried in the AcuA is summarized in Table 3.1. Determinations of each taxonomic type are based on Tholen (1984); Bus & Binzel (2002b); Lazzaro et al. (2004); Carvano et al. (2010), and other references summarized in Table 3.5. Figure 3.1 shows histograms of the numbers of AcuA asteroids as a function of the semimajor axes. We focus on three regions of the main belt which are defined on the basis of semimajor axis: the inner ($2.06 < a \leq 2.50$ AU), middle ($2.50 < a \leq 2.82$ AU), and outer ($2.82 < a \leq 3.27$ AU) regions (Sect.1.2.3). It should be noted that some near-Earth asteroids (Apollos and Amors) which occasionally have semimajor axis in the ranges of MBAs, are not considered in the following discussion (see Fig.1.6).

As described in Sect.1.2.3, the boundaries of the main belt regions at the semimajor axis $a = 2.06$, 2.50, 2.82, and 3.27 AU correspond, respectively, to the 4:1, 3:1, 5:2, and 2:1 mean motion resonances of Jupiter. The mean motions and secular resonances of Jupiter are the dominant effects on the dynamical evolution of MBAs at the present stage of solar system evolution. The Yarkovsky thermal force (e.g., Bottke et al. 2002b) is also known to cause changes in the orbits of asteroids (mainly affecting the semimajor axis), but its effects are less than those of the dynamical resonances on large-size objects. The numbers of AcuA asteroids in each region of the main belt (inner, middle, and outer) are 858, 1523, and 2341, respectively (also see Table 3.1). The number of detected asteroids in the outer region is greater than that in the inner region, implying that the actual number of asteroids is greater in outer regions, compared to the number of observed asteroids, which generally decreases as a function of distance on account of distance-dependent instrumental detection limits, while the precise number density of asteroids in each region is not examined. Moreover, the number of inner region MBAs (858) is about half that of middle region MBAs (1523), despite the fact that inner region MBAs are more readily detected. Figure 3.2 also illustrates the size distribution of the inner, middle, and outer

Table 3.1 Numbers of asteroids detected by AKARI, classified by dynamical group and by the main belt region.

Dynamical group	C	S	X	D	V	Unclassified	Total
Near-Earth asteroids	2	16	2	···	1	37	58
Main belt asteroids	1150	722	490	130	4	2226	4722
Cybeles	22	2	26	26	···	29	105
Hildas	1	1	19	30	···	35	86
Jovian Trojans (L4, L5)	6	···	7	53	···	43	109
Others†	2	17	6	2	···	13	40
Total	1183	758	550	241	5	2383	5120
MBAs subtotal							
Inner	160	242	64	16	4	372	858
Middle	401	267	168	28	···	659	1523
Outer	589	213	258	86	···	1195	2341
Total	1150	722	490	130	4	2226	4722
MBAs ($d > 20$ km) subtotal							
Inner	48	56	32	8	1	11	156
Middle	184	138	124	17	···	61	524
Outer	381	147	212	62	···	492	1294
Total	613	341	368	87	1	564	1974

† Others include asteroids belonging to the Hungaria and Thule families.

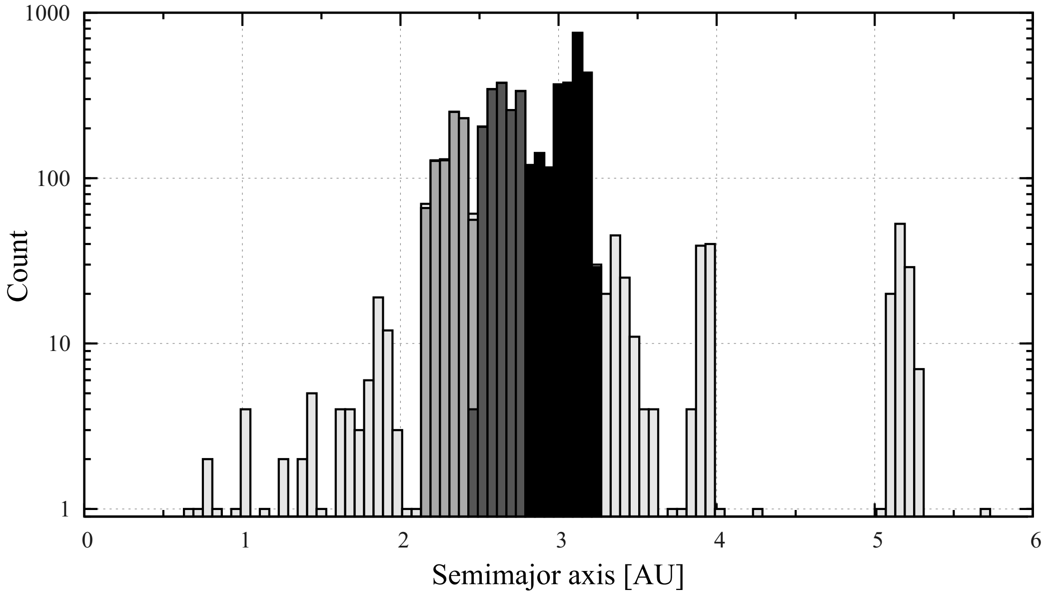


Figure 3.1 Histogram of the number of detected asteroids with AKARI as a function of the semimajor axis. Light gray, dark gray, and black boxes denote inner, middle, and outer region MBAs, respectively. The bin size is set to 100 segments for the semimajor axis range of 0–6 AU.

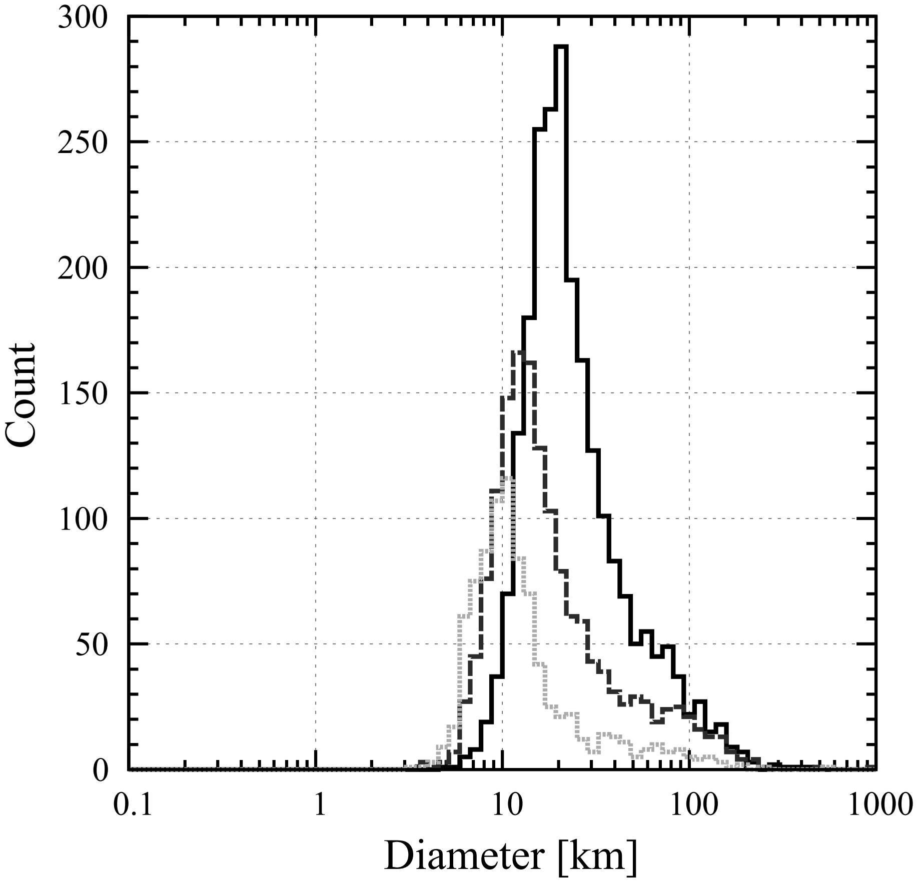


Figure 3.2 Histogram of the size distribution of AcuA MBAs. Gray dotted, gray dashed, and black lines denote inner, middle, and outer region MBAs, respectively. The bin size is set to 70 segments for the diameter range of 0.1–1000 km in the logarithmic scale.

Table 3.2 Summary of the numbers (N) and mean albedos ($\overline{p_{\mathrm{V}}}$) in the five taxonomic types of total MBAs and MBAs larger than 20 km detected by AKARI.

Type	N	$\overline{p_{\mathrm{V}}}$	$N(d > 20\mathrm{km})$	$\overline{p_{\mathrm{V}}}(d > 20\mathrm{km})$
C	1150	0.071 ± 0.040	613	0.066 ± 0.031
S	722	0.208 ± 0.079	341	0.192 ± 0.060
X	490	0.098 ± 0.081	368	0.094 ± 0.073
D	130	0.086 ± 0.053	87	0.077 ± 0.041
V	4	0.297 ± 0.131	1	0.342
Total	2496		1410	

MBAs. Concerning the size distribution of asteroids, the number of asteroids is expected to increase monotonically with decrease in size. This figure, however, shows maxima at $d \sim 20$ km for the outer MBAs. This suggests that the survey completeness rapidly drops for asteroids smaller than ~ 20 km in the outer region on account of the detection limit of AKARI instrumentation. This size limit is consistent with the fact that AcuA is complete for all MBAs with $H < 10.3$, as described in Sect.2.3.3. In this work, we consider only the inner, middle, and outer MBAs in our comprehensive analysis of the asteroid belt; we do not consider objects outside of the main belt ($a \leq 2.06$, or $a > 3.27$) and do not investigate the properties of the individual dynamical families in detail.

3.3 Albedo properties of MBAs

3.3.1 Albedo size-dependencies

Figure 3.3 shows the distributions of albedo values as a function of diameter, for asteroids cataloged in the AcuA. The total number of asteroids with $d < 5$ km is relatively low, on account of the detection limit for small bodies (see, Fig.2.22 (a)). Notably, the distributions of albedo values for the asteroids in each region are bimodal.

Figure 3.4 shows the distribution of albedo values of AcuA MBAs as a function of size, separated by taxonomic type: C, S, X, and D. Mean albedos of each type are summarized in Table 3.2. It should be noted that the taxonomic type is known for 2496 AcuA asteroids

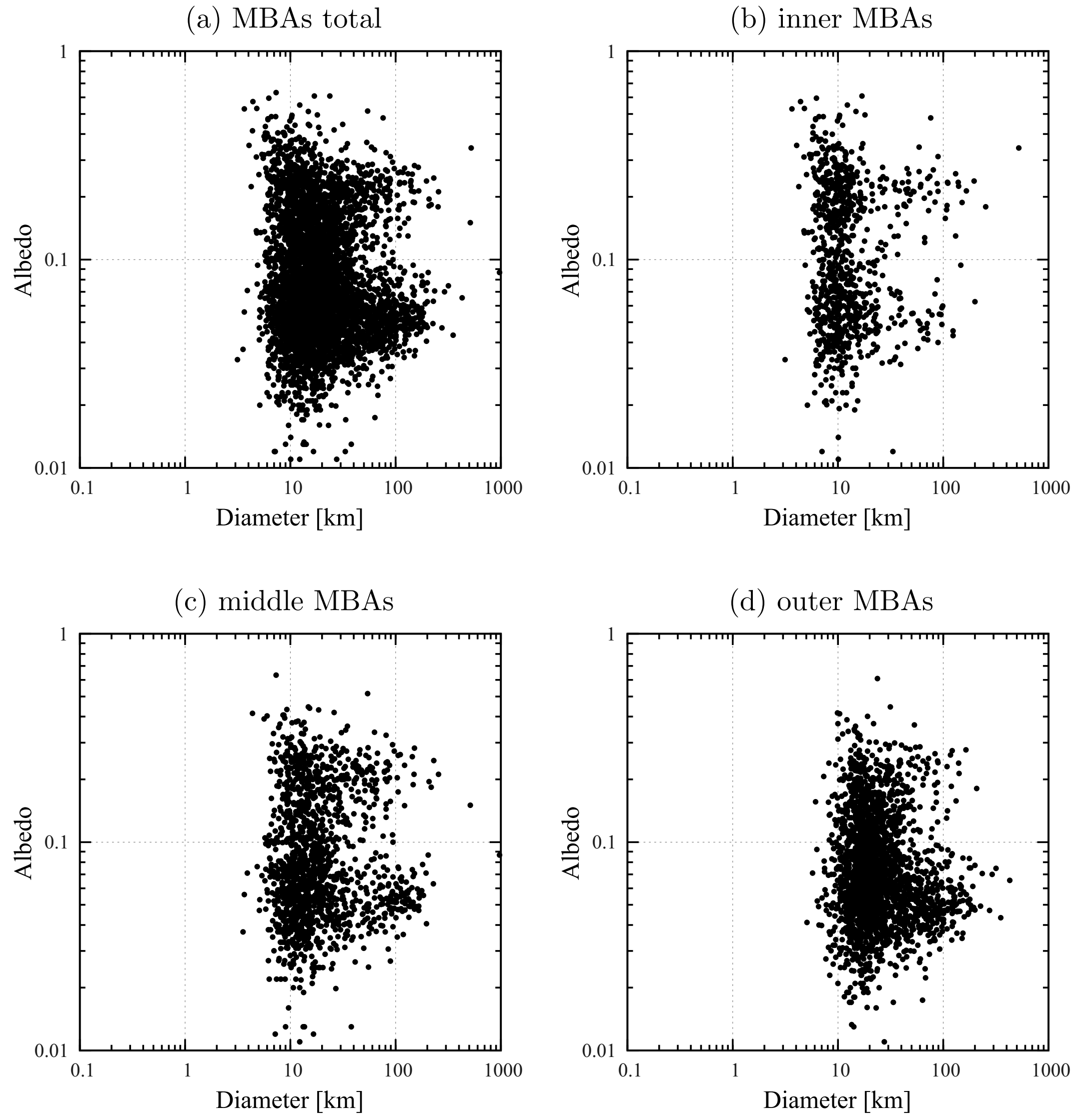


Figure 3.3 Size–albedo distributions for AcuA MBAs: (a) total population, and (b) inner, (c) middle, and (d) outer region MBAs.

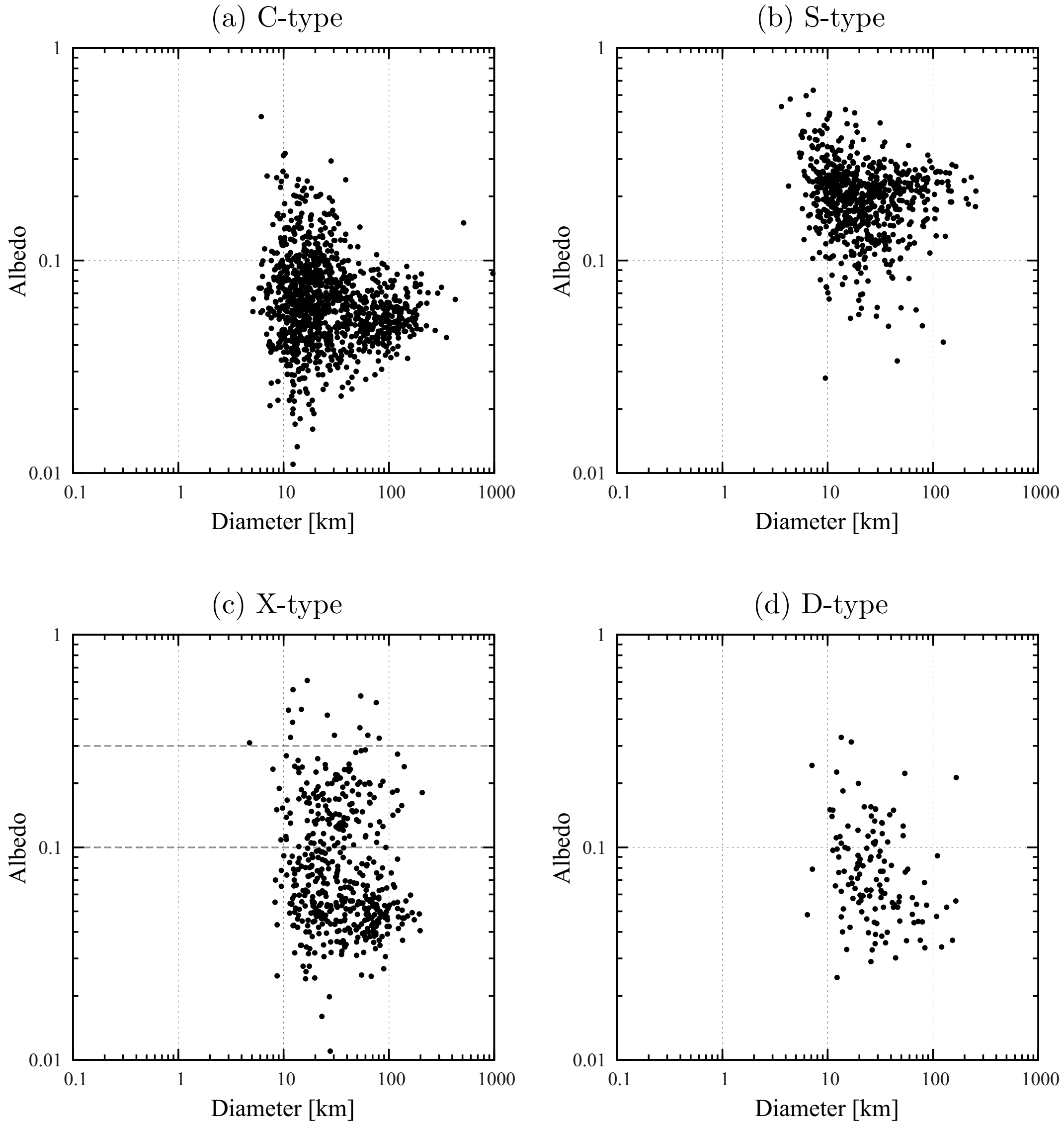


Figure 3.4 Size–albedo distributions for each taxonomic type of AcuA MBAs. Note that X-types are classified into three subclasses, E-, M-, and P-types, on the basis of albedo values of $p_{\mathrm{v}} = 0.3$ and 0.1.

(53% of the total number of the AcuA MBAs). It should also be noted that the taxonomic type was determined using data from Tholen (1984); Bus & Binzel (2002b); Lazzaro et al. (2004); Carvano et al. (2010), and the literatures shown in Table 3.5, and not from AKARI observations; this is because (a) the AKARI observations were conducted at infrared, not visible, wavelengths and (b) the two AKARI mid-infrared channels (*S9W* and *L18W*) did not observe the same region of the sky simultaneously (see Fig.2.8); thus, a complete data set for each asteroid was not always obtained with AKARI.

Figure 3.4 reveals that the clusters of high- and low-albedo asteroids depicted in Fig.3.3 correspond to S-type and C-type asteroids. In both distributions, it is found that the scatter in albedo among the smaller asteroids increases. The albedo values of X-type asteroids are widely distributed. The albedo values of D-type asteroids are moderately low, and the number of D-type asteroids is relatively small.

X-type asteroids, which have featureless flat or slightly reddened spectra over visible wavelengths, are spectrally degenerate and can be classified into three subclasses only on the basis of albedo values (Tholen & Barucci 1989; Clark et al. 2004; Fornasier et al. 2011), as E-type: $p_{\rm v} > 0.3$ (high albedo), M-type: $0.3 \geq p_{\rm v} > 0.1$ (medium albedo), and P-type: $0.1 \geq p_{\rm v}$ (low albedo). These three classes are spectrally similar to each other, but have very different inferred mineralogy, as E-type: containing enstatite-rich aubrites, M-type: containing metallic iron cores, and P-type: carbon and/or organic-rich. According to the classification based on albedo values, of the 490 X-type AcuA MBAs, 14 are E-type, 145 are M-type, and 331 are P-type. Note that for 90% of these X-type MBAs, the AcuA albedos provide the first sub-classification into E-, M-, and P-types. The largest E-type member is (71) Niobe ($d = 80.86$ km, $p_{\rm v} = 0.326$) in the middle MBAs. The mean albedos of each subclass of X-type are presented in Table 3.3. Note that there are two objects that show inconsistency between taxonomic type and albedo value. While (498) Tokio was classified as an M-type asteroid in a previous work (Tholen 1984), the albedo value of this object is $p_{\rm v} = 0.063$ by AKARI (or 0.069 by IRAS; Tedesco et al. 2002a); thus, (498) is a P-type, not an M-type, asteroid. (55) Pandora was also classified as an M-type asteroid (also by Tholen 1984); however, it is an E-type asteroid ($p_{\rm v} = 0.337$ by AKARI or 0.301 by IRAS). (498) and (55) are middle MBAs. Figure 3.5 shows the albedo distribution of

Table 3.3 Mean albedo values ($\overline{p_{\mathrm{V}}}$) of the subclasses of X-type asteroids, separated by the main belt region: inner, middle, and outer.

	E	M	P
Inner	0.454 ± 0.119 (6)	0.169 ± 0.044 (22)	0.063 ± 0.017 (36)
Middle	0.397 ± 0.076 (6)	0.166 ± 0.041 (56)	0.057 ± 0.018 (106)
Outer	0.376 ± 0.016 (2)	0.166 ± 0.050 (67)	0.052 ± 0.017 (189)
$d > 20$ km			
Inner	0.479 (1)	0.161 ± 0.033 (10)	0.061 ± 0.016 (21)
Middle	0.387 ± 0.081 (5)	0.165 ± 0.039 (42)	0.054 ± 0.017 (77)
Outer	0.365 (1)	0.169 ± 0.050 (58)	0.053 ± 0.017 (153)

Note: Numbers of AcuA asteroids in each category are given in parentheses.

X-type asteroids. There are two major components found in this figure, the M-type with $p_{\rm v} > 0.1$ and P-type with $p_{\rm v} \leq 0.1$. From this distribution, it seems reasonable that the boundary between medium-albedo M-type and low-albedo P-type is set as $p_{\rm v} = 0.1$. On the other hand, no clear boundary in the distribution is found around $p_{\rm v} \sim 0.3$, between E- and M-type.

Two large and high-albedo asteroids are observed among the D-types: (9) Metis ($d = 166$ km, $p_{\rm v} = 0.213$) is an inner MBA, and (224) Oceana ($d = 54$ km, $p_{\rm v} = 0.222$) is a middle MBA. These were considered as D-type asteroids by Lazzaro et al. (2004), but were recently re-classified as S-type (9) and M-type (224) asteroids (Neese 2010); albedo values for these asteroids in the AcuA also support this classification of Neese (2010).

The number of AcuA V-type asteroids is small ((4) Vesta, (854) Frostia, (1273) Helma, (1981) Midas, and (3657) Ermolova; (1981) is a near-Earth asteroid (Apollos), not a MBA, and the other four are inner MBAs), and (4) is the only asteroid larger than 20 km. These V-type asteroids are not used in this study.

3.3.2 Variations in the distributions of albedo values

Figure 3.6 shows histograms of albedo values for the inner, middle, and outer region. In Fig.3.3 (also see Fig.2.22(b)), the “bimodal” distribution of albedo is clearly visible. The population densities of the low- and high-albedo components are, however, not the same; the peak of the low-albedo distribution is about twice that of the high-albedo distribution. This same pattern is observed in the inner, middle, and outer region distributions as Fig.3.3, but the detailed features of each distribution vary. In the inner region (red lines in Fig.3.6), the peak of the high-albedo distribution is nearly the same as, or a little higher than, that of the lower albedo distribution. In the middle and outer region asteroids (green and blue lines in Fig.3.6), the low-albedo component is dominant, and the peak of the high-albedo distribution is nearly buried in the long tail of the low-albedo component; this pattern is especially prominent in the albedo distributions of the smaller asteroids.

Another outstanding feature of the albedo distributions is that, for the large asteroids in Fig.3.6(c), the distributions are clearly divided at $p_{\rm v} \sim 0.1$; this division is less pronounced in the small asteroids; the mean albedo value of the total population of 4722 AcuA MBAs is

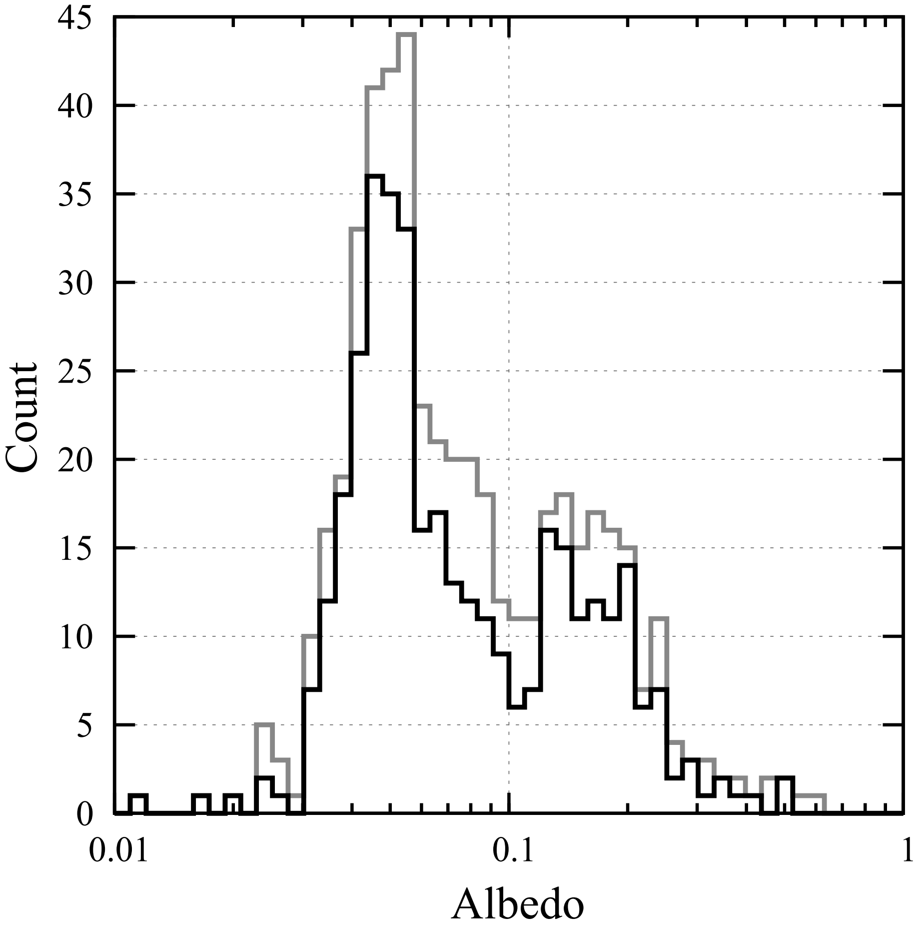
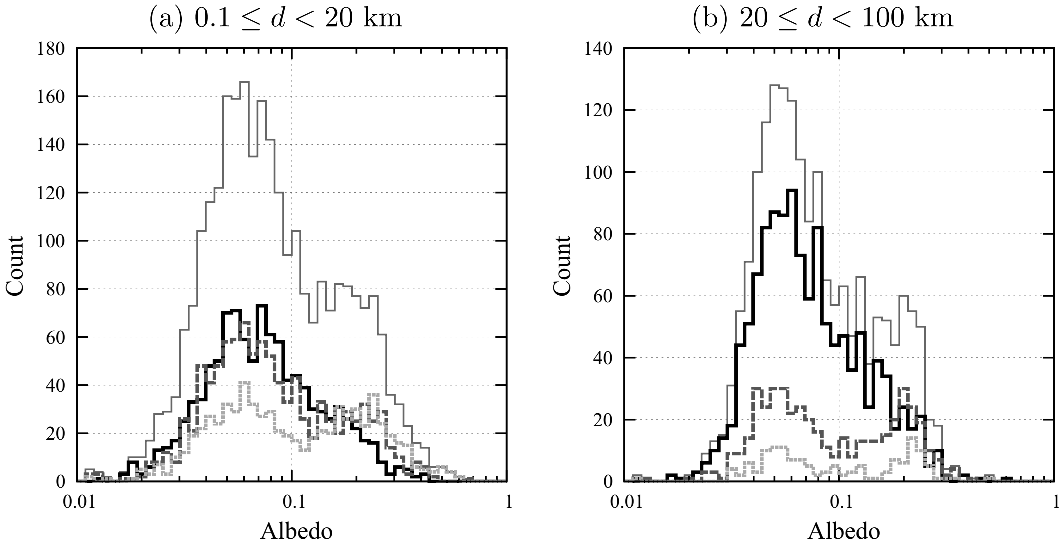


Figure 3.5 Histogram of albedo values for AcuA X-type MBAs. Gray and black lines denote all X-types, and X-types larger than 20 km, respectively. The bin size is set at 50 segments for the albedo range of 0.01–1.0 in the logarithmic scale.


(a) $0.1 \leq d < 20$ km

(b) $20 \leq d < 100$ km

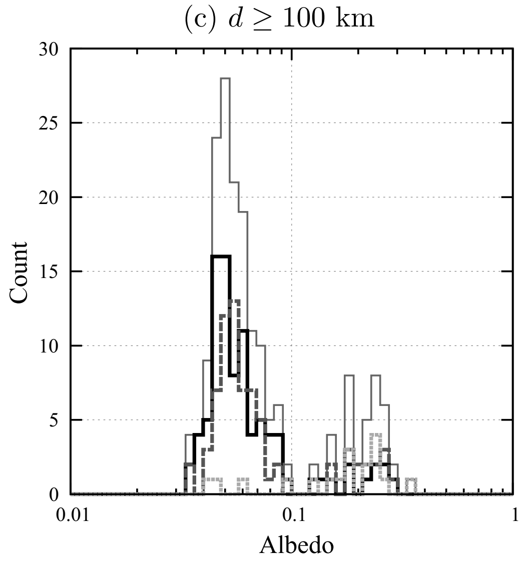

(c) $d \geq 100$ km

Figure 3.6 Histogram of albedo values for MBAs detected by AKARI for three size classes (diameters, d, in km): (a) $0.1 \leq d < 20$; (b) $20 \leq d < 100$; (c) $d \geq 100$. Gray dotted, gray dashed, and black lines denote inner region, middle region, outer region, and total MBAs, respectively. The bin size is set at 50 segments for the albedo range of 0.01–1.0 in the logarithmic scale.

$\overline{p_{\rm v}} = 0.102 \pm 0.079$. This division in the albedo distribution was also observed in data from the IRAS asteroid catalog (Tedesco et al. 2002a); however, the boundary was observed at $p_{\rm v} = 0.089$ (Morbidelli et al. 2002).

Figure 3.7 shows the heliocentric distribution for asteroids with diameters $d > 20$ km for each of the taxonomic types. AcuA covers a complete data set of all MBAs with $H < 10.3$, which correspond to $d > 20$ km. We should be noted that there is a possible selection effect in the determination of the taxonomic type, i.e., spectroscopic data have been preferentially obtained from brighter (larger size, higher albedo) objects and/or particular family members, and hence these objects are more heavily represented in the data than are darker objects.

Figure 3.7(a) illustrates the numbers of AcuA MBAs of each taxonomic type. As observed in Fig.3.1, the number of detected asteroids increases with increasing semimajor axis, except for large deviations at $a \sim 2.8$ AU. Taxonomic classifications were determined for 1409 asteroids (71% of the AcuA MBAs with sizes $d > 20$ km), representing the following regional distribution: 144 inner, 463 middle, and 802 outer MBAs. Percentage of asteroids with taxonomy determinations in each region is 92%, 88%, and 62%, respectively. Fewer classifications exist in outer region due to the selection effect as mentioned above. Figure 3.7(b) shows the fractional representation of each taxonomic type at different semimajor axis, as well as the results obtained by Bus & Binzel (2002b). Bus & Binzel (2002b) showed the bias-corrected heliocentric distribution for each taxonomic type in 1447 asteroids of size $d > 20$ km, which is the same size range in this work. We observed distributions of S-type and D-type asteroids similar to those of Bus & Binzel (2002b); that is, S-type asteroids are dominant in the inner region, with relative proportions decreasing with an increase in semimajor axis; D-type asteroids comprise $< 10\%$ of the total number of asteroids, but their relative proportions gradually increase with increasing semimajor axis. Our data on the fractions of C-type and X-type asteroids depart from those of Bus & Binzel (2002b) by $\sim 10\%$; the fraction of C-type in this work is less than that in Bus & Binzel (2002b), and that of X-type is more than that in Bus & Binzel (2002b). This result could be caused by biases related to the number of taxonomic identifications.

Figure 3.8 shows the heliocentric distribution for subclasses of X-types from AcuA as-

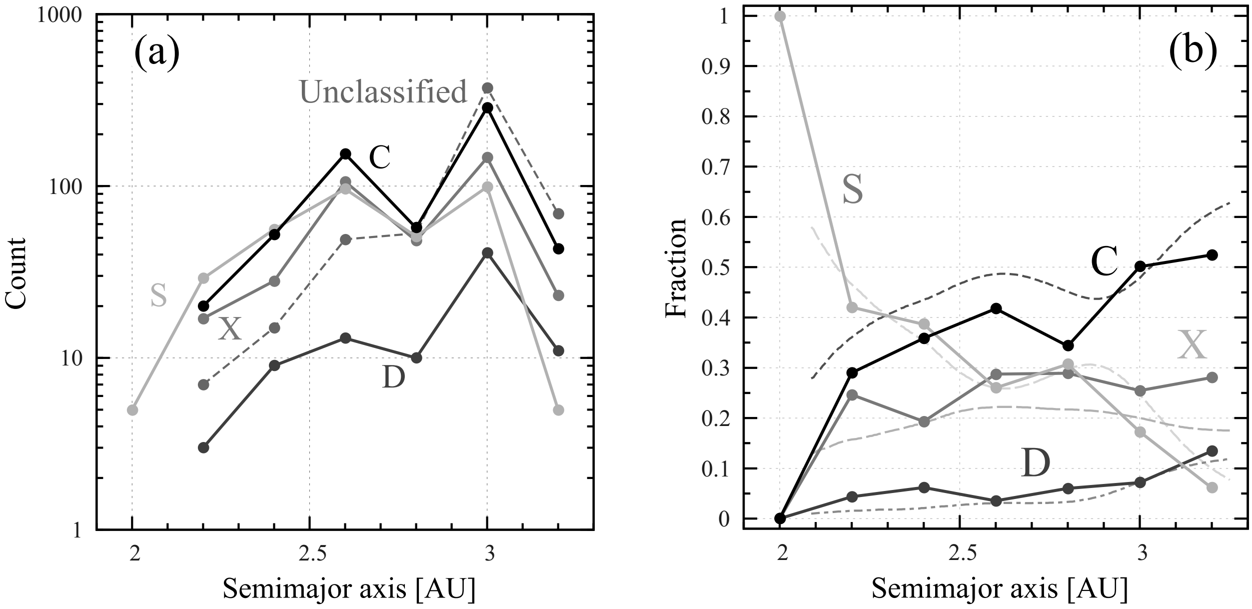


Figure 3.7 Histograms showing the numerical distribution (a) and fractional distribution (b) of MBAs with $d \geq 20$ km for each of the taxonomic types. Bold lines in (b) show AcuA data (this study) and dashed lines show data from Bus & Binzel (2002b).

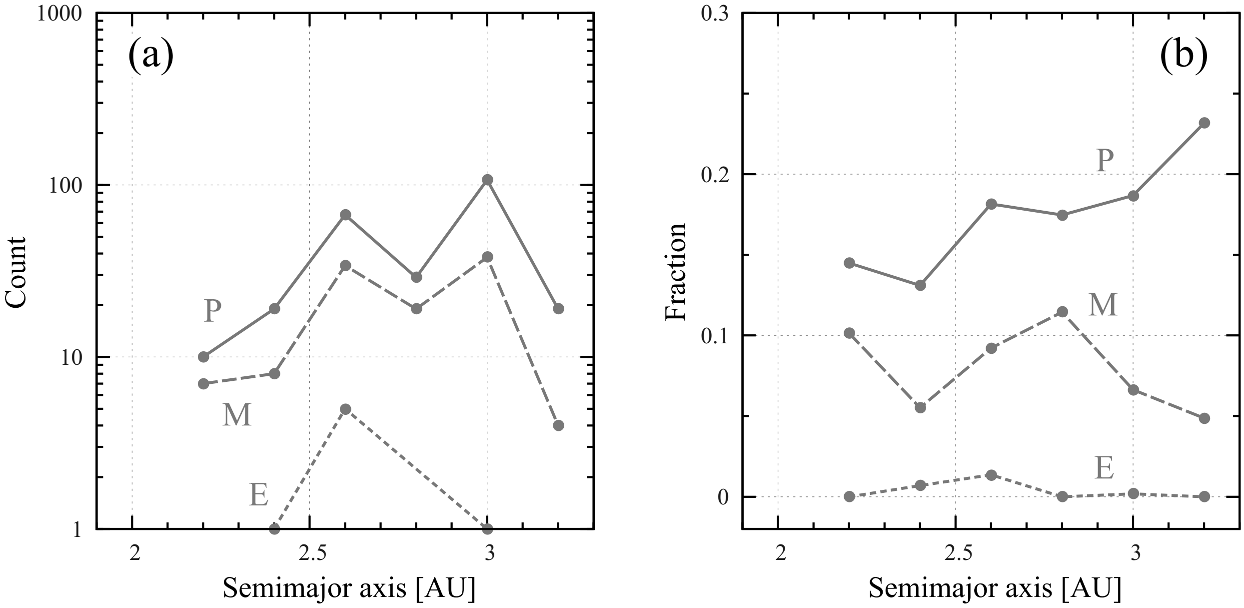


Figure 3.8 Histograms showing the numerical distribution (a) and fractional distribution (b) of X-type MBAs with $d \geq 20$ km. Dotted, dashed, and bold lines denote E-, M-, and P-type asteroids, respectively.

Table 3.4 Large ($d > 20$ km) E-type asteroids.

Asteroid	d [km]	$p_{\rm v}$	Region	T$^{(a)}$	B$^{(b)}$	L$^{(c)}$
(44) Nysa	75.66 ± 0.74	0.479 ± 0.013	inner	E	Xc	⋯
(55) Pandora	63.30 ± 0.97	0.337 ± 0.013	middle	M	X	⋯
(64) Angelina	54.29 ± 0.48	0.515 ± 0.012	middle	E	Xe	⋯
(71) Niobe	80.86 ± 0.80	0.326 ± 0.008	middle	S	Xe	⋯
(214) Aschera	26.07 ± 0.34	0.419 ± 0.013	middle	E	Xc	B
(504) Cora	30.39 ± 0.35	0.336 ± 0.010	middle	⋯	X	X
(665) Sabine	53.01 ± 0.77	0.365 ± 0.012	outer	⋯	⋯	X

(a) Tholen class (Tholen 1984).
(b) Bus class (Bus & Binzel 2002b).
(c) Lazzaro class (Lazzaro et al. 2004).

teroids with diameters $d > 20$ km: E-, M-, and P-types. Traditionally the distribution of X-subclasses were described in Bell et al. (1989) based on Tholen taxonomy (Tholen 1984), however they did not have detailed albedo information. Figure 3.8 shows revised distributions based on the AcuA data set. The number of identified E-type asteroids larger than 20 km is only seven (see Table 3.4). These large E-type asteroids are non-family members except for (44) Nysa. Although E-type members are primarily located in the inner asteroid belt, five of seven large E-types are the middle MBAs. One E-type in the outer MBAs is (665) Sabine ($d = 53.01$ km, $p_{\rm v} = 0.365$, $a = 3.14$ AU), which has a detailed shape model (Michałowski et al. 2006). A major group in the X-subclasses is the P-type, which accounts for 68% of our X-type sample ($d > 20$ km). Throughout the main belt region, P-type asteroids are dominant among the X-types. In Fig.3.8(b), the abundance of P-types increases beyond 3 AU, while that of M-types decreases. The distribution of P-types is similar to that of C- or D-types in Fig.3.7(b). The mean albedo of P-types is 0.054 ± 0.017 of total 251 (Table 3.3), which is also similar to C: 0.066 ± 0.031, or D: 0.077 ± 0.041 (Table 3.2). From this, it can be conjectured that P-type asteroids have similar origin or similar evolutional process, to C- or D-types, though the actual component of X-types are not fully understood yet.

Figure 3.9 presents the dependency of mean albedo on heliocentric distance. In the total population of asteroids, albedo gradually decreases as the semimajor axis increases; i.e.,

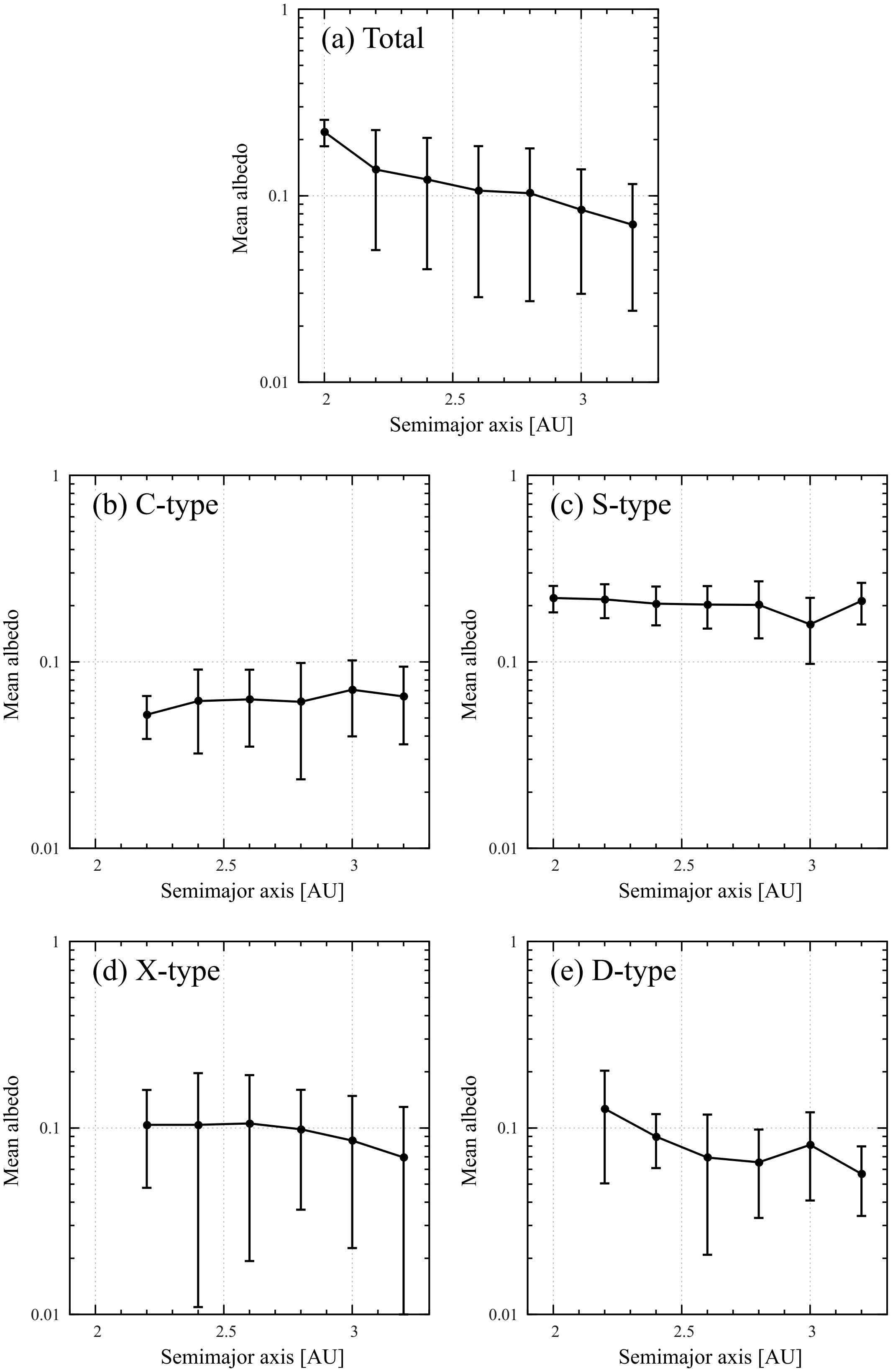


Figure 3.9 Mean albedo as a function of the semimajor axis for MBAs with $d \geq 20$ km for each of the taxonomic types. Bars represent variations of albedo in each region.

asteroids located further from the Sun are darker. On the other hand, within individual taxonomic types, the heliocentric distributions of mean albedo are nearly constant throughout the entire main belt, although albedo variations at any given distance are large. Thus, the albedo within a given taxonomic type is relatively independent of heliocentric distance. The cause of the decline in the mean albedo of the total distribution in outer regions is not the heliocentric distance itself, but the influence of the compositional mixing ratios of taxonomic types, as observed in Fig.3.7.

3.4 Discussion about albedo variations

As observed in Fig.3.4, the albedo of asteroids is dependent on its size. This does not mean, however, that smaller asteroids tend to have higher albedos; rather, it implies that the diversity of albedo values is greater for smaller asteroids than for larger asteroids. AcuA provides a complete data set for $H < 10.3$, which corresponds to $d > 20$ km. Moreover, detectability with AKARI does not depend on albedo. This is because the thermal flux of an asteroid is hardly dependent on albedo (surface temperature is proportional to $(1 - A_{\mathrm{B}})^{1/4}$, which has a value in a range from 0.99 to 0.93 with $p_{\mathrm{v}} = 0.01$–0.6, see Eq. (2.5)), while the visible reflected component of sunlight is proportional to the albedo. For these reasons, the scatter in albedo among the smaller objects should be real, not a bias effect; even so, taxonomic information is available only for 53% of the total MBAs in AcuA, or 71% of $d > 20$ km MBAs in AcuA. Taxonomic classifications are derived from spectroscopic studies of asteroids, which have strong observational selection biases. Especially for asteroid with $d < 20$ km, our study of the size-albedo distribution of MBAs rapidly becomes incomplete due to the sensitivity limits of AKARI.

Spacecraft explorations show that most asteroid surfaces are covered with regolith and/or numerous boulders in a wide range of sizes. For example, a unique boulder with an unusually low brightness is found to sit on top of the asteroid (25143) Itokawa like a benchmark (Fig.3.10) by the Hayabusa spacecraft (Fujiwara et al. 2006). Several interpretations for the origin of this distinct "black boulder", which is about 40% darker than surrounding materials, have been considered (e.g., Hirata & Ishiguro 2011). Such local heterogeneities are averaged out and nearly homogenized in the global view, and only a small degree of regional variation on surfaces is observed. However, especially for smaller asteroids, the effects of these heterogeneities are conspicuous relative to their sizes. This could partly explain the albedo variations at smaller sizes.

For S-type asteroids, albedo dependency can be explained by the space weathering of stony chondritic asteroids. The collisional life times and surface ages of S-type asteroids are correlated with their sizes (Davis et al. 2002; Bottke et al. 2005; Nesvorný et al. 2005); thus, fresher and smaller objects are less space weathered and their albedos are relatively

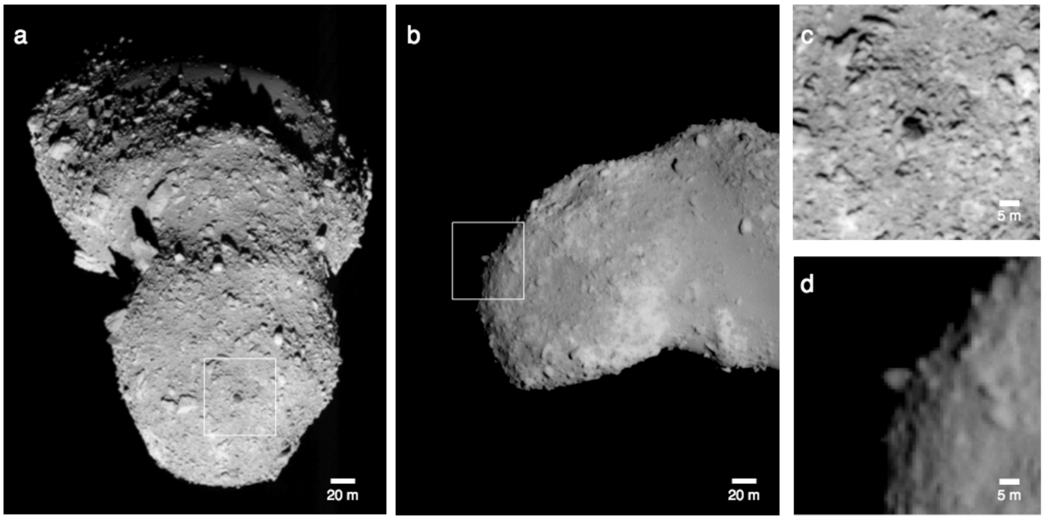


Figure 3.10 Black boulder on (25143) Itokawa, found by the Hayabusa spacecraft. Figure adapted from Hirata & Ishiguro (2011).

higher (Burbine et al. 2008; Thomas et al. 2011). Space weathering effects cause the visible and near-infrared reflectance spectra of stony asteroids to be darker and redder than those of pristine materials (Sasaki et al. 2001). Ground-based observations suggest that a color transition exists between ordinary chondrite-like objects and S-type asteroids over the size range 0.1–5 km, which implies that the surfaces of small stony asteroids are evolving towards the colors of large asteroids (Binzel et al. 2004, 2010). Our data indicate that the albedo transition occurs in the size range of $d > 5$ km.

In contrast to S-type asteroids, the reason for the albedo transition in C-type asteroids is less known. The relationship between age and the space weathering effect in C-type asteroids has been mentioned in several papers (e.g., Nesvorný et al. 2005; Lazzarin et al. 2006), however, the relationship is still uncertain, mainly on account of the "darkness" of C-type asteroids. Laboratory measurements indicate that thermally metamorphosed samples of carbonaceous chondrites possess high absolute reflectance (Hiroi et al. 1994), which could cause the high albedo of asteroids. Figure 3.11 shows the dependence of the absolute reflectance of chondrites on the degree of metamorphism (Clark et al. 2009). The classification of metamorphism in chondritic meteorites is qualitatively determined

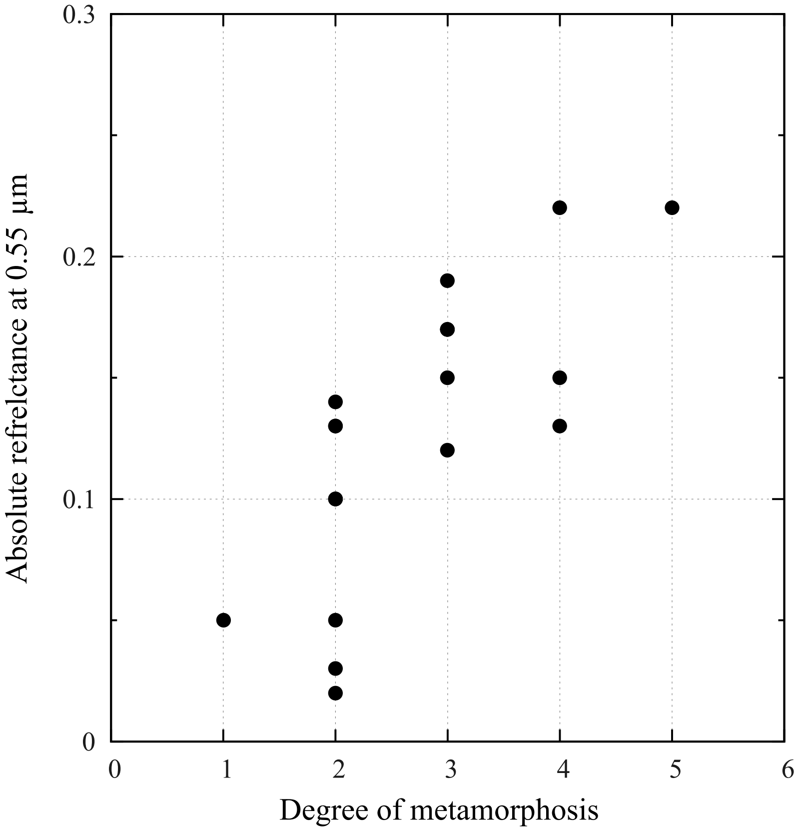


Figure 3.11 Absolute reflectance of meteorites at 0.55 μm measured in laboratories as a function of the degree of metamorphosis/alteration. Type 3 materials are the most pristine, types 4–6 represent an increasing degree of thermal metamorphism, and types 2–1 represent an increasing degree of aqueous alteration. Data compiled from Clark et al. (2009).

(Weisberg et al. 2006): the most pristine materials are type 3; types 4–6 represent an increasing degree of thermal metamorphism, and types 2–1 represent an increasing degree of aqueous alteration. While thermal metamorphism and aqueous alteration are related to different mechanisms of recrystallization, the classification from 1 to 6 can be taken to represent an increasing degree of metamorphism. The metamorphism of chondrites occurs in the inner parts of the parent body, which is internally heated by the decay energy of short-lived radioisotopes (e.g., Trieloff et al. 2003; Greenwood et al. 2010). In a catastrophic disruption caused by a highly energetic impact, small fragments, including those from the inner portion of a parent body, are exposed. Asteroids smaller than a few tens of kilometers are considered to be formed mainly by collisional breakup (Bottke et al. 2005); thus, the high albedo of some materials may have been derived from deeper thermal metamorphic processes. In other materials, however, the albedo might be due to the presence of reaccumulated fragments (e.g., Davis et al. 1979; Fujiwara 1982), and/or a regolith layer (Hiroi & Pieters 1992, 1994). Thus, a variety of processes might cause the albedo variation at smaller sizes.

No clear dependency of albedo on size is found for D-type asteroids in Fig.3.4(d), while the number of detected D-types is relatively small. Some researchers have distinguished between the features of inner D-type and outer D-type varieties of D-type asteroids (e.g., Lagerkvist et al. 2005; Mothé-Diniz 2009). D-type asteroids dominate the Jovian Trojans, but become rarer at smaller heliocentric distances. As discussed by Carvano et al. (2003), the variations in D-type asteroids might be related to different origins and evolutionary histories, or to different processes of differentiation occurring closer to the Sun. Indeed, the actual mineralogical characterization of D-type asteroids is difficult to ascertain because of their small number of samples (except for the Tagish Lake meteorite; Hiroi et al. 2001).

Table 3.5 Reference list of previous works of the taxonomic types of asteroids.

(E1)	Jewitt & Luu 1990	(E15)	Le Bras et al. 2001	(E29)	Lazzarin et al. 2005
(E2)	Barucci & Lazzarin 1993	(E16)	Manara et al. 2001	(E30)	Marchi et al. 2005
(E3)	Dahlgren & Lagerkvist 1995	(E17)	Mothé-Diniz et al. 2001	(E31)	Alvarez-Candal et al. 2006
(E4)	Xu et al. 1995	(E18)	Fornasier et al. 2003	(E32)	Dotto et al. 2006
(E5)	Dahlgren et al. 1997	(E19)	Rivkin et al. 2003	(E33)	de León et al. 2006
(E6)	Di Martino et al. 1997	(E20)	Yang et al. 2003	(E34)	Michelsen et al. 2006
(E7)	Lazzarin et al. 1997	(E21)	Bendjoya et al. 2004	(E35)	Davies et al. 2007
(E8)	Doressoundiram et al. 1998	(E22)	Binzel et al. 2004	(E36)	Licandro et al. 2008
(E9)	Hicks et al. 1998	(E23)	Duffard et al. 2004	(E37)	Moskovitz et al. 2008a
(E10)	Hicks et al. 2000	(E24)	Fornasier et al. 2004	(E38)	Moskovitz et al. 2008b
(E11)	Zappalà et al. 2000	(E25)	Marchi et al. 2004	(E39)	Mothé-Diniz & Nesvorný 2008a
(E12)	Binzel et al. 2001	(E26)	Lazzarin et al. 2004a	(E40)	Mothé-Diniz & Nesvorný 2008b
(E13)	Cellino et al. 2001	(E27)	Lazzarin et al. 2004b	(E41)	Roig et al. 2008
(E14)	Fornasier & Lazzarin 2001	(E28)	Lagerkvist et al. 2005	(E42)	Duffard & Roig 2009

4

Conclusion

Constructing AKARI asteroid catalog (AcuA)

We constructed an unbiased asteroid catalog from the mid-infrared part of the All-Sky Survey with the Infrared Camera (IRC) on board AKARI. About 20% of the point source events recorded in the IRC All-Sky Survey observations were not used for the IRC Point Source Catalog in its production process because of a lack of multiple detection by position. Asteroids, which are moving objects on the celestial sphere, are included in these "residual events". We identified asteroids out of the residual events by matching them with the positions of known asteroids. For the identified asteroids, we calculated the size and albedo based on the Standard Thermal Model. Finally we had a new brand of asteroid catalog, which contains 5120 objects, about twice as many as the former IRAS asteroid catalog. This new catalog is named *the Asteroid Catalog Using AKARI*, or *AcuA*.

AcuA, which was constructed based on the 16-month All-Sky Survey data, provides a complete data set of all asteroids brighter than absolute magnitude of $H < 9$ within the semimajor axis of $a < 6$ AU, and $H < 10.3$ for all main belt asteroids (MBAs). $H < 10.3$ for MBAs corresponds to $d > 20$ km in diameter.

Studying albedo properties of the main belt asteroids based on AcuA

Using the AcuA data set, we have presented an analysis of the albedo properties of MBAs. As is already known, the albedo distribution of MBAs is strongly bimodal;

this trend is present not only in the distribution of the total population, but also in the distributions of inner, middle, and outer MBAs. The bimodal distributions are separated into two major groups at an albedo value of $p_{\rm v} \sim 0.1$, which demarcates low-albedo C-type and high-albedo S-type asteroids. In each group, the albedo distribution is size-dependent, and the variation in albedo values is greater at smaller sizes. For smaller asteroids, the effects of surface heterogeneities on albedo are relatively large, while such local heterogeneities are averaged out and seemingly homogenized for larger asteroids. Moreover, albedo distributions in S-type asteroids appear to be affected by the space weathering, whereas the albedo distributions in C-type asteroids are partially explained by the effect of metamorphism.

We examined the heliocentric distributions of mean albedo values for each taxonomic type. In spite of the influence of the space weathering and other albedo transition processes, the mean albedo is nearly constant and independent of heliocentric distance throughout the entire main belt region, irrespective of taxonomic type. In the total distribution, on the other hand, the mean albedo value gradually decreases with increasing the semimajor axis, presumably due to the compositional mixing ratios of taxonomic types.

Almost 90% of the X-type MBAs in the AcuA data set can now be subdivided into the E-, M-, and P-types based on the AKARI-derived albedos. The distribution of P-types, which have lower albedos among the X-types, is spread throughout the main belt regions, and increases beyond 3 AU, while the proportion of medium-albedo M-types decreases. P-type asteroids are considered to have similar origin or similar evolutional process, to C- or D-types.

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Appendices

A *H*–*G* magnitude system for asteroids

The absolute magnitude is a measure of the intrinsic brightness of a celestial object. For the solar system objects, the situation is more complicated than that for the stellar or galactic objects. The absolute magnitude of an asteroid is defined as the apparent visual magnitude of an asteroid located at 1 AU from the Sun and the Earth, and at a zero phase angle, although it is actually a geometrically impossible situation. Because the object is illuminated by the Sun, the apparent magnitude is a function of a phase angle. In order to predict the brightness of an asteroid as a function of phase angle, the H–G magnitude system (Bowell et al. 1989) was developed. It allows comparison of the brightness of an asteroid at different apparitions. The H–G system, as adopted at the IAU General Assembly in November 1985, has been applied extensively to spacecraft and telescopic observations of a multitude of objects throughout the solar system to derive physical and optical surface characteristics.

The apparent visual magnitude, which is the observed magnitude of an asteroid in V band, is expressed as V_{obs}. The reduced magnitude ($H(\alpha)$), which is the magnitude removed the influence of distance, i.e., relating solely to the phase angle (α), is written as:

$$H(\alpha) \quad = \quad V_{\mathrm{obs}} - 5\log(R_{\mathrm{h}}\,\Delta)\ , \qquad \text{(A.1)}$$

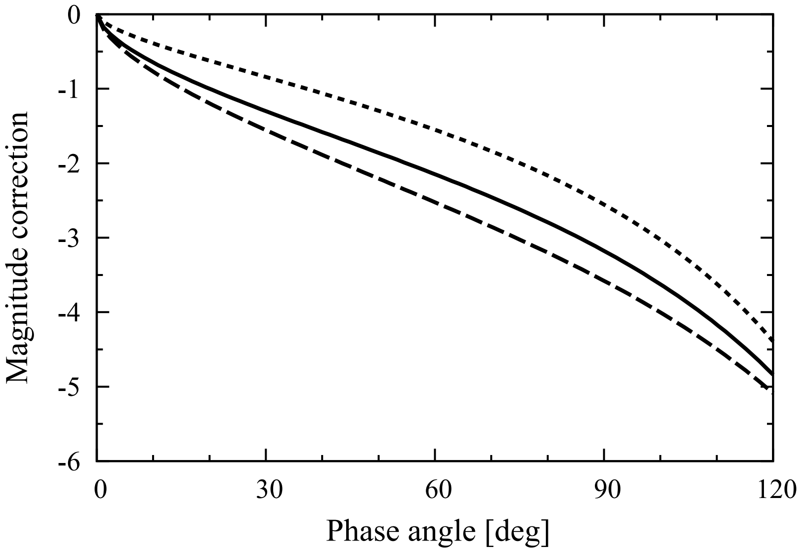

Figure A.1 Magnitude correction in Eq. (A.2) against the phase angle. Dashed, bold, and dotted lines indicate mean the correction curve of $G = 0.01$, 0.15, and 0.5, respectively. There is a pronounced increase in brightness near zero solar phase angle, which is called the "opposition effect".

where R_{h} and Δ are, respectively, the heliocentric distance of the asteroid, and the distance of the asteroid from the observer, in unit of AU (see Fig.2.11).

Based on the H–G system (Bowell et al. 1989), H is expressed as:

$$H = H(\alpha) + 2.5 \log \left\{ (1 - G)\Phi_1(\alpha) + G\Phi_2(\alpha) \right\} , \tag{A.2}$$

where Φ_i are the (empirical) phase function described as:

$$\Phi_i = \exp\left[-A_i \left(\tan\frac{\alpha}{2} \right)^{B_i} \right]; \quad i = 1, 2 \tag{A.3}$$

$$\begin{cases} A_1 = 3.33, & A_2 = 1.87, \\ B_1 = 0.63, & B_2 = 1.22, \end{cases}$$

and G is the slope parameter.

Figure A.1 shows the correction term in Eq. (A.2) plotted against the phase angle. It is common for G to be given a nominal value of 0.15 until a specific value is available. It is noted that Eq. (A.3) is valid for the range of phase angle as $0^\circ \leq \alpha \lesssim 120^\circ$. The AKARI observations were done within the range of $9.5° \leq \alpha \leq 88.3°$, while the solar elongation angle was in the range of $89° \leq \varepsilon \leq 91°$.

Thermal emission from an asteroid also have a dependency of phase angle like the visible brightness, that is, the thermal emission decreases with increasing phase angle. Matson (1971) empirically introduced the thermal-infrared phase coefficient as $\beta_{\mathrm{E}} = 0.01$ mag deg^{-1}; then the correction term (corresponding to the second terms on the right-hand side of Eq. (A.2)) is replaced simply with $\beta_{\mathrm{E}} \cdot \alpha$. This value has been used ever since to correct thermal fluxes back to zero phase angle for use in radiometric method (e.g., Lebofsky & Spencer 1989, Harris & Lagerros 2002). Although much effort has gone into explaining the visible phase curves of asteroids, there have been little attempts to match thermal phase curves with a physical model until now (e.g., Spencer 1990), partially because of technical difficulty to produce a continuous lightcurve at the mid-infrared wavelengths.

B Relationship between the absolute magnitude and asteroidal diameter and albedo

Let us assume a complete Lambertian disk that has a surface with perfect reflection. The amount of light scattered from the surface is balanced with the amount of incident light as:

$$\int_0^{2\pi} \int_0^{\pi/2} F(\alpha, \Delta) \Delta^2 \sin\alpha \, d\alpha d\varphi \quad = \quad F_0 \, S \ , \tag{B.4}$$

where $F(\alpha, \Delta)$ is the flux from the surface at the phase angle (α) and observer's distance (Δ), φ is the azimuth angle, F_0 is the incident light flux, and S is the cross section of the disk. Note that from Lambert's cosine law, $F(\alpha, \Delta) = F(0, \Delta) \cos\alpha$. By calculating the definite integral, and substituting $S = \pi(d/2)^2$, where d is the effective diameter of the disk, Eq. (B.4) can be rewritten as:

$$\pi F(0, \Delta) \Delta^2 \quad = \quad F_0 \pi (\frac{d}{2})^2 \ . \tag{B.5}$$

The geometric albedo of a object (p) is defined as *the ratio of the brightness of a body at zero phase angle to the brightness of a perfect Lambert disk of the same radius and at* *the same distance as the body, but illuminated and observed perpendicularly* (Hapke 1993, P.273). Thus:

$$\begin{aligned} p &\equiv \frac{F_{\mathrm{obj}}(0,\Delta)}{F(0,\Delta)} \\ &= \frac{F_{\mathrm{obj}}(0,\Delta)}{F_0} \cdot \frac{4\Delta^2}{d^2} \ , \end{aligned}$$

or,

$$F_{\mathrm{obj}}(0,\Delta) \ = \ \frac{1}{4} F_0 \frac{d^2 p}{\Delta^2} \ , \tag{B.6}$$

where $F_{\mathrm{obj}}(0,\Delta)$ is the flux of the object from the object at zero phase angle at distance Δ.

From basic concepts of astronomy (e.g., Pogson 1856), the magnitude is defined as:

$$m \ = \ -2.5 \log \frac{F_{\mathrm{obs}}}{F_{\mathrm{ref}}} \ , \tag{B.7}$$

where m, F_{obs}, and F_{ref} are the apparent magnitude of the object, the observed flux of the object, and some reference flux, respectively. The apparent magnitude of the Sun is written as:

$$m_{\odot} \ = \ -2.5 \log \frac{F_{\odot}}{F_{\mathrm{ref}}} \ , \tag{B.8}$$

where $m_{\odot}$ and $F_{\odot}$ are the apparent magnitude and observed flux of the Sun at 1 AU, respectively.

The absolute magnitude (H) of the object is defined as the apparent magnitude of the object in the standard V band, illuminated by the Sun at 1 AU and observed from a distance of 1 AU at a zero phase angle (described in Appendix A). Taking account of the incident flux as $F_0 = F_{\odot}$, combining Eq. (B.6) and Eq. (B.7), and using Eq. (B.8), the absolute magnitude can be derived as:

$$\begin{aligned}
H &= -2.5\,\log\frac{F_{\rm obj}(0,R_1)}{F_{\rm ref}} \\
&= -2.5\,\log\left\{\frac{\left(\frac{1}{4}F_\odot\frac{d^2p}{{R_1}^2}\right)}{F_{\rm ref}}\right\} \\
&= -2.5\,\log\frac{1}{4} - 2.5\,\log\frac{F_\odot}{F_{\rm ref}} - 2.5\,\log\frac{d^2p}{{R_1}^2} \\
&= 5\,\log 2 + m_\odot - 5\log\frac{d\sqrt{p}}{R_1}\ , \qquad \text{(B.9)}
\end{aligned}$$

where R_1 is the length of 1 AU. Thus:

$$\begin{aligned}
d &= \frac{R_1}{\sqrt{p}}\,10^{-H/5+\log(2)+m_\odot/5} \\
&= \frac{R_1\cdot 2\cdot 10^{m_\odot/5}}{\sqrt{p}}\,10^{-H/5}\ . \qquad \text{(B.10)}
\end{aligned}$$

The zero point of the magnitude system is based on the apparent magnitude of the Sun. Here the Johnson V band is used as the standard, thus, $m_\odot = -26.762 \pm 0.017$ (Campins et al. 1985) is adopted (e.g., Pravec & Harris 2007). By using $R_1 = 149,597,871$ km, Eq. (B.10) can be rewritten as:

$$d = \frac{1329}{\sqrt{p_{\rm v}}}\,10^{-H/5}\ , \qquad \text{(B.11)}$$

or,

$$\log d = 3.123555 - 0.5\log p_{\rm v} - 0.2H\ , \qquad \text{(B.11)}'$$

where p is replaced with $p_{\rm v}$, which is the visible geometric albedo. This derivation was originally introduced by Russell (1916), and the factor of 1329 in Eq. (B.11) (or the constant of 3.1236 in Eq. (B.11)$'$) has been extensively used in asteroidal studies (e.g., Fowler & Chillemi 1992).

C Mean albedo for each taxonomic class

Table C.1 summarize the mean albedo of each taxonomic class, classified according to Tholen taxonomy (Tholen 1984), Bus taxonomy (Bus & Binzel 2002b), and Carvano taxonomy (Carvano et al. 2010), respectively.

Table C.1 Summary of the numbers, mean albedos, and albedo variations of 784 asteroids detected by AKARI, classified according to taxonomy of Tholen, Bus, and Carvano.

Type	Tholen taxonomy[(a)]			Bus taxonomy[(b)]			Carvano taxonomy[(c)]		
	Class	N	$\overline{p_{\rm V}}$	Class	N	$\overline{p_{\rm V}}$	Class	N	$\overline{p_{\rm V}}$
C	B	13	0.113 ± 0.069	B	46	0.092 ± 0.056	C	701	0.069 ± 0.040
	C	178	0.061 ± 0.028	C	121	0.072 ± 0.043	CL	1	0.149
	F	35	0.058 ± 0.023	Cb	25	0.075 ± 0.058	CQ	1	0.597
	G	10	0.073 ± 0.018	Cg	8	0.069 ± 0.029	CX	66	0.061 ± 0.034
				Cgh	11	0.097 ± 0.041			
				Ch	128	0.063 ± 0.023			
S	A	5	0.282 ± 0.101	A	9	0.298 ± 0.143	A	2	0.268 ± 0.045
	R	1	0.277	K	28	0.154 ± 0.065	AQ	1	0.194
	S	339	0.213 ± 0.071	L	22	0.139 ± 0.038	L	80	0.173 ± 0.091
	O	1	0.256	Ld	7	0.137 ± 0.060	LS	32	0.194 ± 0.059
	K	23	0.143 ± 0.039	O	2	0.334 ± 0.110	O	3	0.135 ± 0.115
				Q	2	0.353 ± 0.001	Q	3	0.269 ± 0.127
				R	1	0.277	QO	1	0.054
				S	185	0.233 ± 0.069	S	120	0.218 ± 0.072
				Sa	14	0.224 ± 0.076	SA	1	0.232
				Sk	14	0.239 ± 0.059	SQ	2	0.217 ± 0.027
				Sl	28	0.218 ± 0.051			
				Sq	16	0.327 ± 0.201			
				Sr	1	0.360			
X	E	7	0.559 ± 0.140	X	101	0.119 ± 0.079	X	199	0.084 ± 0.080
	M	38	0.175 ± 0.052	Xc	49	0.100 ± 0.092	XD	10	0.080 ± 0.050
	P	39	0.049 ± 0.018	Xe	21	0.286 ± 0.201	XL	9	0.123 ± 0.066
				Xk	35	0.111 ± 0.132			
D	D	84	0.061 ± 0.030	D	7	0.086 ± 0.056	D	111	0.064 ± 0.026
	T	7	0.075 ± 0.023	T	11	0.054 ± 0.009	DL	3	0.171 ± 0.065
V	V	3	0.293 ± 0.150	V	2	0.318 ± 0.035	V	1	0.2840
	J	1	0.436						

Note: The classification is based on the references in Table 3.5.

(a) Taxonomic class of asteroids determined by Tholen (1984) and Lazzaro et al. (2004). Asteroids belonging to Q (S-type) and W (X-type) classes are not detected by AKARI.

(b) Taxonomic class of asteroids determined by Bus & Binzel (2002b) and Lazzaro et al. (2004).

(c) Taxonomic class of asteroids determined by Carvano et al. (2010). Asteroids belonging to CD, CO, CS, AV, LA, LQ, OV, QV, SO, SV, XS, DS classes are not detected by AKARI.

D Parameter dependency of the Standard Thermal Model

Figure D.2 shows the model spectra of asteroids including the reflected sunlight and the thermal emission, as the same as Fig.2.9. The Standard Thermal Model is used for the calculation (see Sect.2.2.4). Solid line in each panel denotes the same asteroidal model with $d = 100$ km, $p_{\rm v} = 0.1$, $\eta = 0.756$, $G = 0.15$, as a standard. Figure D.2 (a) shows the spectra with the same parameter but with the diameter changed; (b) with the albedo changed, (c) with the beaming parameter changed, and (d) with the slope parameter changed. The geometry (see Fig.2.11) is fixed as $R_{\rm h} = 3.0$ AU, $\Delta = 2.9$ AU, and $\alpha = 19.4°$.

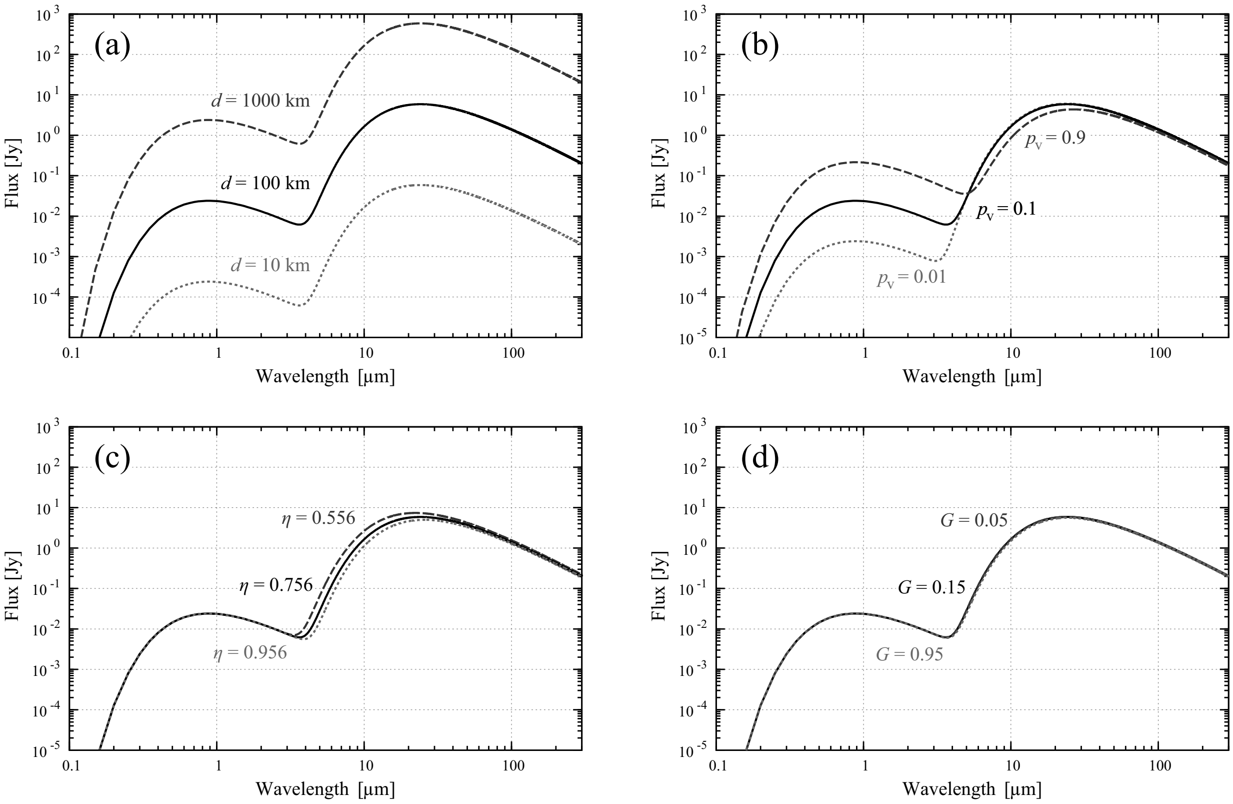

Figure D.2 Model spectra of asteroids based on the Standard Thermal Model. Black solid line in each panel indicates the same asteroid model as a standard, dashed and dotted lines depict the different models with (a) the diameter changed, (b) the albedo changed, (c) the beaming parameter changed, and (d) the slope parameter changed.

E Data of the Asteroid Catalog Using AKARI (AcuA)

The Asteroid Catalog Using AKARI, or *AcuA*, is publicly available via the Internet (`http://darts.jaxa.jp/ir/akari/catalogue/AcuA.html`) at the Data ARchives and Transmission System (DARTS), provided by Center for Science-satellite Operation and Data Archives (C-SODA) at Institute of Space and Astronautical Science (ISAS), Japan Aerospace Exploration Agency (JAXA). It contains 5120 asteroids detected in the mid-infrared region along with the size, albedo, and their associated uncertainties.

The actual data of *the Asteroid Catalog Using AKARI* (*AcuA*) is presented in Table E.2, which is the modified version of the original catalog. The asteroid number, name, and provisional designation are revised by the recent information from the minor planet center (`http://www.minorplanetcenter.net/iau/lists/NumberedMPs.txt`) retrieved on October 27th 2012. The other data including the absolute magnitude, the slope parameter, as well as the diameter and albedo, are kept as the original one.

Table E.2 The Asteroid Catalog Using AKARI (AcuA).

Asteroid		H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
1	Ceres	3.34	0.12	7	973.89	13.31	0.087	0.003
2	Pallas	4.13	0.11	12	512.59	4.98	0.150	0.004
3	Juno	5.33	0.32	8	231.09	2.60	0.246	0.007
4	Vesta	3.20	0.32	5	521.74	7.50	0.342	0.013
5	Astraea	6.85	0.15	7	110.77	1.37	0.263	0.008
6	Hebe	5.71	0.24	11	197.15	1.83	0.238	0.006
7	Iris	5.51	0.15	7	254.20	3.27	0.179	0.006
8	Flora	6.49	0.28	10	138.31	1.37	0.235	0.006
9	Metis	6.28	0.17	7	166.48	2.08	0.213	0.007
10	Hygiea	5.43	0.15	6	428.46	6.57	0.066	0.002
11	Parthenope	6.55	0.15	6	150.48	2.06	0.188	0.006
12	Victoria	7.24	0.22	5	131.51	1.98	0.130	0.005
13	Egeria	6.74	0.15	8	203.37	2.57	0.086	0.003
14	Irene	6.30	0.15	6	144.09	1.94	0.257	0.009
15	Eunomia	5.28	0.23	7	256.41	3.09	0.212	0.006
16	Psyche	5.90	0.20	6	207.22	2.98	0.181	0.006
17	Thetis	7.76	0.15	6	74.59	0.99	0.251	0.008
18	Melpomene	6.51	0.25	6	139.95	1.85	0.225	0.007
19	Fortuna	7.13	0.10	6	199.66	3.02	0.063	0.002
20	Massalia	6.50	0.25	12	131.56	1.16	0.258	0.006
21	Lutetia	7.35	0.11	8	108.38	1.28	0.181	0.005
22	Kalliope	6.45	0.21	5	139.78	2.14	0.239	0.009
23	Thalia	6.95	0.15	4	106.21	1.88	0.260	0.012
24	Themis	7.08	0.19	8	176.81	2.30	0.084	0.003
25	Phocaea	7.83	0.15	8	83.21	0.96	0.189	0.005
26	Proserpina	7.50	0.15	9	87.45	0.95	0.234	0.006
27	Euterpe	7.00	0.15	6	109.79	1.54	0.234	0.008
28	Bellona	7.09	0.15	5	97.40	1.43	0.273	0.010
29	Amphitrite	5.85	0.20	7	206.86	2.60	0.195	0.006
30	Urania	7.57	0.15	9	88.92	0.97	0.212	0.006
31	Euphrosyne	6.74	0.15	12	276.49	2.86	0.047	0.001
32	Pomona	7.56	0.15	8	83.49	0.96	0.243	0.007
33	Polyhymnia	8.55	0.33	6	53.98	0.91	0.232	0.009
34	Circe	8.51	0.15	13	116.46	1.14	0.052	0.001
35	Leukothea	8.50	0.15	5	111.48	1.85	0.060	0.002
36	Atalante	8.46	0.15	6	110.54	1.57	0.060	0.002
37	Fides	7.29	0.24	6	103.23	1.39	0.204	0.007
38	Leda	8.32	0.15	7	114.22	1.52	0.068	0.002
39	Laetitia	6.10	0.15	9	151.57	1.65	0.282	0.008
40	Harmonia	7.00	0.15	8	110.30	1.31	0.233	0.007
41	Daphne	7.12	0.10	7	179.61	2.58	0.078	0.003
42	Isis	7.53	0.15	7	104.50	1.37	0.158	0.005
43	Ariadne	7.93	0.11	5	58.75	0.87	0.347	0.013
44	Nysa	7.03	0.46	8	75.66	0.74	0.479	0.013
45	Eugenia	7.46	0.07	6	183.57	2.85	0.056	0.002
46	Hestia	8.36	0.06	8	120.62	1.53	0.055	0.002
47	Aglaja	7.84	0.16	3	147.05	3.58	0.060	0.004
48	Doris	6.90	0.15	7	200.27	2.75	0.077	0.002
49	Pales	7.80	0.15	5	148.02	2.56	0.061	0.003
50	Virginia	9.24	0.15	14	84.37	0.82	0.050	0.001
51	Nemausa	7.35	0.08	9	147.18	1.69	0.094	0.003
52	Europa	6.31	0.18	7	350.36	5.08	0.043	0.002
53	Kalypso	8.81	0.15	11	101.90	1.03	0.053	0.001
54	Alexandra	7.66	0.15	8	144.46	1.80	0.074	0.002
55	Pandora	7.80	0.15	5	63.30	0.97	0.337	0.013
56	Melete	8.31	0.15	10	105.22	1.16	0.076	0.002
57	Mnemosyne	7.03	0.15	7	108.76	1.42	0.230	0.007
58	Concordia	8.86	0.15	9	93.62	1.07	0.058	0.002
59	Elpis	7.93	0.15	7	156.18	2.31	0.049	0.002
60	Echo	8.21	0.27	3	58.95	1.24	0.265	0.014
61	Danae	7.68	0.15	8	83.56	1.02	0.216	0.006
62	Erato	8.76	0.15	12	78.62	0.90	0.091	0.002
63	Ausonia	7.55	0.25	6	87.47	1.13	0.232	0.008
64	Angelina	7.67	0.48	9	54.29	0.48	0.515	0.012
65	Cybele	6.62	0.01	6	300.54	4.82	0.044	0.002
66	Maja	9.36	0.15	8	71.79	0.92	0.062	0.002
67	Asia	8.28	0.15	10	61.63	0.65	0.230	0.006
68	Leto	6.78	0.05	11	121.96	1.19	0.233	0.006
69	Hesperia	7.05	0.19	9	132.74	1.52	0.157	0.004
70	Panopaea	8.11	0.14	8	141.40	1.91	0.050	0.002
71	Niobe	7.30	0.40	9	80.86	0.80	0.326	0.008
72	Feronia	8.94	0.15	10	83.11	0.94	0.068	0.002
73	Klytia	9.00	0.15	9	45.51	0.52	0.217	0.006
74	Galatea	8.66	0.15	4	113.09	2.15	0.048	0.002
75	Eurydike	8.96	0.23	9	56.22	0.62	0.147	0.004
76	Freia	7.90	0.15	11	168.36	1.95	0.043	0.001
77	Frigga	8.52	0.16	7	65.82	0.86	0.161	0.005
78	Diana	8.09	0.08	7	126.52	1.67	0.064	0.002
79	Eurynome	7.96	0.25	7	74.75	0.94	0.209	0.007
80	Sappho	7.98	0.15	7	70.84	0.93	0.245	0.008
81	Terpsichore	8.48	0.15	11	122.96	1.42	0.048	0.001
82	Alkmene	8.40	0.28	8	64.01	0.73	0.190	0.005
83	Beatrix	8.66	0.15	12	87.42	0.84	0.080	0.002
84	Klio	9.32	0.15	8	78.32	0.96	0.054	0.002
85	Io	7.61	0.15	8	150.66	1.91	0.071	0.002
86	Semele	8.54	0.15	9	117.32	1.51	0.051	0.002
87	Sylvia	6.94	0.15	7	262.67	3.86	0.043	0.002
88	Thisbe	7.04	0.14	7	195.59	2.72	0.071	0.002
89	Julia	6.60	0.15	7	146.78	1.90	0.188	0.006
90	Antiope	8.27	0.15	5	123.80	2.12	0.057	0.003
91	Aegina	8.84	0.15	9	100.17	1.23	0.051	0.002
92	Undina	6.61	0.15	6	120.93	1.70	0.275	0.009
93	Minerva	7.70	0.15	6	147.10	2.24	0.068	0.003
94	Aurora	7.57	0.15	4	179.15	3.83	0.053	0.003
95	Arethusa	7.84	0.15	2	143.78	4.89	0.062	0.005
96	Aegle	7.67	0.15	6	164.77	2.54	0.056	0.002
97	Klotho	7.63	0.15	9	87.84	0.97	0.204	0.006
98	Ianthe	8.84	0.15	10	104.24	1.29	0.047	0.001
99	Dike	9.43	0.15	6	70.60	0.99	0.060	0.002
100	Hekate	7.67	0.15	5	88.52	1.46	0.193	0.008
101	Helena	8.33	0.35	7	60.38	0.73	0.226	0.007
102	Miriam	9.26	0.15	4	94.62	1.95	0.039	0.002
103	Hera	7.66	0.15	7	83.23	1.04	0.222	0.007
104	Klymene	8.27	0.15	7	126.50	1.86	0.055	0.002
105	Artemis	8.57	0.10	9	123.53	1.50	0.043	0.001
106	Dione	7.41	0.15	6	153.42	2.38	0.084	0.003
107	Camilla	7.08	0.08	5	200.37	3.51	0.065	0.003
108	Hecuba	8.09	0.15	7	69.50	0.91	0.213	0.007
109	Felicitas	8.75	0.04	5	80.81	1.24	0.086	0.003
110	Lydia	7.80	0.20	11	82.97	0.81	0.195	0.005
111	Ate	8.02	0.15	6	146.55	2.35	0.051	0.002
112	Iphigenia	9.84	0.15	7	71.06	0.94	0.041	0.001
113	Amalthea	8.74	0.35	5	45.54	0.66	0.273	0.010
114	Kassandra	8.26	0.15	9	93.91	1.08	0.100	0.003
115	Thyra	7.51	0.12	9	80.65	0.88	0.270	0.007
116	Sirona	7.82	0.15	5	78.28	1.21	0.216	0.009
117	Lomia	7.95	0.15	8	144.92	1.86	0.056	0.002
118	Peitho	9.14	0.15	5	43.99	0.75	0.217	0.010
119	Althaea	8.42	0.15	9	58.79	0.62	0.221	0.006
120	Lachesis	7.75	0.15	12	156.53	1.67	0.058	0.002
121	Hermione	7.31	0.15	8	194.11	2.69	0.058	0.002
122	Gerda	7.87	0.15	6	85.41	1.23	0.173	0.006
123	Brunhild	8.89	0.15	7	48.22	0.60	0.214	0.007
124	Alkeste	8.11	0.19	8	81.39	0.93	0.153	0.004
125	Liberatrix	9.04	0.33	5	43.17	0.67	0.233	0.009
126	Velleda	9.27	0.15	9	43.94	0.49	0.180	0.005
127	Johanna	8.30	0.15	7	114.19	1.52	0.065	0.002
128	Nemesis	7.49	0.15	10	177.94	2.07	0.059	0.002
129	Antigone	7.07	0.33	8	119.55	1.42	0.185	0.005
130	Elektra	7.12	0.15	9	183.03	2.26	0.075	0.002
131	Vala	10.03	0.15	9	37.24	0.43	0.129	0.004
132	Aethra	9.38	0.15	5	44.47	0.74	0.161	0.006
133	Cyrene	7.98	0.13	7	70.92	0.90	0.226	0.007
134	Sophrosyne	8.76	0.28	7	100.42	1.33	0.055	0.002
135	Hertha	8.23	0.15	8	72.78	0.87	0.171	0.005
136	Austria	9.69	0.15	5	36.38	0.57	0.178	0.007
137	Meliboea	8.05	0.15	5	143.77	2.51	0.052	0.002
138	Tolosa	8.75	0.15	5	51.61	0.84	0.212	0.008
139	Juewa	7.78	0.15	5	166.69	2.77	0.049	0.002
140	Siwa	8.34	0.15	6	110.61	1.67	0.067	0.003
141	Lumen	8.20	0.15	10	132.16	1.51	0.053	0.002
142	Polana	10.27	0.15	5	50.18	0.81	0.055	0.002
143	Adria	9.12	0.15	5	91.99	1.73	0.047	0.002
144	Vibilia	7.91	0.17	9	142.20	1.76	0.060	0.002
145	Adeona	8.13	0.15	2	141.39	5.17	0.050	0.004
146	Lucina	8.20	0.11	8	126.89	1.64	0.058	0.002
147	Protogeneia	8.27	0.15	6	108.41	1.67	0.076	0.003
148	Gallia	7.63	0.15	7	80.87	1.04	0.240	0.008
149	Medusa	10.79	0.15	6	21.41	0.35	0.191	0.008
150	Nuwa	8.23	0.15	6	139.65	2.09	0.046	0.002
151	Abundantia	9.24	0.15	8	42.18	0.49	0.201	0.006
152	Atala	8.33	0.15	6	57.12	0.97	0.257	0.010
153	Hilda	7.48	0.15	4	163.48	3.12	0.068	0.003
154	Bertha	7.58	0.15	7	185.83	2.72	0.048	0.002
155	Scylla	11.39	0.15	6	39.21	0.97	0.035	0.002
156	Xanthippe	8.64	0.15	7	115.49	1.74	0.047	0.002
157	Dejanira	10.60	0.15	2	22.47	1.24	0.204	0.024
158	Koronis	9.27	0.15	6	34.45	0.54	0.299	0.011
159	Aemilia	8.12	0.15	5	130.04	2.29	0.059	0.003
160	Una	9.08	0.15	6	77.72	1.23	0.069	0.003
161	Athor	9.15	0.13	7	40.84	0.52	0.233	0.007
162	Laurentia	8.83	0.15	1	85.34	2.86	0.071	0.006
163	Erigone	9.47	-0.04	7	72.14	0.95	0.056	0.002
164	Eva	8.89	0.15	6	97.70	1.56	0.051	0.002
165	Loreley	7.65	0.15	6	173.66	2.65	0.051	0.002
166	Rhodope	9.89	0.15	12	53.26	0.62	0.076	0.002
167	Urda	9.24	0.15	10	38.36	0.46	0.245	0.007
168	Sibylla	7.94	0.15	10	146.48	1.74	0.055	0.002
169	Zelia	9.56	0.15	4	34.11	0.61	0.229	0.010
170	Maria	9.39	0.15	11	35.36	0.34	0.249	0.006
171	Ophelia	8.31	0.15	9	104.69	1.26	0.080	0.002
172	Baucis	8.79	0.15	8	66.89	0.82	0.121	0.004
173	Ino	7.66	0.01	4	160.61	3.05	0.059	0.003
174	Phaedra	8.48	0.15	8	64.08	0.77	0.187	0.005
175	Andromache	8.31	0.15	5	96.03	1.82	0.093	0.004
176	Iduna	7.90	0.15	10	119.46	1.30	0.086	0.002
177	Irma	9.49	0.15	10	73.08	0.81	0.053	0.001
178	Belisana	9.38	0.15	2	38.26	1.12	0.214	0.016
179	Klytaemnestra	8.15	0.15	8	64.25	0.79	0.245	0.007
180	Garumna	10.31	0.15	8	26.34	0.50	0.198	0.009
181	Eucharis	7.84	0.15	8	121.29	1.61	0.088	0.003
182	Elsa	9.12	0.15	7	45.15	0.62	0.209	0.007
183	Istria	9.68	0.15	3	34.55	0.84	0.201	0.012
184	Dejopeja	8.31	0.15	8	64.90	0.90	0.202	0.007
185	Eunike	7.62	0.15	5	167.72	2.83	0.057	0.002
186	Celuta	8.91	0.15	10	48.79	0.50	0.205	0.005
187	Lamberta	8.16	0.15	7	130.44	1.89	0.057	0.002
188	Menippe	9.22	0.15	9	39.33	0.44	0.238	0.007
189	Phthia	9.33	0.15	5	42.47	0.67	0.181	0.007
190	Ismene	7.59	0.15	4	179.89	3.64	0.051	0.003
191	Kolga	9.07	0.15	7	100.93	1.40	0.041	0.001
192	Nausikaa	7.13	0.03	7	89.45	1.15	0.313	0.010
193	Ambrosia	9.68	0.15	6	37.89	0.65	0.179	0.008
194	Prokne	7.68	0.15	10	166.72	1.89	0.054	0.001
195	Eurykleia	9.01	0.15	9	89.38	1.10	0.055	0.002
196	Philomela	6.54	0.15	6	141.78	2.02	0.213	0.007
197	Arete	9.18	0.15	8	33.38	0.39	0.345	0.010
198	Ampella	8.33	0.15	9	60.87	0.69	0.223	0.006
199	Byblis	8.30	0.15	3	54.65	1.33	0.285	0.017
200	Dynamene	8.26	0.15	8	133.84	1.72	0.049	0.002

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_V	$\sigma(p_V)$
201	Penelope		8.43	0.24	4	65.85	1.15	0.177	0.008
202	Chryseis		7.42	0.15	8	88.72	1.03	0.245	0.007
203	Pompeja		8.76	0.15	4	108.20	2.14	0.047	0.002
204	Kallisto		8.89	0.15	10	51.03	0.60	0.191	0.005
205	Martha		9.23	0.15	8	82.19	1.06	0.054	0.002
206	Hersilia		8.68	0.15	12	93.93	0.94	0.068	0.002
207	Hedda		9.92	0.15	6	63.91	1.00	0.047	0.002
208	Lacrimosa		8.96	0.15	6	40.08	0.70	0.292	0.012
209	Dido		8.24	0.15	6	133.43	2.06	0.051	0.002
210	Isabella		9.33	0.15	8	69.58	0.92	0.068	0.002
211	Isolda		7.89	0.12	11	153.49	1.71	0.052	0.001
212	Medea		8.28	0.15	5	153.72	2.88	0.037	0.002
213	Lilaea		8.64	0.15	8	76.31	0.97	0.107	0.003
214	Aschera		9.50	0.51	9	26.07	0.34	0.419	0.013
215	Oenone		9.59	0.15	10	35.92	0.41	0.202	0.006
216	Kleopatra		7.30	0.29	7	121.55	1.60	0.149	0.005
217	Eudora		9.80	0.15	5	67.80	1.18	0.046	0.002
218	Bianca		8.60	0.32	10	60.75	0.62	0.181	0.005
219	Thusnelda		9.32	0.15	6	42.35	0.57	0.184	0.006
220	Stephania		11.00	0.15	13	32.29	0.33	0.069	0.002
221	Eos		7.67	0.13	6	107.74	1.51	0.131	0.005
222	Lucia		9.13	0.15	10	52.82	0.60	0.143	0.004
223	Rosa		9.68	0.15	5	80.93	1.46	0.037	0.002
224	Oceana		8.59	0.15	9	54.26	0.59	0.222	0.006
225	Henrietta		8.72	0.15	8	107.57	1.50	0.051	0.002
226	Weringia		9.70	0.15	10	32.26	0.36	0.226	0.006
227	Philosophia		8.70	0.15	6	95.61	1.56	0.064	0.002
228	Agathe		12.48	0.15	7	9.67	0.16	0.198	0.008
229	Adelinda		9.13	0.15	12	109.41	1.20	0.034	0.001
230	Athamantis		7.35	0.27	9	108.28	1.18	0.173	0.005
231	Vindobona		9.20	0.15	8	80.07	0.97	0.058	0.002
232	Russia		10.25	0.15	6	53.17	0.80	0.050	0.002
233	Asterope		8.21	0.15	11	93.02	0.96	0.108	0.003
234	Barbara		9.02	0.15	7	47.80	0.68	0.192	0.007
235	Carolina		8.82	0.15	8	59.94	0.73	0.147	0.004
236	Honoria		8.18	-0.02	9	81.31	0.96	0.144	0.004
237	Coelestina		9.24	0.15	5	39.51	0.69	0.230	0.010
238	Hypatia		8.18	0.15	11	143.97	1.55	0.046	0.001
239	Adrastea		10.30	0.15	6	40.79	0.73	0.084	0.004
240	Vanadis		9.00	0.15	7	90.13	1.22	0.055	0.002
241	Germania		7.58	0.15	6	181.57	2.93	0.050	0.002
242	Kriemhild		9.20	0.15	8	45.14	0.51	0.184	0.005
243	Ida		9.94	0.15	9	29.00	0.43	0.229	0.008
244	Sita		12.20	0.15	5	11.60	0.26	0.176	0.009
245	Vera		7.82	0.15	9	72.88	0.91	0.252	0.008
246	Asporina		8.62	0.15	9	59.93	0.66	0.177	0.005
247	Eukrate		8.04	0.15	10	150.24	1.66	0.048	0.001
248	Lameia		10.21	0.15	7	51.65	0.75	0.055	0.002
249	Ilse		11.33	0.15	6	37.03	0.61	0.038	0.001
250	Bettina		7.58	0.15	7	109.37	1.48	0.142	0.005
251	Sophia		10.00	0.15	9	29.65	0.42	0.207	0.007
252	Clementina		9.10	0.15	9	67.67	0.82	0.090	0.003
253	Mathilde		10.20	0.15	6	54.01	0.87	0.050	0.002
254	Augusta		12.13	0.15	9	12.17	0.23	0.174	0.007
255	Oppavia		10.39	0.15	8	56.21	0.78	0.039	0.001
256	Walpurga		9.80	0.15	8	61.71	0.84	0.057	0.002
257	Silesia		9.47	0.15	10	79.20	0.97	0.046	0.001
258	Tyche		8.50	0.23	6	64.37	0.89	0.173	0.006
259	Aletheia		7.76	0.15	7	174.67	2.37	0.046	0.002
260	Huberta		8.97	0.15	7	95.20	1.36	0.054	0.002
261	Prymno		9.44	0.19	8	44.72	0.53	0.149	0.004
262	Valda		11.67	0.15	3	16.47	0.75	0.140	0.014
263	Dresda		10.40	0.15	6	25.74	0.57	0.188	0.009
264	Libussa		8.42	0.15	10	57.57	0.62	0.231	0.006
265	Anna		11.20	0.15	5	26.54	0.58	0.084	0.004
266	Aline		8.80	0.15	7	101.99	1.40	0.051	0.002
267	Tirza		10.50	0.15	11	55.85	0.62	0.036	0.001
268	Adorea		8.28	0.15	8	136.35	1.76	0.046	0.001
269	Justitia		9.50	0.15	10	58.93	0.64	0.082	0.002
270	Anahita		8.75	0.15	5	46.93	0.69	0.258	0.009
271	Penthesilea		9.80	0.15	7	64.00	0.94	0.055	0.002
272	Antonia		10.70	0.15	7	23.89	0.49	0.167	0.008
273	Atropos		10.26	0.15	10	31.37	0.33	0.144	0.004
274	Philagoria		10.10	0.15	5	27.32	0.71	0.230	0.014
275	Sapientia		8.85	0.15	7	118.86	1.76	0.036	0.001
276	Adelheid		8.56	0.15	8	135.30	2.09	0.036	0.001
277	Elvira		9.84	0.15	9	29.39	0.45	0.246	0.009
278	Paulina		9.40	0.15	5	34.04	0.53	0.273	0.011
279	Thule		8.57	0.15	3	113.04	3.11	0.051	0.003
280	Philia		10.70	0.15	8	43.15	0.63	0.050	0.002
281	Lucretia		12.02	0.28	3	12.27	0.54	0.185	0.018
282	Clorinde		10.91	0.15	8	37.88	0.48	0.054	0.002
283	Emma		8.72	0.15	12	122.07	1.38	0.039	0.001
284	Amalia		10.05	0.11	9	57.84	0.72	0.051	0.001
285	Regina		10.50	0.15	6	52.25	0.93	0.041	0.002
286	Iclea		8.98	0.15	8	109.11	1.49	0.038	0.001
287	Nephthys		8.30	0.22	6	65.83	0.94	0.197	0.007
288	Glauke		9.84	0.15	11	32.29	0.47	0.199	0.007
289	Nenetta		9.51	0.15	2	30.92	1.39	0.291	0.030
291	Alice		11.45	0.15	7	13.19	0.32	0.270	0.014
292	Ludovica		9.50	0.15	10	31.68	0.36	0.281	0.008
293	Brasilia		9.94	0.15	8	57.72	0.74	0.056	0.002
294	Felicia		9.60	0.15	10	53.90	0.60	0.089	0.002
295	Theresia		10.19	0.15	4	27.58	0.83	0.199	0.013
297	Caecilia		9.50	0.15	7	42.28	0.70	0.158	0.006
298	Baptistina		11.00	0.15	10	20.53	0.27	0.170	0.005
299	Thora		11.40	0.15	3	16.69	0.65	0.178	0.015
300	Geraldina		9.60	0.15	7	79.42	1.20	0.041	0.001
301	Bavaria		10.10	0.15	6	51.90	0.82	0.060	0.002
302	Clarissa		10.89	0.15	7	34.44	0.48	0.068	0.002
303	Josephina		8.70	0.15	5	98.74	1.73	0.060	0.003
304	Olga		9.74	0.07	5	71.26	1.30	0.044	0.002
305	Gordonia		8.77	0.15	7	48.57	0.75	0.234	0.008
306	Unitas		8.96	0.15	6	46.24	0.64	0.219	0.008
307	Nike		10.12	0.15	4	59.51	1.32	0.045	0.002
308	Polyxo		8.17	0.21	7	135.25	1.71	0.052	0.002
309	Fraternitas		10.40	0.15	7	43.85	0.62	0.064	0.002
310	Margarita		10.30	0.15	8	30.57	0.50	0.145	0.005
311	Claudia		9.89	0.15	6	29.78	0.56	0.221	0.010
312	Pierretta		8.89	0.15	12	47.79	0.44	0.221	0.005
313	Chaldaea		8.90	0.15	8	94.93	1.24	0.054	0.002
314	Rosalia		9.50	0.15	7	57.07	0.95	0.087	0.003
316	Goberta		9.80	0.15	7	58.33	0.89	0.063	0.002
317	Roxane		10.03	0.15	5	16.88	0.39	0.610	0.032
318	Magdalena		9.40	0.15	9	92.76	1.13	0.036	0.001
319	Leona		9.80	0.15	10	65.90	0.92	0.051	0.002
320	Katharina		10.70	0.15	8	23.88	0.42	0.165	0.007
321	Florentina		10.04	0.15	5	25.10	0.63	0.277	0.015
322	Phaeo		9.01	0.15	7	71.99	0.93	0.085	0.003
323	Brucia		9.73	0.15	6	37.29	0.76	0.165	0.007
324	Bamberga		6.82	0.09	7	229.69	3.31	0.063	0.002
325	Heidelberga		8.65	0.15	12	76.48	0.83	0.105	0.003
326	Tamara		9.36	0.15	6	89.42	1.51	0.040	0.002
327	Columbia		10.10	0.15	5	26.17	0.66	0.250	0.015
328	Gudrun		8.60	0.15	6	125.01	1.97	0.041	0.001
329	Svea		9.66	0.15	9	70.39	0.84	0.049	0.001
330	Adalberta	A910 CB	12.60	0.15	2	12.48	0.69	0.108	0.013
331	Etheridgea		9.62	0.15	8	77.75	1.06	0.042	0.001
332	Siri		9.50	0.15	7	42.51	0.67	0.158	0.006
333	Badenia	1892 A	9.46	0.15	2	69.73	2.80	0.061	0.006
334	Chicago	1892 L	7.64	0.15	9	167.21	2.11	0.057	0.002
335	Roberta	1892 C	8.96	0.15	9	92.12	1.13	0.055	0.002
336	Lacadiera	1892 D	9.76	0.15	8	69.16	0.89	0.047	0.002
337	Devosa	1892 E	8.74	0.19	6	66.63	0.98	0.127	0.005
338	Budrosa	1892 F	8.50	0.15	7	78.00	1.04	0.116	0.004
339	Dorothea	1892 G	9.24	0.15	8	45.48	0.56	0.174	0.005
340	Eduarda	1892 H	9.90	0.15	10	31.26	0.35	0.200	0.005
341	California	1892 J	10.55	0.15	4	17.20	0.28	0.360	0.015
342	Endymion	1892 K	10.22	0.15	5	55.50	0.96	0.050	0.002
343	Ostara	1892 N	11.56	0.15	5	22.33	0.58	0.086	0.005
344	Desiderata	1892 M	8.08	0.15	6	132.88	2.06	0.059	0.002
345	Tercidina	1892 O	8.71	0.10	12	99.24	0.99	0.060	0.002
346	Hermentaria	1892 P	7.13	0.15	11	93.02	0.89	0.294	0.007
347	Pariana	1892 Q	8.96	0.15	7	51.37	0.64	0.177	0.006
348	May	1892 R	9.40	0.15	11	81.32	0.93	0.046	0.001
349	Dembowska	1892 T	5.93	0.37	8	164.65	1.84	0.277	0.008
350	Ornamenta	1892 U	8.37	0.15	8	117.20	1.49	0.058	0.002
351	Yrsa	1892 V	8.98	0.15	9	44.55	0.55	0.230	0.007
352	Gisela	1893 B	10.01	0.15	8	26.76	0.34	0.249	0.008
354	Eleonora	1893 A	6.44	0.37	6	149.62	1.98	0.211	0.007
355	Gabriella	1893 E	10.40	0.15	5	24.60	0.50	0.207	0.010
356	Liguria	1893 G	8.22	0.15	8	136.56	1.88	0.049	0.002
357	Ninina	1893 J	8.72	0.15	8	110.43	1.52	0.048	0.002
358	Apollonia	1893 K	9.10	0.15	7	89.39	1.24	0.052	0.002
359	Georgia	1893 M	8.86	0.15	8	50.78	0.63	0.198	0.006
360	Carlova	1893 N	8.48	0.15	8	121.52	1.58	0.049	0.002
361	Bononia	1893 P	8.22	0.15	8	151.78	2.33	0.040	0.001
362	Havnia	1893 R	9.00	0.15	9	85.11	1.03	0.062	0.002
363	Padua	1893 S	9.01	0.15	6	90.88	1.45	0.053	0.002
364	Isara	1893 T	9.86	0.15	11	28.78	0.30	0.244	0.006
365	Corduba	1893 V	9.18	0.15	10	103.90	1.23	0.035	0.001
366	Vincentina	1893 W	8.50	0.15	16	86.18	0.74	0.097	0.002
367	Amicitia	1893 AA	10.70	0.15	6	16.78	0.40	0.343	0.018
368	Haidea	1893 AB	9.93	0.15	7	65.79	0.95	0.044	0.002
369	Aeria	1893 AE	8.52	0.15	9	65.39	0.72	0.163	0.004
370	Modestia	1893 AC	10.68	0.15	9	38.40	0.45	0.065	0.002
371	Bohemia	1893 AD	8.72	0.15	6	45.66	0.62	0.277	0.009
372	Palma	1893 AH	7.20	0.15	6	177.21	2.63	0.075	0.003
373	Melusina	1893 AJ	9.13	0.15	10	96.65	1.23	0.043	0.001
374	Burgundia	1893 AK	8.67	0.15	8	52.83	0.63	0.217	0.006
375	Ursula	1893 AL	7.47	0.27	8	193.63	2.52	0.049	0.001
376	Geometria	1893 AM	9.49	0.15	8	34.80	0.37	0.235	0.006
377	Campania	1893 AN	8.89	0.15	9	92.61	1.10	0.057	0.002
378	Holmia	1893 AP	9.80	0.15	10	28.95	0.47	0.261	0.009
379	Huenna	1894 AQ	8.87	0.15	8	82.35	1.08	0.075	0.002
380	Fiducia	1894 AR	9.42	0.15	7	75.72	1.02	0.053	0.002
381	Myrrha	1894 AS	8.25	0.15	7	117.12	1.58	0.065	0.002
382	Dodona	1894 AT	8.77	0.15	9	53.02	0.65	0.203	0.006
383	Janina	1894 AU	9.91	0.15	4	38.83	0.99	0.133	0.008
384	Burdigala	1894 AV	9.64	0.15	6	38.76	0.65	0.165	0.006
385	Ilmatar	1894 AX	7.49	0.15	13	83.69	0.75	0.265	0.006
386	Siegena	1894 AY	7.43	0.16	5	201.17	3.52	0.047	0.002
387	Aquitania	1894 AZ	7.41	0.15	7	105.06	1.34	0.174	0.005
388	Charybdis	1894 BA	8.57	0.07	6	120.93	1.84	0.045	0.002
389	Industria	1894 BB	7.88	0.15	8	79.32	0.95	0.201	0.006
390	Alma	1894 BC	10.39	0.15	5	24.31	0.53	0.228	0.012
391	Ingeborg	1894 BE	10.10	0.15	9	18.15	0.19	0.495	0.013
392	Wilhelmina	1894 BF	9.70	0.15	11	58.99	0.62	0.067	0.002
393	Lampetia	1894 BG	8.39	0.15	6	134.04	2.26	0.043	0.002
394	Arduina	1894 BH	9.66	0.15	5	33.23	0.77	0.231	0.012
395	Delia	1894 BK	10.38	0.15	6	54.08	0.94	0.043	0.002
396	Aeolia	1894 BL	9.90	0.15	6	46.28	0.73	0.102	0.004
397	Vienna	1894 BM	9.31	0.15	7	45.76	0.66	0.161	0.006
398	Admete	1894 BN	10.30	0.15	8	54.26	0.72	0.046	0.002
399	Persephone	1895 BP	9.00	0.15	9	46.27	0.55	0.211	0.006
400	Ducrosa	1895 BU	10.10	0.15	8	33.35	0.49	0.149	0.005
401	Ottilia	1895 BT	9.10	0.15	6	94.19	1.46	0.046	0.002
402	Chloe	1895 BW	9.02	0.15	3	60.55	1.42	0.119	0.007
403	Cyane	1895 BX	9.10	0.15	5	43.76	0.67	0.217	0.008
404	Arsinoe	1895 BY	9.01	0.15	8	92.98	1.15	0.052	0.002

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
405	Thia	1895 BZ	8.46	0.15	5	113.32	1.72	0.057	0.002
406	Erna	1895 CB	10.36	0.15	7	46.02	0.73	0.061	0.002
407	Arachne	1895 CC	8.88	0.15	5	97.54	1.59	0.052	0.002
408	Fama	1895 CD	9.50	0.15	4	36.94	1.21	0.209	0.014
409	Aspasia	1895 CE	7.62	0.29	4	197.25	3.72	0.041	0.002
410	Chloris	1896 CH	8.30	0.15	7	106.68	1.44	0.075	0.002
411	Xanthe	1896 CJ	8.90	0.15	6	85.76	1.27	0.067	0.002
412	Elisabetha	1896 CK	9.00	0.15	7	100.94	1.40	0.043	0.001
413	Edburga	1896 CL	10.18	0.15	5	34.19	0.58	0.130	0.005
414	Liriope	1896 CN	9.49	0.15	7	77.49	1.11	0.047	0.002
415	Palatia	1896 CO	9.21	0.15	7	87.61	1.25	0.048	0.002
416	Vaticana	1896 CS	7.89	0.20	6	88.81	1.27	0.157	0.006
417	Suevia	1896 CT	9.34	0.15	10	49.57	0.59	0.134	0.004
418	Alemannia	1896 CV	9.77	0.15	6	40.12	0.62	0.137	0.005
419	Aurelia	1896 CW	8.42	0.15	6	122.37	1.90	0.051	0.002
420	Bertholda	1896 CY	8.31	0.15	5	141.90	2.59	0.042	0.002
421	Zahringia	1896 CZ	11.78	0.15	2	11.58	0.96	0.260	0.048
422	Berolina	1896 DA	10.83	0.15	5	12.25	0.27	0.551	0.028
423	Diotima	1896 DB	7.24	0.15	6	226.91	3.11	0.049	0.002
424	Gratia	1896 DF	9.80	0.15	9	89.17	1.19	0.027	0.001
425	Cornelia	1896 DC	9.90	0.15	9	69.91	0.87	0.040	0.001
426	Hippo	1897 DH	8.42	0.15	5	121.29	2.25	0.052	0.002
427	Galene	1897 DJ	9.80	0.15	3	30.37	0.98	0.232	0.017
428	Monachia	1897 DK	11.50	0.15	10	21.79	0.26	0.097	0.003
429	Lotis	1897 DL	9.82	0.15	8	72.60	1.00	0.040	0.001
430	Hybris	1897 DM	10.30	0.15	3	41.12	1.12	0.100	0.006
431	Nephele	1897 DN	8.72	0.15	7	90.87	1.29	0.078	0.003
432	Pythia	1897 DO	8.84	0.15	7	46.80	0.58	0.236	0.007
433	Eros	1898 DQ	11.16	0.46	5	15.27	0.21	0.272	0.010
434	Hungaria	1898 DR	11.21	0.15	6	9.72	0.20	0.622	0.029
435	Ella	1898 DS	10.23	0.15	7	37.04	0.50	0.106	0.003
436	Patricia	1898 DT	9.80	0.15	5	56.92	0.97	0.066	0.003
438	Zeuxo	1898 DU	9.80	0.15	5	62.90	0.98	0.054	0.002
439	Ohio	1898 EB	9.83	0.15	10	75.60	0.90	0.037	0.001
440	Theodora	1898 EC	11.50	0.15	4	12.89	0.46	0.273	0.021
441	Bathilde	1898 ED	8.51	0.15	9	59.42	0.64	0.198	0.005
442	Eichsfeldia	1899 EE	10.03	0.15	9	65.13	0.82	0.042	0.001
443	Photographica	1899 EF	10.28	0.15	7	27.71	0.36	0.179	0.006
444	Gyptis	1899 EL	7.83	0.22	1	166.03	6.66	0.047	0.004
445	Edna	1899 EX	9.29	0.15	6	89.16	1.43	0.043	0.001
446	Aeternitas	1899 ER	8.90	0.15	8	47.16	0.54	0.222	0.006
447	Valentine	1899 ES	8.99	0.15	7	79.20	1.12	0.072	0.002
448	Natalie	1899 ET	10.30	0.15	7	47.37	0.81	0.062	0.002
449	Hamburga	1899 EU	9.47	0.15	9	63.61	0.75	0.072	0.002
450	Brigitta	1899 EV	10.28	0.15	10	37.48	0.59	0.099	0.004
451	Patientia	1899 EY	6.65	0.19	10	234.91	2.66	0.071	0.002
453	Tea	1900 FA	10.60	0.15	4	24.07	0.42	0.176	0.008
454	Mathesis	1900 FC	9.20	0.15	3	85.67	2.15	0.052	0.003
455	Bruchsalia	1900 FG	8.86	0.15	9	83.46	1.01	0.073	0.002
456	Abnoba	1900 FH	9.20	0.15	5	42.65	0.65	0.204	0.008
457	Alleghenia	1900 FJ	11.00	0.15	2	20.36	1.74	0.170	0.031
458	Hercynia	1900 FK	9.63	0.15	5	42.27	0.92	0.145	0.007
459	Signe	1900 FM	10.44	0.15	8	25.91	0.32	0.177	0.005
460	Scania	1900 FN	10.60	0.15	6	23.58	0.51	0.189	0.009
461	Saskia	1900 FP	10.48	0.15	4	43.10	1.05	0.069	0.005
462	Eriphyla	1900 FQ	9.23	0.15	8	39.22	0.49	0.239	0.007
463	Lola	1900 FS	11.82	0.15	3	22.29	0.83	0.076	0.007
464	Megaira	1901 FV	9.52	0.15	7	79.28	1.16	0.045	0.002
465	Alekto	1901 FW	9.70	0.15	10	72.64	0.86	0.045	0.001
466	Tisiphone	1901 FX	8.30	0.15	7	102.03	1.39	0.082	0.003
467	Laura	1901 FY	10.50	0.15	8	46.33	0.60	0.052	0.002
468	Lina	1901 FZ	9.83	0.15	8	59.80	0.89	0.059	0.002
469	Argentina	1901 GE	8.62	0.15	8	123.11	1.65	0.041	0.001
470	Kilia	1901 GJ	10.07	0.15	8	27.69	0.38	0.217	0.007
471	Papagena	1901 GN	6.73	0.37	6	117.44	1.50	0.261	0.009
472	Roma	1901 GP	8.92	0.15	8	47.90	0.58	0.211	0.006
474	Prudentia	1901 GD	10.60	0.15	9	38.72	0.40	0.069	0.002
475	Ocllo	1901 HN	11.88	0.15	8	18.64	0.33	0.092	0.004
476	Hedwig	1901 GQ	8.55	0.15	7	111.06	1.54	0.055	0.002
477	Italia	1901 GR	10.25	0.15	13	25.02	0.22	0.224	0.005
478	Tergeste	1901 GU	7.98	0.15	8	85.59	1.03	0.155	0.005
479	Caprera	1901 HJ	9.60	0.15	11	72.49	0.81	0.050	0.001
480	Hansa	1901 GL	8.38	0.15	10	55.94	0.58	0.254	0.007
481	Emita	1902 HP	8.60	0.15	5	103.53	1.90	0.061	0.003
482	Petrina	1902 HT	8.84	0.15	11	47.11	0.48	0.240	0.006
483	Seppina	1902 HU	8.33	0.15	12	69.63	0.71	0.172	0.004
484	Pittsburghia	1902 HX	9.86	0.15	7	32.07	0.47	0.203	0.007
485	Genua	1902 HZ	8.30	0.15	7	54.70	0.72	0.284	0.009
486	Cremona	1902 JB	10.70	0.15	5	20.96	0.38	0.230	0.010
487	Venetia	1902 JL	8.14	0.15	7	66.13	0.84	0.239	0.008
488	Kreusa	1902 JG	7.81	0.15	7	172.55	2.55	0.045	0.002
489	Comacina	1902 JM	8.32	0.15	8	134.57	1.75	0.046	0.001
490	Veritas	1902 JP	8.32	0.15	6	112.82	1.66	0.066	0.002
491	Carina	1902 JQ	8.50	0.15	9	97.15	1.14	0.075	0.002
492	Gismonda	1902 JR	9.80	0.15	6	48.35	0.71	0.092	0.003
493	Griseldis	1902 JS	10.30	0.15	6	50.52	0.85	0.054	0.002
494	Virtus	1902 JV	8.96	0.15	5	87.92	1.56	0.060	0.003
495	Eulalia	1902 KG	10.78	0.15	7	38.95	0.58	0.058	0.002
496	Gryphia	1902 KH	11.61	0.15	2	10.88	0.70	0.339	0.046
497	Iva	1902 KJ	10.02	0.11	3	36.45	1.12	0.132	0.009
498	Tokio	1902 KU	8.95	0.15	8	86.04	1.11	0.063	0.002
499	Venusia	1902 KX	9.39	0.15	7	85.75	1.60	0.043	0.002
500	Selinur	1903 LA	9.30	0.15	7	44.05	0.56	0.174	0.005
501	Urhixidur	1903 LB	8.90	0.15	8	78.58	1.01	0.079	0.002
502	Sigune	1903 LC	10.77	0.15	5	17.39	0.41	0.291	0.015
503	Evelyn	1903 LF	9.14	0.15	9	90.18	1.05	0.048	0.001
504	Cora	1902 LK	9.40	0.15	8	30.39	0.35	0.336	0.010
505	Cava	1902 LL	8.61	-0.03	9	100.55	1.24	0.063	0.002
506	Marion	1903 LN	8.85	0.15	10	99.22	1.20	0.052	0.002
507	Laodica	1903 LO	9.10	0.15	6	51.03	0.85	0.178	0.007
508	Princetonia	1903 LQ	8.24	0.15	6	139.43	2.31	0.046	0.002
509	Iolanda	1903 LR	8.40	0.15	11	59.46	0.58	0.223	0.005
510	Mabella	1903 LT	9.73	0.15	7	54.71	0.81	0.076	0.003
511	Davida	1903 LU	6.22	0.16	7	290.98	4.19	0.070	0.002
512	Taurinensis	1903 LV	10.68	0.15	7	20.87	0.36	0.225	0.010
513	Centesima	1903 LY	9.75	0.15	7	39.14	0.73	0.146	0.006
514	Armida	1903 MB	9.04	0.15	7	97.26	1.38	0.046	0.002
515	Athalia	1903 ME	11.23	0.15	3	39.76	1.38	0.037	0.003
516	Amherstia	1903 MG	8.27	0.15	12	66.26	0.62	0.199	0.005
517	Edith	1903 MH	9.35	0.15	7	83.35	1.27	0.047	0.002
518	Halawe	1903 MO	11.10	0.15	5	17.79	0.47	0.204	0.012
519	Sylvania	1903 MP	9.14	0.15	6	50.39	0.71	0.155	0.005
520	Franziska	1903 MV	10.61	0.15	5	27.70	0.61	0.135	0.007
521	Brixia	1904 NB	8.31	-0.06	8	125.37	1.64	0.053	0.002
522	Helga	1904 NC	9.12	0.15	11	100.76	1.23	0.039	0.001
523	Ada	1904 ND	9.60	0.15	2	36.51	1.44	0.192	0.017
524	Fidelio	1904 NN	9.83	0.15	6	69.30	0.97	0.043	0.002
525	Adelaide	1908 EKa	12.53	0.15	5	10.66	0.31	0.156	0.010
526	Jena	1904 NQ	10.17	0.15	7	45.19	0.74	0.076	0.003
527	Euryanthe	1904 NR	10.10	0.15	8	52.74	0.71	0.059	0.002
528	Rezia	1904 NS	9.14	0.15	9	84.62	1.04	0.057	0.002
529	Preziosa	1904 NT	10.06	0.15	8	41.21	0.53	0.099	0.003
530	Turandot	1904 NV	9.29	0.15	5	88.37	1.74	0.044	0.002
531	Zerlina	1904 NW	11.80	0.15	4	14.11	0.45	0.185	0.014
532	Herculina	1904 NY	5.81	0.26	6	216.77	2.96	0.184	0.006
533	Sara	1904 NZ	9.67	0.15	6	32.40	0.58	0.229	0.009
534	Nassovia	1904 OA	9.77	0.15	10	33.80	0.46	0.198	0.006
535	Montague	1904 OC	9.48	0.15	6	75.30	1.13	0.051	0.002
536	Merapi	1904 OF	8.08	0.15	5	146.33	2.57	0.049	0.002
537	Pauly	1904 OG	8.80	0.15	9	43.95	0.47	0.283	0.008
538	Friederike	1904 OK	9.30	0.15	10	72.86	0.84	0.064	0.002
539	Pamina	1904 OL	9.70	0.15	8	60.73	0.80	0.064	0.002
540	Rosamunde	1904 ON	10.76	0.15	8	19.12	0.29	0.265	0.010
541	Deborah	1904 OO	10.10	0.15	5	53.48	0.84	0.057	0.002
542	Susanna	1904 OQ	9.36	0.15	9	41.87	0.58	0.186	0.006
543	Charlotte	1904 OT	9.40	0.15	9	45.96	0.51	0.147	0.004
544	Jetta	1904 OU	9.90	0.15	6	34.22	0.54	0.206	0.008
545	Messalina	1904 OY	8.84	0.15	5	102.03	1.68	0.050	0.002
546	Herodias	1904 PA	9.70	0.15	8	63.91	0.79	0.058	0.002
547	Praxedis	1904 PB	9.52	0.15	9	71.37	0.87	0.054	0.002
548	Kressida	1904 PC	11.26	0.15	2	16.25	1.00	0.211	0.028
549	Jessonda	1904 PK	11.01	0.15	3	18.43	0.69	0.206	0.017
550	Senta	1904 PL	9.37	0.15	12	40.64	0.41	0.192	0.005
551	Ortrud	1904 PM	9.57	0.15	8	77.23	1.00	0.044	0.001
552	Sigelinde	1904 PO	9.40	0.15	6	77.74	1.16	0.051	0.002
553	Kundry	1904 PP	12.20	0.15	2	9.93	0.67	0.237	0.034
554	Peraga	1905 PS	8.97	0.15	10	96.98	1.17	0.049	0.001
555	Norma	1905 PT	10.60	0.15	7	31.80	0.58	0.101	0.004
556	Phyllis	1905 PW	9.56	0.15	9	35.11	0.40	0.216	0.006
557	Violetta	1905 PY	11.80	0.15	8	20.05	0.40	0.088	0.004
558	Carmen	1905 QB	9.09	0.15	10	60.11	0.66	0.114	0.003
559	Nanon	1905 QD	9.36	0.15	7	62.14	0.84	0.083	0.003
560	Delila	1905 QF	10.90	0.15	9	44.15	0.66	0.040	0.001
561	Ingwelde	1905 QG	11.21	0.15	4	24.94	0.94	0.094	0.008
562	Salome	1905 QH	9.95	0.15	3	33.26	1.00	0.170	0.012
563	Suleika	1905 QK	8.50	0.15	8	52.16	0.61	0.261	0.008
564	Dudu	1905 QM	10.43	0.15	9	50.21	0.62	0.048	0.001
565	Marbachia	1905 QN	10.88	0.15	8	27.82	0.37	0.103	0.003
566	Stereoskopia	1905 QO	8.03	0.15	9	176.87	2.23	0.035	0.001
567	Eleutheria	1905 QP	9.16	0.15	12	96.25	1.14	0.042	0.001
568	Cheruskia	1905 QS	9.10	0.15	8	76.51	1.00	0.070	0.002
569	Misa	1905 QT	10.12	0.15	5	65.29	1.22	0.037	0.002
570	Kythera	1905 QX	8.81	0.15	5	98.64	1.76	0.055	0.002
571	Dulcinea	1905 QZ	11.59	0.15	8	12.71	0.20	0.255	0.009
572	Rebekka	1905 RB	10.94	0.15	7	26.19	0.37	0.111	0.004
573	Recha	1905 RC	9.60	0.15	6	42.30	0.80	0.149	0.007
575	Renate	1905 RE	10.90	0.15	5	19.05	0.41	0.217	0.011
576	Emanuela	1905 RF	9.40	0.15	6	86.71	1.40	0.041	0.001
577	Rhea	1905 RH	9.50	0.15	4	40.71	0.97	0.172	0.010
578	Happelia	1905 RZ	9.20	0.15	5	64.58	1.12	0.089	0.004
579	Sidonia	1905 SD	7.85	0.15	6	82.69	1.16	0.188	0.006
580	Selene	1905 SE	10.20	0.15	7	48.07	0.83	0.065	0.003
581	Tauntonia	1905 SH	9.60	0.15	7	67.11	1.00	0.057	0.002
582	Olympia	1906 SO	9.11	0.15	13	42.65	0.38	0.224	0.005
583	Klotilde	1905 SP	9.01	0.15	10	83.37	1.08	0.064	0.002
584	Semiramis	1906 SY	8.71	0.24	10	52.63	0.53	0.212	0.005
585	Bilkis	1906 TA	10.40	0.15	8	57.07	0.74	0.037	0.001
586	Thekla	1906 TC	9.21	0.15	9	78.35	0.92	0.060	0.002
587	Hypsipyle	1906 TF	12.70	0.15	6	13.54	0.28	0.081	0.004
588	Achilles	1906 TG	8.67	0.15	4	133.22	3.33	0.035	0.002
589	Croatia	1906 TM	9.14	0.15	7	91.75	1.30	0.047	0.002
590	Tomyris	1906 TO	9.90	0.15	5	36.59	0.90	0.158	0.009
591	Irmgard	1906 TP	10.64	0.15	6	49.05	0.76	0.041	0.002
592	Bathseba	1906 TS	9.30	0.15	6	47.24	0.84	0.152	0.006
593	Titania	1906 TT	9.28	0.06	9	75.23	0.94	0.061	0.002
595	Polyxena	1906 TZ	8.00	0.15	8	110.44	1.41	0.091	0.003
596	Scheila	1906 UA	8.90	0.15	8	120.17	1.69	0.034	0.001
597	Bandusia	1906 UB	9.40	0.15	9	40.62	0.49	0.197	0.006
598	Octavia	1906 UC	9.53	0.15	2	78.08	3.01	0.045	0.004
599	Luisa	1906 UJ	8.71	0.15	7	62.35	0.90	0.151	0.005
600	Musa	1906 UM	10.18	0.15	10	24.33	0.36	0.259	0.009
601	Nerthus	1906 UN	9.65	0.15	9	75.33	0.95	0.043	0.001
602	Marianna	1906 TE	8.31	0.15	6	129.86	1.93	0.050	0.002
603	Timandra	1906 TJ	12.10	0.15	4	14.35	0.46	0.127	0.009
604	Tekmessa	1906 TK	9.20	0.15	3	59.76	1.86	0.112	0.009
605	Juvisia	1906 UU	9.90	0.15	6	62.74	1.10	0.050	0.002
606	Brangane	1906 VB	10.38	0.15	6	36.18	0.53	0.096	0.003
607	Jenny	1906 VC	9.50	0.15	8	62.61	0.78	0.072	0.002
608	Adolfine	1906 VD	10.60	0.15	10	26.19	0.37	0.150	0.005
609	Fulvia	1906 VF	10.00	0.15	7	52.14	0.77	0.066	0.002

Table E.2 (Continued.)

Asteroid			H	G	$N_{\rm ID}$	d	$\sigma(d)$	$p_{\rm v}$	$\sigma(p_{\rm v})$
611	Valeria	1906 VL	9.19	0.15	14	57.24	0.56	0.115	0.003
612	Veronika	1906 VN	11.20	0.15	5	44.35	0.82	0.030	0.001
613	Ginevra	1906 VP	9.67	0.15	8	75.30	1.07	0.042	0.001
614	Pia	1906 VQ	11.00	0.15	5	24.87	0.62	0.119	0.007
615	Roswitha	1906 VR	10.36	0.15	2	46.70	1.52	0.060	0.005
616	Elly	1906 VT	10.68	0.15	8	20.40	0.37	0.236	0.010
617	Patroclus	1906 VY	8.19	0.15	4	140.85	3.37	0.047	0.003
618	Elfriede	1906 VZ	8.26	0.15	8	121.54	1.59	0.060	0.002
619	Triberga	1906 WC	9.95	0.15	13	30.62	0.27	0.200	0.004
620	Drakonia	1906 WE	11.28	0.15	1	11.08	1.03	0.442	0.085
621	Werdandi	1906 WJ	10.49	0.15	7	30.71	0.50	0.124	0.005
622	Esther	1906 WP	10.17	0.15	6	25.39	0.45	0.242	0.010
623	Chimaera	1907 XJ	10.97	0.15	6	43.06	0.67	0.040	0.001
624	Hektor	1907 XM	7.49	0.15	9	230.99	3.94	0.034	0.001
625	Xenia	1907 XN	10.00	0.15	5	25.64	0.52	0.281	0.013
626	Notburga	1907 XO	9.00	0.15	4	76.56	1.49	0.076	0.004
627	Charis	1907 XS	9.95	0.15	13	49.47	0.51	0.080	0.002
628	Christine	1907 XT	9.25	0.15	9	51.83	0.59	0.132	0.004
629	Bernardina	1907 XU	9.90	0.15	8	37.53	0.52	0.138	0.004
630	Euphemia	1907 XW	11.00	0.15	2	16.64	1.10	0.255	0.036
631	Philippina	1907 YJ	8.70	0.15	9	56.27	0.65	0.187	0.005
632	Pyrrha	1907 YX	11.60	0.15	3	12.78	0.51	0.248	0.022
633	Zelima	1907 ZM	9.73	0.15	8	41.65	0.62	0.132	0.004
634	Ute	1907 ZN	9.60	0.15	7	62.54	1.07	0.066	0.003
635	Vundtia	1907 ZS	9.01	0.15	9	98.56	1.21	0.046	0.001
636	Erika	1907 XP	9.50	0.15	4	73.56	1.57	0.052	0.003
637	Chrysothemis	1907 YE	11.00	0.15	2	23.44	1.46	0.128	0.017
638	Moira	1907 ZQ	9.80	0.15	9	66.12	0.78	0.049	0.001
639	Latona	1907 ZT	8.20	0.15	9	80.42	0.92	0.145	0.004
640	Brambilla	1907 ZW	8.99	0.15	8	71.89	0.91	0.091	0.003
641	Agnes	1907 ZX	12.10	0.15	1	9.24	0.64	0.299	0.044
642	Clara	1907 ZY	9.98	0.15	6	38.56	0.73	0.124	0.005
643	Scheherezade	1907 ZZ	9.72	0.15	6	71.03	1.13	0.046	0.002
644	Cosima	1907 AA	11.13	0.15	4	19.23	0.58	0.171	0.011
645	Agrippina	1907 AG	9.94	0.15	6	30.86	0.76	0.198	0.011
646	Kastalia	1907 AC	12.50	0.15	3	6.88	0.33	0.377	0.038
647	Adelgunde	1907 AD	11.41	0.15	1	13.69	0.76	0.257	0.031
648	Pippa	1907 AE	9.68	0.15	9	75.97	0.95	0.043	0.001
650	Amalasuntha	1907 AM	12.93	0.15	8	19.22	0.36	0.035	0.002
651	Antikleia	1907 AN	10.01	0.15	10	34.49	0.45	0.148	0.004
652	Jubilatrix	1907 AU	11.40	0.15	1	20.16	1.09	0.120	0.014
653	Berenike	1907 BK	9.18	0.15	8	46.91	0.66	0.173	0.006
654	Zelinda	1908 BM	8.52	0.15	10	123.58	1.46	0.045	0.001
655	Briseis	1907 BF	9.60	0.15	5	30.48	0.60	0.281	0.013
656	Beagle	1908 BU	10.00	0.15	11	54.32	0.77	0.065	0.002
657	Gunlod	1908 BV	10.93	0.15	9	39.50	0.52	0.049	0.002
658	Asteria	1908 BW	10.54	0.15	3	24.90	0.87	0.174	0.013
659	Nestor	1908 CS	8.99	0.15	2	107.06	4.33	0.040	0.004
660	Crescentia	1908 CC	9.14	0.15	6	40.93	0.56	0.234	0.008
661	Cloelia	1908 CL	9.63	0.15	7	49.49	0.68	0.102	0.003
662	Newtonia	1908 CW	10.50	0.15	11	22.35	0.25	0.230	0.006
663	Gerlinde	1908 DG	9.21	0.15	9	97.27	1.20	0.039	0.001
664	Judith	1908 DH	9.97	0.15	6	74.77	1.58	0.033	0.002
665	Sabine	1908 DK	8.10	0.15	7	53.01	0.77	0.365	0.012
666	Desdemona	1908 DM	10.90	0.15	5	27.37	0.71	0.105	0.006
667	Denise	1908 DN	8.90	0.15	5	89.56	1.51	0.062	0.003
668	Dora	1908 DO	11.80	0.15	4	28.06	0.55	0.043	0.002
669	Kypria	1908 DQ	10.24	0.15	9	34.62	0.48	0.123	0.004
670	Ottegebe	1908 DR	9.80	0.15	7	33.75	0.49	0.188	0.007
671	Carnegia	1908 DV	10.00	0.15	8	59.03	0.80	0.051	0.002
672	Astarte	1908 DY	11.10	0.15	6	31.59	0.47	0.065	0.002
673	Edda	1908 EA	10.20	0.15	6	39.38	0.65	0.095	0.004
674	Rachele	1908 EP	7.42	0.15	6	89.28	1.27	0.241	0.008
675	Ludmilla	1908 DU	7.91	0.15	6	67.66	0.94	0.267	0.009
676	Melitta	1909 FN	9.30	0.15	7	82.17	1.16	0.050	0.002
677	Aaltje	1909 FR	9.70	0.15	5	32.45	0.59	0.224	0.010
678	Fredegundis	1909 FS	9.02	0.15	4	42.10	0.77	0.246	0.011
679	Pax	1909 FY	9.01	0.15	10	60.66	0.64	0.129	0.003
680	Genoveva	1909 GW	9.31	0.15	5	82.64	1.58	0.049	0.002
681	Gorgo	1909 GZ	11.00	0.15	2	21.61	1.45	0.150	0.021
683	Lanzia	1909 HC	8.10	0.15	9	112.73	1.36	0.080	0.002
684	Hildburg	1909 HD	11.40	0.15	7	16.28	0.34	0.186	0.009
685	Hermia	1909 HE	11.80	0.15	8	11.46	0.21	0.280	0.012
686	Gersuind	1909 HF	9.67	0.15	7	48.70	0.75	0.102	0.004
687	Tinette	1909 HG	11.71	0.15	2	25.36	1.62	0.059	0.008
688	Melanie	1909 HH	10.59	0.15	8	49.12	0.60	0.045	0.001
689	Zita	1909 HJ	12.15	0.15	2	16.12	1.04	0.095	0.013
690	Wratislavia	1909 HZ	8.02	0.15	6	158.11	2.48	0.044	0.002
691	Lehigh	1909 JG	9.30	0.15	5	86.38	1.50	0.045	0.002
692	Hippodamia	1901 HD	9.18	0.15	8	45.34	0.68	0.185	0.006
693	Zerbinetta	1909 HN	9.38	0.15	9	79.86	0.96	0.049	0.001
694	Ekard	1909 JA	9.17	0.15	8	92.11	1.26	0.045	0.001
695	Bella	1909 JB	9.30	0.15	11	41.67	0.40	0.201	0.005
696	Leonora	1910 JJ	9.00	0.15	9	94.75	1.20	0.050	0.002
697	Galilea	1910 JO	9.63	0.15	4	76.86	1.62	0.042	0.002
698	Ernestina	1910 JX	10.70	0.15	4	26.74	0.63	0.130	0.007
699	Hela	1910 KD	11.72	0.15	4	13.39	0.45	0.203	0.015
700	Auravictrix	1910 KE	11.20	0.15	8	15.19	0.25	0.263	0.010
701	Oriola	1910 KN	9.25	0.15	3	38.83	1.02	0.239	0.016
702	Alauda	1910 KQ	7.25	0.15	7	190.58	2.65	0.061	0.002
703	Noemi	1910 KT	12.10	0.15	1	7.25	0.50	0.486	0.071
704	Interamnia	1910 KU	5.94	-0.02	11	316.25	3.24	0.075	0.002
705	Erminia	1910 KV	8.39	0.15	4	150.22	2.85	0.035	0.002
706	Hirundo	1910 KX	10.20	0.15	4	29.36	0.79	0.172	0.011
707	Steina	1910 LD	12.20	0.15	11	11.24	0.19	0.192	0.007
708	Raphaela	1911 LJ	10.61	0.15	5	21.03	0.47	0.229	0.012
709	Fringilla	1911 LK	9.04	0.15	11	95.92	1.03	0.047	0.001
710	Gertrud	1911 LM	11.10	0.15	7	27.85	0.50	0.086	0.004
711	Marmulla	1911 LN	11.90	0.15	2	11.82	0.74	0.224	0.030
712	Boliviana	1911 LO	8.32	0.03	6	113.49	1.72	0.065	0.002
713	Luscinia	1911 LS	8.97	0.15	8	97.46	1.34	0.048	0.002
714	Ulula	1911 LW	9.07	0.15	9	44.29	0.49	0.224	0.006
715	Transvaalia	1911 LX	9.80	0.15	6	32.07	0.60	0.209	0.009
716	Berkeley	1911 MD	10.84	0.15	6	21.55	0.57	0.182	0.011
717	Wisibada	1911 MJ	11.10	0.15	10	32.52	0.37	0.061	0.002
718	Erida	1911 MS	9.80	0.15	5	68.05	1.21	0.047	0.002
720	Bohlinia	1911 MW	9.71	0.15	8	34.19	0.49	0.199	0.007
721	Tabora	1911 MZ	9.26	0.15	7	81.95	1.24	0.053	0.002
722	Frieda	1911 NA	12.10	0.15	8	11.43	0.23	0.201	0.009
723	Hammonia	1911 NB	9.70	0.15	2	28.34	1.36	0.294	0.031
725	Amanda	1911 ND	11.81	0.15	7	20.49	0.28	0.082	0.003
726	Joella	1911 NM	10.57	0.15	7	48.28	0.68	0.045	0.002
727	Nipponia	1912 NT	9.62	0.15	4	34.59	0.68	0.212	0.010
729	Watsonia	1912 OD	9.31	0.15	9	51.93	0.65	0.124	0.004
731	Sorga	1912 OQ	9.62	0.15	10	38.93	0.44	0.173	0.005
732	Tjilaki	1912 OR	10.70	0.15	9	36.49	0.43	0.070	0.002
733	Mocia	1912 PF	9.05	0.15	7	97.20	1.47	0.045	0.002
734	Benda	1912 PH	9.70	0.15	4	73.28	1.57	0.044	0.002
735	Marghanna	1912 PY	9.55	0.15	4	78.69	1.62	0.043	0.002
736	Harvard	1912 PZ	11.64	0.15	6	17.92	0.27	0.122	0.004
737	Arequipa	1912 QB	8.81	0.15	9	45.22	0.52	0.264	0.007
738	Alagasta	1913 QO	10.13	0.15	6	55.37	0.99	0.052	0.002
739	Mandeville	1913 QR	8.50	0.15	7	123.14	1.83	0.047	0.002
740	Cantabia	1913 QS	8.97	0.15	13	101.13	1.05	0.045	0.001
741	Botolphia	1913 QT	10.40	0.15	7	31.54	0.46	0.125	0.004
742	Edisona	1913 QU	9.55	0.15	9	47.27	0.63	0.122	0.004
743	Eugenisis	1913 QV	10.00	0.15	6	50.13	0.79	0.070	0.003
744	Aguntina	1913 QW	10.21	0.15	7	55.80	0.86	0.048	0.002
745	Mauritia	1913 QX	10.30	0.15	2	23.23	1.38	0.249	0.032
746	Marlu	1913 QY	10.00	0.15	5	71.55	1.41	0.036	0.002
747	Winchester	1913 QZ	7.69	0.15	7	170.09	2.51	0.052	0.002
748	Simeisa	1913 RD	9.01	0.15	5	111.75	2.31	0.035	0.002
749	Malzovia	1913 RF	11.82	0.15	6	12.13	0.26	0.239	0.011
750	Oskar	1913 RG	12.13	0.15	6	20.88	0.49	0.057	0.003
751	Faina	1913 RK	8.66	0.08	9	106.81	1.28	0.055	0.002
752	Sulamitis	1913 RL	10.10	0.15	8	60.54	0.80	0.046	0.001
753	Tiflis	1913 RM	10.21	0.15	5	26.48	0.41	0.209	0.008
754	Malabar	1906 UT	9.19	0.15	9	91.34	1.10	0.045	0.001
755	Quintilla	1908 CZ	9.81	0.15	3	31.32	1.20	0.220	0.019
756	Lilliana	1908 DC	9.60	0.15	10	69.61	0.80	0.054	0.002
757	Portlandia	1908 EJ	10.20	0.15	7	34.06	0.47	0.129	0.004
758	Mancunia	1912 PE	8.16	0.15	8	88.09	1.07	0.125	0.004
759	Vinifera	1913 SJ	10.50	0.15	5	46.48	0.80	0.052	0.002
760	Massinga	1913 SL	7.96	0.15	4	70.03	1.25	0.237	0.011
761	Brendelia	1913 SO	10.83	0.15	3	21.06	0.90	0.188	0.017
762	Pulcova	1913 SQ	8.28	0.15	8	129.21	1.78	0.054	0.002
764	Gedania	1913 SU	9.48	0.15	5	74.59	1.39	0.052	0.002
766	Moguntia	1913 SW	10.15	0.15	4	35.33	0.92	0.124	0.007
767	Bondia	1913 SX	10.00	0.15	7	46.91	0.66	0.084	0.003
768	Struveana	1913 SZ	10.21	0.15	4	31.16	1.00	0.169	0.012
769	Tatjana	1913 TA	8.90	0.15	8	102.30	1.41	0.047	0.002
770	Bali	1913 TE	10.93	0.15	10	16.07	0.21	0.304	0.010
771	Libera	1913 TO	10.49	0.15	5	28.91	0.72	0.141	0.008
772	Tanete	1913 TR	8.33	0.15	6	117.01	1.81	0.060	0.002
773	Irmintraud	1913 TV	9.10	0.15	4	87.07	1.76	0.053	0.003
774	Armor	1913 TW	8.60	0.15	6	50.76	0.76	0.252	0.009
775	Lumiere	1914 TX	10.40	0.15	7	28.56	0.53	0.152	0.006
776	Berbericia	1914 TY	7.68	0.34	9	149.76	1.78	0.067	0.002
777	Gutemberga	1914 TZ	9.80	0.15	6	65.37	1.03	0.050	0.002
778	Theobalda	1914 UA	9.66	0.15	8	65.76	1.10	0.056	0.002
779	Nina	1914 UB	8.30	0.15	8	81.27	1.00	0.132	0.004
780	Armenia	1914 UC	9.00	0.15	7	98.44	1.42	0.046	0.002
781	Kartvelia	1914 UF	9.40	0.15	6	76.07	1.32	0.054	0.002
782	Montefiore	1914 UK	11.50	0.15	9	14.05	0.22	0.234	0.009
783	Nora	1914 UL	10.60	0.15	6	39.58	0.62	0.065	0.002
784	Pickeringia	1914 UM	9.00	0.15	8	74.89	0.92	0.080	0.002
785	Zwetana	1914 UN	9.45	0.15	11	50.66	0.55	0.116	0.003
786	Bredichina	1914 UO	8.65	0.15	11	111.47	1.30	0.051	0.001
787	Moskva	1914 UQ	9.90	0.15	9	29.32	0.39	0.240	0.008
788	Hohensteina	1914 UR	8.30	0.15	7	118.31	1.67	0.061	0.002
789	Lena	1914 UU	10.90	0.15	8	20.56	0.34	0.186	0.007
790	Pretoria	1912 NW	8.00	0.15	2	144.85	4.94	0.053	0.004
791	Ani	1914 UV	9.25	0.15	10	97.87	1.15	0.037	0.001
792	Metcalfia	1907 ZC	10.33	0.15	5	58.68	1.18	0.038	0.002
793	Arizona	1907 ZD	10.26	0.15	9	27.94	0.35	0.180	0.005
794	Irenaea	1914 VB	11.10	0.15	3	38.00	1.35	0.045	0.004
795	Fini	1914 VE	9.70	0.15	9	79.36	1.05	0.037	0.001
796	Sarita	1914 VH	9.12	0.15	8	42.09	0.58	0.228	0.008
797	Montana	1914 VR	10.34	0.15	7	21.91	0.41	0.281	0.012
798	Ruth	1914 VT	9.44	0.15	7	45.24	0.62	0.148	0.005
799	Gudula	1915 WO	10.30	0.15	5	44.08	0.69	0.069	0.003
800	Kressmannia	1915 WP	11.61	0.15	8	14.23	0.23	0.202	0.008
801	Helwerthia	1915 WQ	11.55	0.15	9	34.68	0.45	0.036	0.001
803	Picka	1915 WS	9.60	0.15	6	57.41	0.95	0.079	0.003
804	Hispania	1915 WT	7.84	0.18	8	147.01	1.93	0.060	0.002
805	Hormuthia	1915 WW	9.82	0.15	7	79.23	1.32	0.034	0.001
806	Gyldenia	1915 WX	10.60	0.15	7	67.79	0.89	0.022	0.001
807	Ceraskia	1915 WY	10.56	0.15	8	30.38	0.56	0.121	0.005
808	Merxia	1901 GY	9.70	0.15	9	33.77	0.39	0.206	0.006
811	Nauheima	1915 XR	10.78	0.15	3	18.59	0.89	0.250	0.025
812	Adele	1915 XV	11.50	0.15	4	13.57	0.43	0.257	0.019
814	Tauris	1916 YT	8.74	0.15	3	109.76	2.78	0.047	0.003
815	Coppelia	1916 YU	10.70	0.15	4	14.78	0.48	0.446	0.032
816	Juliana	1916 YV	10.50	0.15	7	67.70	1.04	0.025	0.001
817	Annika	1916 YW	10.80	0.15	7	23.02	0.34	0.163	0.006
818	Kapteynia	1916 YZ	9.10	0.15	6	50.74	0.89	0.159	0.006
820	Adriana	1916 ZB	11.00	0.15	12	63.76	0.73	0.017	0.000
821	Fanny	1916 ZC	11.84	0.15	4	28.77	1.00	0.040	0.003
822	Lalage	1916 ZD	12.18	0.15	5	11.34	0.28	0.187	0.010
823	Sisigambis	1916 ZG	11.20	0.15	8	16.07	0.30	0.232	0.010

Table E.2 (Continued.)

Asteroid			H	G	$N_{\rm ID}$	d	$\sigma(d)$	$p_{\rm v}$	$\sigma(p_{\rm v})$
824	Anastasia	1916 ZH	10.41	0.15	7	29.06	0.42	0.151	0.005
825	Tanina	1916 ZL	11.50	0.15	5	13.06	0.38	0.278	0.018
826	Henrika	1916 ZO	11.30	0.15	6	21.83	0.43	0.114	0.005
828	Lindemannia	1916 ZX	10.33	0.15	9	54.92	0.73	0.044	0.001
829	Academia	1916 ZY	10.70	0.15	8	40.96	0.55	0.056	0.002
830	Petropolitana	1916 ZZ	9.10	0.15	6	48.47	0.92	0.174	0.008
832	Karin	1916 AB	11.18	0.15	1	14.35	1.34	0.290	0.056
833	Monica	1916 AC	11.30	0.15	3	22.77	0.88	0.125	0.012
834	Burnhamia	1916 AD	9.39	0.15	1	61.44	2.13	0.082	0.007
835	Olivia	1916 AE	11.90	0.15	6	36.05	0.91	0.025	0.001
838	Seraphina	1916 AH	10.09	0.15	7	49.36	0.78	0.068	0.002
839	Valborg	1916 AJ	10.20	0.15	3	18.51	0.85	0.430	0.042
840	Zenobia	1916 AK	9.30	0.15	2	23.73	1.49	0.610	0.082
842	Kerstin	1916 AM	10.80	0.15	3	41.21	1.40	0.050	0.004
844	Leontina	1916 AP	9.40	0.15	5	39.90	0.79	0.200	0.010
845	Naema	1916 AS	9.70	0.15	5	60.52	1.06	0.065	0.003
846	Lipperta	1916 AT	10.26	0.15	9	51.45	0.76	0.053	0.002
847	Agnia	1915 XX	10.29	0.15	5	29.62	0.70	0.155	0.008
848	Inna	1915 XS	10.90	0.15	8	34.37	0.64	0.070	0.003
849	Ara	1912 NY	8.10	0.15	5	59.92	1.09	0.287	0.013
850	Altona	1916 S24	9.60	0.15	9	73.16	0.88	0.048	0.001
851	Zeissia	1916 S26	11.62	0.15	6	12.81	0.35	0.248	0.015
852	Wladilena	1916 S27	9.90	0.15	10	26.54	0.29	0.278	0.008
853	Nansenia	1916 S28	11.67	0.15	5	34.08	0.54	0.033	0.002
854	Frostia	1916 S29	12.10	0.15	1	9.49	0.65	0.284	0.041
855	Newcombia	1916 ZP	11.80	0.15	5	10.97	0.28	0.285	0.017
856	Backlunda	1916 S30	10.69	0.15	10	43.43	0.50	0.050	0.001
857	Glasenappia	1916 S33	11.32	0.15	5	16.42	0.37	0.200	0.010
858	El Djezair	1916 a	10.00	0.15	8	24.21	0.41	0.305	0.012
859	Bouzareah	1916 c	9.60	0.15	8	76.66	1.16	0.044	0.002
860	Ursina	1917 BD	10.26	0.15	8	33.92	0.53	0.122	0.004
861	Aida	1917 BE	9.60	0.15	6	69.61	1.13	0.053	0.002
862	Franzia	1917 BF	10.60	0.15	3	28.59	0.91	0.125	0.009
863	Benkoela	1917 BH	9.02	0.15	4	31.50	0.83	0.444	0.027
864	Aase	A921 SB	12.87	0.15	1	5.76	0.49	0.378	0.067
865	Zubaida	1917 BO	11.90	0.15	10	16.81	0.21	0.110	0.003
866	Fatme	1917 BQ	9.50	0.15	9	86.49	1.16	0.038	0.001
867	Kovacia	1917 BS	11.30	0.15	6	25.02	0.63	0.088	0.005
868	Lova	1917 BU	10.22	0.15	8	55.45	0.73	0.048	0.002
869	Mellena	1917 BV	12.40	0.15	8	18.45	0.32	0.058	0.002
870	Manto	1917 BX	11.60	0.15	12	11.87	0.16	0.321	0.010
871	Amneris	1917 BY	12.10	0.15	1	9.31	0.64	0.295	0.043
872	Holda	1917 BZ	9.91	0.15	10	30.64	0.36	0.208	0.006
873	Mechthild	1917 CA	11.49	0.15	5	33.56	0.59	0.041	0.002
874	Rotraut	1917 CC	10.00	0.15	9	59.38	0.73	0.051	0.002
875	Nymphe	1917 CF	11.50	0.15	6	15.90	0.43	0.185	0.012
876	Scott	1917 CH	10.89	0.15	6	26.62	0.55	0.122	0.006
877	Walkure	1915 S7	10.71	0.15	8	39.93	0.51	0.058	0.002
879	Ricarda	1917 CJ	10.90	0.15	9	17.65	0.25	0.257	0.008
880	Herba	1917 CK	11.46	0.15	8	32.13	0.44	0.046	0.001
881	Athene	1917 CL	11.80	0.15	7	12.04	0.28	0.237	0.012
882	Swetlana	1917 CM	10.50	0.15	10	44.94	0.50	0.056	0.002
884	Priamus	1917 CQ	8.81	0.15	7	119.99	2.13	0.037	0.001
885	Ulrike	1917 CX	10.70	0.15	4	44.69	1.06	0.047	0.003
886	Washingtonia	1917 b	8.70	0.15	7	96.57	1.25	0.063	0.002
888	Parysatis	1918 DC	9.51	0.15	8	42.18	0.50	0.158	0.005
889	Erynia	1918 DG	11.10	0.15	4	18.14	0.59	0.196	0.014
890	Waltraut	1918 DK	10.78	0.15	5	28.40	0.68	0.111	0.006
891	Gunhild	1918 DQ	9.90	0.15	12	63.80	0.67	0.049	0.001
892	Seeligeria	1918 DR	9.50	0.15	8	80.00	1.14	0.044	0.002
893	Leopoldina	1918 DS	9.47	0.15	9	75.55	0.97	0.051	0.001
894	Erda	1918 DT	9.40	0.15	10	37.84	0.45	0.232	0.007
895	Helio	1918 DU	8.30	0.15	8	128.17	1.78	0.053	0.002
896	Sphinx	1918 DV	11.80	0.15	5	14.45	0.35	0.163	0.009
897	Lysistrata	1918 DZ	10.37	0.15	8	26.44	0.35	0.181	0.006
899	Jokaste	1918 EB	10.14	0.15	4	28.83	0.87	0.200	0.013
900	Rosalinde	1918 EC	11.74	0.15	7	19.56	0.31	0.096	0.004
901	Brunsia	1918 EE	11.35	0.15	2	10.32	0.64	0.480	0.063
902	Probitas	1918 EJ	12.30	0.15	5	9.86	0.30	0.225	0.015
903	Nealley	1918 EM	9.80	0.15	9	70.81	0.93	0.043	0.001
904	Rockefellia	1918 EO	9.90	0.15	8	61.36	0.77	0.051	0.002
905	Universitas	1918 ES	11.59	0.15	7	11.84	0.24	0.300	0.014
906	Repsolda	1918 ET	9.50	0.15	10	69.24	0.80	0.059	0.002
907	Rhoda	1918 EU	9.76	0.15	11	75.22	0.83	0.040	0.001
908	Buda	1918 EX	10.69	0.15	5	28.29	0.61	0.118	0.006
909	Ulla	1919 FA	8.95	0.15	11	113.13	1.48	0.037	0.001
910	Anneliese	1919 FB	10.30	0.15	10	48.85	0.57	0.057	0.002
911	Agamemnon	1919 FD	7.89	0.15	8	185.30	3.37	0.037	0.001
912	Maritima	1919 FJ	8.40	0.15	8	89.71	1.09	0.096	0.003
913	Otila	1919 FL	11.90	0.15	3	11.32	0.45	0.245	0.021
914	Palisana	1919 FN	8.76	0.15	6	97.33	1.49	0.059	0.002
915	Cosette	1918 b	11.70	0.15	2	12.31	0.85	0.247	0.037
916	America	1915 S1	11.20	0.15	10	34.46	0.38	0.050	0.001
917	Lyka	1915 S4	11.00	0.15	6	31.29	0.49	0.072	0.003
918	Itha	1919 FR	10.70	0.15	2	21.37	0.84	0.203	0.018
919	Ilsebill	1918 EQ	11.30	0.15	7	33.41	0.49	0.048	0.002
920	Rogeria	1919 FT	11.19	0.15	10	25.80	0.36	0.090	0.003
921	Jovita	1919 FV	10.60	0.15	9	60.71	0.97	0.028	0.001
922	Schlutia	1919 FW	11.70	0.15	1	18.71	0.76	0.105	0.010
923	Herluga	1919 GB	11.50	0.15	8	34.78	0.63	0.037	0.002
924	Toni	1919 GC	9.37	0.15	5	78.33	1.34	0.052	0.002
925	Alphonsina	1920 GM	8.33	0.15	10	62.57	0.64	0.214	0.006
926	Imhilde	1920 GN	10.30	0.15	6	49.87	0.92	0.054	0.002
927	Ratisbona	1920 GO	9.54	0.15	7	78.20	1.11	0.044	0.002
928	Hildrun	1920 GP	10.10	0.15	7	64.04	1.09	0.040	0.001
929	Algunde	1920 GR	12.10	0.15	5	10.70	0.36	0.242	0.018
930	Westphalia	1920 GS	11.40	0.15	2	39.51	1.47	0.031	0.002
931	Whittemora	1920 GU	9.26	0.15	5	48.98	1.01	0.148	0.007
932	Hooveria	1920 GV	10.00	0.15	9	60.20	0.71	0.049	0.001
933	Susi	1927 CH	11.80	0.15	10	23.82	0.27	0.059	0.002
934	Thuringia	1920 HK	10.30	0.15	9	58.00	0.70	0.041	0.001
935	Clivia	1920 HM	12.90	0.15	2	7.18	0.66	0.247	0.050
936	Kunigunde	1920 HN	10.00	0.15	4	38.08	0.94	0.124	0.007
937	Bethgea	1920 HO	11.83	0.15	3	12.69	0.43	0.203	0.015
938	Chlosinde	1920 HQ	10.80	0.15	1	23.70	1.62	0.151	0.022
940	Kordula	1920 HT	9.55	0.15	5	87.65	1.50	0.035	0.002
942	Romilda	1920 HW	10.30	0.15	2	35.97	1.75	0.108	0.012
943	Begonia	1920 HX	9.77	0.15	7	69.30	1.23	0.047	0.002
944	Hidalgo	1920 HZ	10.77	0.15	2	52.45	3.60	0.042	0.007
945	Barcelona	1921 JB	10.13	0.15	6	26.74	0.42	0.221	0.008
946	Poesia	1921 JC	10.42	0.15	10	39.60	0.64	0.079	0.003
947	Monterosa	1921 JD	9.80	0.15	8	27.23	0.31	0.288	0.008
948	Jucunda	1921 JE	11.30	0.15	2	17.77	1.08	0.170	0.022
949	Hel	1921 JK	9.70	0.15	12	60.98	0.74	0.063	0.002
950	Ahrensa	1921 JP	11.60	0.15	5	16.21	0.53	0.158	0.011
951	Gaspra	1916 S45	11.46	0.15	2	15.68	0.93	0.189	0.024
952	Caia	1916 S61	9.20	0.15	12	87.97	0.97	0.048	0.001
953	Painleva	1921 JT	10.30	0.15	9	29.01	0.43	0.163	0.006
954	Li	1921 JU	9.94	0.15	8	52.59	0.83	0.068	0.002
955	Alstede	1921 JV	11.10	0.15	1	17.24	1.53	0.216	0.040
957	Camelia	1921 JX	9.70	0.15	5	64.36	1.01	0.056	0.002
958	Asplinda	1921 KC	10.71	0.15	4	48.57	1.51	0.041	0.003
959	Arne	1921 KF	10.20	0.15	7	53.09	0.75	0.054	0.002
961	Gunnie	1921 KM	11.30	0.15	8	31.49	0.55	0.055	0.002
962	Aslog	1921 KP	11.52	0.15	1	15.16	1.10	0.190	0.029
963	Iduberga	1921 KR	12.49	0.15	1	10.38	0.71	0.165	0.024
964	Subamara	1921 KS	10.90	0.15	2	21.23	1.17	0.171	0.020
965	Angelica	1921 KT	9.80	0.15	9	64.11	0.74	0.052	0.002
966	Muschi	1921 KU	9.91	0.15	5	26.70	0.65	0.272	0.015
967	Helionape	1921 KV	12.10	0.15	9	13.55	0.21	0.142	0.005
968	Petunia	1921 KW	10.01	0.15	7	29.51	0.49	0.204	0.008
969	Leocadia	1921 KZ	12.57	0.15	11	19.37	0.22	0.045	0.001
971	Alsatia	1921 LF	10.05	0.15	6	60.71	0.88	0.046	0.002
972	Cohnia	1922 LK	9.50	0.15	7	79.66	1.07	0.044	0.001
973	Aralia	1922 LR	9.60	0.15	8	55.50	0.77	0.084	0.003
974	Lioba	1922 LS	10.30	0.15	3	28.71	0.91	0.163	0.011
975	Perseverantia	1922 LT	10.41	0.15	7	23.54	0.46	0.221	0.010
976	Benjamina	1922 LU	9.22	0.15	7	79.94	1.16	0.057	0.002
977	Philippa	1922 LV	9.67	0.15	7	65.92	0.94	0.056	0.002
978	Aidamina	1922 LY	9.73	0.15	3	82.28	2.71	0.035	0.002
979	Ilsewa	1922 MC	9.80	0.15	7	38.80	0.55	0.142	0.005
980	Anacostia	1921 W19	7.85	0.06	8	78.26	0.95	0.219	0.007
981	Martina	1917 S92	10.57	0.15	3	31.70	1.29	0.108	0.010
982	Franklina	1922 MD	9.90	0.15	6	31.07	0.86	0.214	0.013
983	Gunila	1922 ME	9.58	0.15	7	92.90	1.44	0.031	0.001
984	Gretia	1922 MH	9.03	0.15	6	34.91	0.47	0.360	0.012
986	Amelia	1922 MQ	9.40	0.15	6	52.30	0.78	0.113	0.004
987	Wallia	1922 MR	9.30	0.15	6	51.96	0.77	0.126	0.005
988	Appella	1922 MT	11.20	0.15	9	30.09	0.37	0.066	0.002
989	Schwassmannia	1922 MW	11.80	0.15	1	12.20	1.12	0.226	0.043
990	Yerkes	1922 MZ	11.50	0.15	2	21.99	1.40	0.092	0.012
991	McDonalda	1922 NB	11.12	0.15	3	31.40	1.07	0.065	0.005
992	Swasey	1922 ND	10.80	0.15	2	21.17	1.50	0.189	0.028
993	Moultona	1923 NJ	11.80	0.15	2	15.15	1.17	0.147	0.023
994	Otthild	1923 NL	10.30	0.15	5	24.34	0.61	0.227	0.013
995	Sternberga	1923 NP	10.30	0.15	6	32.08	0.59	0.134	0.006
996	Hilaritas	1923 NM	10.88	0.15	1	33.67	1.80	0.069	0.008
997	Priska	1923 NR	12.00	0.15	9	18.20	0.28	0.088	0.003
998	Bodea	1923 NU	11.90	0.15	11	31.21	0.39	0.033	0.001
999	Zachia	1923 NW	11.10	0.15	3	21.30	0.79	0.146	0.013
1000	Piazzia	1923 NZ	9.60	0.15	5	51.55	0.86	0.097	0.004
1001	Gaussia	1923 OA	9.77	0.15	11	75.40	0.99	0.039	0.001
1002	Olbersia	1923 OB	11.10	0.15	9	24.31	0.36	0.110	0.004
1003	Lilofee	1923 OK	10.20	0.15	2	27.29	1.83	0.198	0.028
1004	Belopolskya	1923 OS	9.99	0.15	6	79.83	1.33	0.028	0.001
1005	Arago	1923 OT	9.70	0.15	4	56.36	1.36	0.074	0.004
1006	Lagrangea	1923 OU	11.20	0.15	2	32.24	1.16	0.058	0.005
1007	Pawlowia	1923 OX	11.50	0.15	8	24.13	0.47	0.080	0.004
1008	La Paz	1923 PD	10.40	0.15	5	50.50	0.91	0.048	0.002
1010	Marlene	1923 PF	10.40	0.15	7	47.07	0.75	0.056	0.002
1012	Sarema	1924 PM	12.41	0.15	7	22.96	0.49	0.037	0.002
1013	Tombecka	1924 PQ	10.12	0.15	6	36.62	0.58	0.120	0.005
1014	Semphyra	1924 PW	12.10	0.15	3	17.17	0.88	0.087	0.009
1015	Christa	1924 QF	9.03	0.15	8	101.04	1.37	0.042	0.001
1017	Jacqueline	1924 QL	10.90	0.15	9	38.87	0.51	0.051	0.002
1018	Arnolda	1924 QM	10.62	0.15	3	15.29	0.53	0.439	0.034
1019	Strackea	1924 QN	12.63	0.15	6	8.79	0.23	0.206	0.012
1021	Flammario	1924 RG	8.98	0.15	9	97.38	1.23	0.048	0.001
1022	Olympiada	1924 RT	10.50	0.15	5	32.88	0.76	0.105	0.005
1023	Thomana	1924 RU	9.76	0.15	7	61.02	1.00	0.060	0.002
1024	Hale	1923 YO13	10.60	0.15	6	48.18	0.78	0.044	0.002
1026	Ingrid	1923 NY	13.30	0.15	1	6.96	0.68	0.175	0.035
1027	Aesculapia	1923 YO11	10.60	0.15	8	38.55	0.82	0.071	0.003
1028	Lydina	1923 PG	9.43	0.15	8	97.18	1.38	0.032	0.001
1029	La Plata	1924 RK	10.88	0.15	2	16.46	1.07	0.310	0.045
1030	Vitja	1924 RQ	10.30	0.15	8	58.38	0.79	0.040	0.001
1031	Arctica	1924 RR	9.56	0.15	8	77.28	1.05	0.044	0.001
1032	Pafuri	1924 SA	10.00	0.15	9	62.60	0.81	0.046	0.001
1033	Simona	1924 SM	11.00	0.15	1	23.72	1.70	0.125	0.019
1035	Amata	1924 SW	10.30	0.15	9	59.28	0.79	0.039	0.001
1036	Ganymed	1924 TD	9.45	0.30	4	35.01	0.78	0.243	0.013
1038	Tuckia	1924 TK	10.82	0.15	3	52.69	2.41	0.030	0.003
1039	Sonneberga	1924 TL	11.10	0.15	5	33.99	0.72	0.059	0.003
1040	Klumpkea	1925 BD	10.40	0.15	9	23.13	0.38	0.237	0.009
1041	Asta	1925 FA	10.10	0.15	9	58.88	0.87	0.047	0.002
1042	Amazone	1925 HA	9.80	0.15	7	71.88	1.08	0.042	0.002
1043	Beate	1925 HB	9.79	0.15	12	33.97	0.43	0.188	0.006
1044	Teutonia	1924 RO	10.90	0.15	3	16.85	0.61	0.273	0.021
1046	Edwin	1924 UA	10.20	0.15	4	25.15	0.66	0.235	0.014
1048	Feodosia	1924 TP	9.75	0.15	8	85.14	1.17	0.031	0.001

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
1049	Gotho	1925 RB	10.30	0.15	8	54.77	0.76	0.045	0.001
1050	Meta	1925 RC	12.00	0.15	2	10.03	0.65	0.294	0.042
1051	Merope	1925 SA	9.90	0.15	9	69.85	0.88	0.040	0.001
1052	Belgica	1925 VD	11.97	0.15	1	10.86	0.79	0.244	0.037
1054	Forsytia	1925 WD	10.30	0.15	9	53.04	0.71	0.048	0.002
1055	Tynka	1925 WG	12.00	0.15	5	8.95	0.22	0.350	0.019
1056	Azalea	1924 QD	11.70	0.15	3	13.07	0.64	0.223	0.024
1057	Wanda	1925 QB	10.96	0.15	8	44.39	0.88	0.038	0.002
1058	Grubba	1925 MA	11.98	0.15	6	13.03	0.28	0.171	0.008
1059	Mussorgskia	1925 OA	10.70	0.15	8	23.10	0.32	0.177	0.006
1062	Ljuba	1925 TD	9.85	0.15	6	55.75	0.96	0.067	0.003
1063	Aquilegia	1925 XA	11.38	0.15	7	18.93	0.37	0.139	0.006
1064	Aethusa	1926 PA	10.50	0.15	6	19.77	0.36	0.288	0.012
1065	Amundsenia	1926 PD	11.90	0.15	8	8.85	0.15	0.399	0.016
1067	Lunaria	1926 RG	10.99	0.15	2	18.02	1.33	0.221	0.034
1068	Nofretete	1926 RK	11.20	0.15	5	23.92	0.74	0.104	0.007
1069	Planckia	1927 BC	9.30	0.15	3	44.34	1.28	0.179	0.011
1070	Tunica	1926 RB	10.60	0.15	8	39.10	0.64	0.068	0.003
1071	Brita	1924 RE	10.10	0.15	12	62.53	0.65	0.042	0.001
1072	Malva	1926 TA	10.50	0.15	4	47.48	0.87	0.050	0.002
1073	Gellivara	1923 OW	11.90	0.15	5	26.87	0.79	0.045	0.003
1074	Beljawskya	1925 BE	10.00	0.15	5	52.28	0.96	0.066	0.003
1075	Helina	1926 SC	10.15	0.15	6	37.93	0.85	0.111	0.005
1076	Viola	1926 TE	12.30	0.15	6	26.39	0.61	0.032	0.002
1078	Mentha	1926 XB	11.80	0.15	6	9.94	0.28	0.343	0.020
1079	Mimosa	1927 AD	11.20	0.15	2	19.01	1.20	0.174	0.025
1080	Orchis	1927 QB	12.20	0.15	11	21.86	0.26	0.051	0.001
1081	Reseda	1927 QF	11.30	0.15	8	35.66	0.70	0.042	0.002
1082	Pirola	1927 UC	10.41	0.15	8	44.67	0.71	0.061	0.002
1084	Tamariwa	1926 CC	10.78	0.15	6	28.87	0.44	0.103	0.004
1085	Amaryllis	1927 QH	9.40	0.15	12	72.93	0.78	0.058	0.002
1086	Nata	1927 QL	9.30	0.15	9	68.48	0.83	0.072	0.002
1087	Arabis	1927 RD	9.73	0.15	8	36.97	0.50	0.171	0.006
1088	Mitaka	1927 WA	11.39	0.15	1	13.35	0.75	0.276	0.034
1089	Tama	1927 WB	11.60	0.15	11	13.32	0.19	0.243	0.008
1090	Sumida	1928 DG	12.49	0.15	2	13.42	0.76	0.105	0.013
1091	Spiraea	1928 DT	10.60	0.15	6	40.52	0.91	0.063	0.003
1092	Lilium	1924 PN	10.82	0.15	7	52.79	0.87	0.030	0.001
1093	Freda	1925 LA	8.83	0.15	8	101.67	1.45	0.051	0.002
1094	Siberia	1926 CB	11.90	0.15	11	18.79	0.24	0.089	0.003
1095	Tulipa	1926 GS	10.42	0.15	6	28.38	0.58	0.151	0.007
1096	Reunerta	1928 OB	10.30	0.15	5	43.30	0.75	0.072	0.003
1097	Vicia	1928 PC	11.70	0.15	6	24.93	0.54	0.060	0.003
1098	Hakone	1928 RJ	10.20	0.15	6	24.90	0.57	0.245	0.013
1099	Figneria	1928 RQ	10.40	0.15	7	25.13	0.41	0.197	0.008
1100	Arnica	1928 SD	11.00	0.15	4	21.02	0.60	0.163	0.010
1101	Clematis	1928 SJ	10.10	0.15	1	29.13	1.62	0.190	0.023
1102	Pepita	1928 VA	9.40	0.15	7	41.02	0.74	0.188	0.007
1103	Sequoia	1928 VB	12.25	0.15	2	5.21	0.42	0.823	0.138
1104	Syringa	1928 XA	12.50	0.15	3	24.30	1.17	0.031	0.003
1105	Fragaria	1929 AB	10.09	0.15	10	38.41	0.46	0.113	0.003
1107	Lictoria	1929 FB	9.10	0.15	9	80.73	0.96	0.063	0.002
1108	Demeter	1929 KA	11.91	0.15	9	31.06	0.58	0.032	0.001
1109	Tata	1929 CU	10.06	0.15	5	66.49	1.32	0.038	0.002
1110	Jaroslawa	1928 PD	11.80	0.15	3	14.90	0.52	0.153	0.012
1111	Reinmuthia	1927 CO	10.67	0.15	7	24.38	0.48	0.167	0.008
1112	Polonia	1928 PE	10.05	0.15	7	37.55	0.60	0.128	0.005
1113	Katja	1928 QC	9.40	0.15	6	38.20	0.58	0.211	0.008
1114	Lorraine	1928 WA	9.90	0.15	10	68.48	0.79	0.043	0.001
1115	Sabauda	1928 XC	9.30	0.15	8	70.76	0.90	0.068	0.002
1116	Catriona	1929 GD	9.70	0.15	8	36.71	0.53	0.175	0.006
1118	Hanskya	1927 QD	9.50	0.15	9	79.80	1.04	0.045	0.001
1119	Euboea	1927 UB	11.20	0.15	9	31.90	0.38	0.058	0.002
1120	Cannonia	1928 RV	12.80	0.15	2	9.92	0.70	0.137	0.021
1121	Natascha	1928 RZ	11.80	0.15	3	14.52	0.54	0.160	0.013
1123	Shapleya	1928 ST	11.70	0.15	2	12.32	0.84	0.274	0.044
1124	Stroobantia	1928 TB	10.67	0.15	4	27.03	0.70	0.135	0.008
1125	China	1957 UN1	11.20	0.15	1	30.49	1.97	0.063	0.009
1127	Mimi	1929 AJ	10.95	0.15	9	49.53	0.67	0.031	0.001
1128	Astrid	1929 EB	10.70	0.15	6	41.97	0.72	0.053	0.002
1129	Neujmina	1929 PH	10.20	0.15	5	34.43	0.79	0.133	0.007
1130	Skuld	1929 RC	12.10	0.15	2	10.24	0.64	0.244	0.033
1132	Hollandia	1929 RB1	10.60	0.15	5	27.59	0.78	0.135	0.008
1133	Lugduna	1929 RC1	12.22	0.15	1	10.47	0.70	0.208	0.029
1135	Colchis	1929 TA	10.20	0.15	7	46.82	0.65	0.068	0.002
1136	Mercedes	1929 UA	11.00	0.15	12	26.66	0.28	0.103	0.003
1137	Raissa	1929 WB	10.74	0.15	4	21.21	0.55	0.206	0.013
1138	Attica	1929 WF	11.30	0.15	7	26.28	0.57	0.081	0.004
1140	Crimea	1929 YC	10.28	0.15	10	28.87	0.36	0.167	0.005
1142	Aetolia	1930 BC	10.30	0.15	1	24.92	1.57	0.216	0.029
1143	Odysseus	1930 BH	7.93	0.15	3	130.81	3.51	0.072	0.005
1144	Oda	1930 BJ	10.00	0.15	8	64.21	0.96	0.043	0.001
1145	Robelmonte	1929 CC	11.10	0.15	9	24.07	0.37	0.113	0.004
1146	Biarmia	1929 JF	9.80	0.15	5	32.39	0.97	0.219	0.015
1147	Stavropolis	1929 LF	12.00	0.15	1	13.92	0.84	0.145	0.019
1148	Rarahu	1929 NA	10.15	0.15	9	32.81	0.56	0.177	0.007
1149	Volga	1929 PF	10.57	0.15	9	57.67	0.77	0.032	0.001
1150	Achaia	1929 RB	12.70	0.15	4	7.96	0.25	0.239	0.017
1152	Pawona	1930 AD	11.30	0.15	8	16.35	0.31	0.205	0.009
1154	Astronomia	1927 CB	10.51	0.15	7	64.20	1.11	0.028	0.001
1155	Aenna	1928 BD	11.50	0.15	2	11.70	0.75	0.329	0.045
1156	Kira	1928 DA	12.40	0.15	1	10.83	0.76	0.165	0.024
1157	Arabia	1929 QC	10.00	0.15	4	29.01	0.84	0.211	0.013
1158	Luda	1929 QF	10.80	0.15	5	18.70	0.48	0.253	0.015
1159	Granada	1929 RD	11.55	0.15	13	30.26	0.29	0.047	0.001
1160	Illyria	1929 RL	11.10	0.15	4	13.85	0.49	0.349	0.028
1161	Thessalia	1929 SF	11.60	0.15	6	26.04	0.78	0.067	0.004
1162	Larissa	1930 AC	9.44	0.15	4	48.59	1.50	0.127	0.009
1163	Saga	1930 BA	10.60	0.15	4	33.94	0.87	0.097	0.006
1164	Kobolda	1930 FB	12.80	0.15	3	5.79	0.37	0.405	0.056
1165	Imprinetta	1930 HM	10.30	0.15	3	53.40	1.62	0.047	0.003
1166	Sakuntala	1930 MA	10.40	0.15	8	26.32	0.39	0.185	0.006
1167	Dubiago	1930 PB	9.85	0.15	11	75.79	0.90	0.036	0.001
1170	Siva	1930 SQ	12.43	0.15	1	12.13	0.89	0.128	0.020
1171	Rusthawelia	1930 TA	9.90	0.15	7	72.09	1.19	0.038	0.002
1172	Aneas	1930 UA	8.33	0.15	12	148.66	1.98	0.037	0.001
1173	Anchises	1930 UB	8.89	0.15	5	120.49	2.91	0.035	0.002
1174	Marmara	1930 UC	12.00	0.15	3	17.18	1.10	0.095	0.013
1175	Margo	1930 UD	10.20	0.15	4	22.99	0.85	0.302	0.026
1176	Lucidor	1930 VE	10.90	0.15	6	31.48	0.53	0.079	0.003
1177	Gonnessia	1930 WA	9.30	0.15	11	93.50	1.01	0.040	0.001
1178	Irmela	1931 EC	11.81	0.15	5	17.90	0.57	0.105	0.007
1179	Mally	1931 FD	12.90	0.15	1	11.20	0.83	0.097	0.015
1180	Rita	1931 GE	9.14	0.15	5	97.63	2.30	0.041	0.002
1182	Ilona	1927 EA	11.30	0.15	3	17.88	0.62	0.175	0.014
1183	Jutta	1930 DC	12.10	0.15	8	23.81	0.35	0.045	0.002
1185	Nikko	1927 WC	12.09	0.15	1	12.56	0.83	0.164	0.023
1186	Turnera	1929 PL	9.20	0.15	9	39.06	0.57	0.247	0.008
1187	Afra	1929 XC	11.30	0.15	12	31.96	0.33	0.053	0.001
1188	Gothlandia	1930 SB	11.70	0.15	1	12.11	0.76	0.252	0.034
1189	Terentia	1930 SG	10.00	0.15	8	62.81	0.85	0.045	0.001
1190	Pelagia	1930 SL	12.40	0.15	9	17.30	0.27	0.067	0.002
1191	Alfaterna	1931 CA	10.60	0.15	8	46.11	0.63	0.050	0.002
1192	Prisma	1931 FE	12.92	0.15	5	9.27	0.25	0.144	0.009
1194	Aletta	1931 JG	10.20	0.15	6	42.67	0.77	0.085	0.004
1196	Sheba	1931 KE	10.26	0.15	4	33.19	0.65	0.127	0.006
1197	Rhodesia	1931 LD	10.00	0.15	6	48.92	0.98	0.075	0.004
1199	Geldonia	1931 RF	10.36	0.15	7	36.08	0.58	0.098	0.004
1200	Imperatrix	1931 RH	10.50	0.15	10	43.64	0.61	0.060	0.002
1201	Strenua	1931 RK	11.40	0.15	8	38.14	0.52	0.034	0.001
1202	Marina	1931 RL	10.60	0.15	8	63.76	1.28	0.026	0.001
1203	Nanna	1931 TA	11.20	0.15	4	32.59	0.87	0.056	0.004
1204	Renzia	1931 TE	12.20	0.15	3	10.73	0.31	0.222	0.014
1206	Numerowia	1931 UH	11.80	0.15	2	15.63	1.09	0.141	0.021
1208	Troilus	1931 YA	8.99	0.15	6	111.36	2.36	0.037	0.002
1209	Pumma	1927 HA	10.60	0.15	5	25.73	0.59	0.155	0.008
1210	Morosovia	1931 LB	9.91	0.15	4	38.96	0.96	0.127	0.007
1211	Bressole	1931 XA	10.60	0.15	8	43.49	0.57	0.055	0.002
1212	Francette	1931 XC	9.54	0.15	4	85.81	2.18	0.037	0.002
1213	Algeria	1931 XD	10.80	0.15	8	34.46	0.67	0.076	0.003
1214	Richilde	1932 AA	10.90	0.15	7	34.94	0.50	0.064	0.002
1215	Boyer	1932 BA	11.14	0.15	3	20.68	0.79	0.147	0.013
1216	Askania	1932 BL	13.49	0.15	2	10.08	0.54	0.070	0.008
1219	Britta	1932 CJ	11.94	0.24	5	11.76	0.30	0.223	0.013
1220	Crocus	1932 CU	11.72	0.23	2	18.05	1.43	0.111	0.018
1222	Tina	1932 LA	10.30	0.15	8	26.28	0.33	0.199	0.006
1223	Neckar	1931 TG	10.58	0.15	6	23.06	0.56	0.201	0.011
1224	Fantasia	1927 SD	11.36	0.15	3	14.23	0.70	0.254	0.026
1225	Ariane	1930 HK	12.10	0.15	1	9.10	0.69	0.308	0.049
1227	Geranium	1931 TD	10.10	0.15	6	46.08	0.80	0.076	0.003
1228	Scabiosa	1931 TU	11.50	0.15	3	16.17	0.71	0.170	0.016
1229	Tilia	1931 TP1	11.10	0.15	6	27.57	0.56	0.086	0.004
1231	Auricula	1931 TE2	11.60	0.15	3	21.44	0.81	0.089	0.007
1232	Cortusa	1931 TF2	10.20	0.15	5	42.20	1.11	0.085	0.005
1233	Kobresia	1931 TG2	11.30	0.15	6	36.06	0.60	0.041	0.002
1234	Elyna	1931 UF	11.50	0.15	4	29.08	0.90	0.055	0.004
1236	Thais	1931 VX	11.93	0.15	5	20.07	0.41	0.075	0.004
1237	Genevieve	1931 XB	10.70	0.15	6	40.67	0.61	0.057	0.002
1238	Predappia	1932 CA	11.90	0.15	1	27.09	1.02	0.042	0.004
1239	Queteleta	1932 CB	12.50	0.15	6	19.26	0.46	0.048	0.003
1240	Centenaria	1932 CD	9.70	0.15	9	56.87	0.67	0.072	0.002
1241	Dysona	1932 EB1	9.45	0.15	11	77.14	0.86	0.051	0.001
1242	Zambesia	1932 HL	10.10	0.15	8	62.23	0.79	0.043	0.001
1243	Pamela	1932 JE	9.68	0.15	7	70.25	1.00	0.048	0.002
1244	Deira	1932 KE	11.30	0.15	9	32.28	0.35	0.052	0.001
1245	Calvinia	1932 KF	9.89	0.15	4	30.95	0.78	0.214	0.013
1247	Memoria	1932 QA	10.52	0.15	3	34.84	1.29	0.091	0.007
1248	Jugurtha	1932 RO	9.70	0.15	8	30.47	0.45	0.269	0.009
1249	Rutherfordia	1932 VB	11.54	0.15	1	15.77	0.69	0.172	0.017
1250	Galanthus	1933 BD	12.26	0.15	7	19.54	0.36	0.058	0.002
1252	Celestia	1933 DG	10.89	0.15	5	20.36	0.69	0.193	0.014
1254	Erfordia	1932 JA	10.80	0.15	8	50.69	0.79	0.033	0.001
1255	Schilowa	1932 NC	10.20	0.15	8	36.49	0.51	0.111	0.004
1256	Normannia	1932 PD	9.66	0.15	3	73.26	2.34	0.046	0.003
1257	Mora	1932 PE	11.50	0.15	3	21.47	0.64	0.096	0.007
1258	Sicilia	1932 PG	10.50	0.15	7	44.86	0.75	0.056	0.002
1259	Ogyalla	1933 BT	11.00	0.15	3	31.32	1.13	0.072	0.006
1261	Legia	1933 FB	11.00	0.15	6	32.13	0.66	0.070	0.003
1262	Sniadeckia	1933 FE	10.25	0.15	9	59.49	0.82	0.040	0.001
1263	Varsavia	1933 FF	10.50	0.15	6	51.44	0.74	0.042	0.002
1264	Letaba	1933 HG	9.10	0.15	10	70.34	0.77	0.082	0.002
1265	Schweikarda	1911 MV	11.00	0.15	2	21.82	1.06	0.149	0.016
1266	Tone	1927 BD	9.41	0.15	8	88.82	1.33	0.039	0.001
1267	Geertruida	1930 HD	12.10	0.15	4	20.92	0.60	0.060	0.004
1268	Libya	1930 HJ	9.12	0.15	6	93.44	1.42	0.046	0.002
1269	Rollandia	1930 SH	8.82	0.15	7	107.85	1.66	0.045	0.002
1270	Datura	1930 YE	12.50	0.15	3	7.83	0.37	0.291	0.029
1271	Isergina	1931 TN	10.60	0.15	11	52.15	0.76	0.038	0.001
1273	Helma	1932 PF	12.80	0.15	1	10.39	0.61	0.124	0.016
1274	Delportia	1932 WC	11.82	0.15	8	12.95	0.22	0.200	0.008
1275	Cimbria	1932 WG	10.72	0.15	11	26.31	0.30	0.135	0.004
1276	Ucclia	1933 BA	10.40	0.15	8	30.09	0.51	0.141	0.006
1277	Dolores	1933 HA	11.05	0.15	4	27.05	0.90	0.095	0.007
1278	Kenya	1933 LA	10.80	0.15	2	18.80	1.06	0.240	0.029
1280	Baillauda	1933 QB	10.33	0.15	11	53.97	0.72	0.045	0.001
1281	Jeanne	1933 QJ	11.60	0.15	8	23.16	0.30	0.079	0.003
1282	Utopia	1933 QM1	10.00	0.15	9	58.77	0.72	0.052	0.002
1283	Komsomolia	1925 SC	10.30	0.15	5	33.12	0.57	0.123	0.005
1284	Latvia	1933 OP	10.24	0.15	8	41.47	0.52	0.083	0.003
1285	Julietta	1933 QF	10.60	0.15	7	42.39	0.62	0.058	0.002

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
1286	Banachiewicza	1933 QH	10.88	0.15	6	21.84	0.49	0.171	0.009
1287	Lorcia	1933 QL	11.07	0.15	6	21.47	0.60	0.152	0.010
1288	Santa	1933 QM	11.41	0.15	7	36.93	0.61	0.036	0.001
1289	Kutaissi	1933 QR	10.73	0.15	5	22.97	0.56	0.172	0.009
1291	Phryne	1933 RA	10.33	0.15	7	31.13	0.52	0.141	0.005
1292	Luce	1933 SH	11.30	0.15	4	15.26	0.56	0.235	0.019
1293	Sonja	1933 SO	13.50	0.15	1	3.65	0.45	0.529	0.133
1294	Antwerpia	1933 UB1	10.20	0.15	7	34.80	0.66	0.125	0.005
1295	Deflotte	1933 WD	10.60	0.15	4	45.67	1.36	0.049	0.003
1296	Andree	1933 WE	10.90	0.15	9	25.52	0.36	0.121	0.004
1297	Quadea	1934 AD	10.80	0.15	7	24.77	0.49	0.142	0.007
1298	Nocturna	1934 AE	10.70	0.15	7	42.79	0.88	0.051	0.002
1299	Mertona	1934 BA	11.40	0.15	1	14.90	1.23	0.219	0.038
1300	Marcelle	1934 CL	10.90	0.15	9	33.34	0.45	0.070	0.002
1301	Yvonne	1934 EA	10.80	0.15	10	21.54	0.25	0.201	0.006
1302	Werra	1924 SV	10.60	0.15	10	32.18	0.50	0.102	0.004
1303	Luthera	1928 FP	9.00	0.15	8	87.15	1.13	0.059	0.002
1304	Arosa	1928 KC	8.60	0.15	6	48.35	0.81	0.279	0.011
1305	Pongola	1928 OC	10.65	0.15	3	25.12	0.91	0.157	0.012
1306	Scythia	1930 OB	9.71	0.15	7	83.65	1.41	0.034	0.001
1308	Halleria	1931 EB	10.80	0.15	9	45.05	0.57	0.042	0.001
1309	Hyperborea	1931 TO	10.20	0.15	9	57.99	0.72	0.044	0.001
1311	Knopfia	1933 FF1	12.20	0.15	2	13.61	0.99	0.130	0.020
1312	Vassar	1933 OT	10.80	0.15	3	32.70	1.29	0.081	0.007
1313	Berna	1933 QG	11.80	0.15	5	14.27	0.36	0.169	0.009
1314	Paula	1933 SC	12.68	0.15	2	6.70	0.55	0.377	0.074
1315	Bronislawa	1933 SF1	10.00	0.15	8	62.52	0.87	0.045	0.001
1318	Nerina	1934 FG	11.90	0.15	1	10.68	0.72	0.269	0.038
1319	Disa	1934 FO	11.10	0.15	8	24.00	0.37	0.116	0.004
1320	Impala	1934 JG	10.40	0.15	9	37.84	0.45	0.088	0.002
1321	Majuba	1934 JH	10.28	0.15	7	32.59	0.56	0.131	0.005
1322	Coppernicus	1934 LA	12.70	0.15	10	10.70	0.19	0.133	0.005
1323	Tugela	1934 LD	9.90	0.15	7	63.45	0.94	0.048	0.002
1325	Inanda	1934 NR	11.50	0.15	2	12.34	0.61	0.303	0.034
1326	Losaka	1934 NS	10.92	0.15	1	34.10	1.47	0.065	0.006
1327	Namaqua	1934 RT	12.10	0.15	2	25.51	1.20	0.039	0.004
1328	Devota	1925 UA	10.31	0.15	9	56.06	0.91	0.043	0.002
1329	Eliane	1933 FL	10.90	0.15	11	20.94	0.25	0.180	0.005
1330	Spiridonia	1925 DB	10.17	0.15	6	73.75	1.44	0.029	0.001
1331	Solvejg	1933 QS	10.14	0.15	3	31.66	1.30	0.159	0.014
1332	Marconia	1934 AA	10.20	0.15	9	49.95	0.61	0.060	0.002
1333	Cevenola	1934 DA	11.40	0.15	3	15.24	0.74	0.209	0.021
1334	Lundmarka	1934 OB	11.30	0.15	3	26.83	1.03	0.079	0.007
1336	Zeelandia	1934 RW	10.66	0.15	5	19.18	0.51	0.273	0.017
1337	Gerarda	1934 RA1	11.06	0.15	15	40.91	0.49	0.042	0.001
1339	Desagneauxa	1934 XB	10.81	0.15	5	24.20	0.65	0.151	0.009
1340	Yvette	1934 YA	11.10	0.15	2	28.40	1.70	0.082	0.011
1341	Edmee	1935 BA	10.58	0.15	4	27.14	0.73	0.144	0.009
1342	Brabantia	1935 CV	11.35	0.15	5	17.36	0.46	0.171	0.010
1343	Nicole	1935 FC	11.10	0.15	10	25.63	0.31	0.100	0.003
1345	Potomac	1908 CG	9.73	0.15	3	76.72	2.34	0.039	0.003
1347	Patria	1931 VW	11.60	0.15	8	33.48	0.49	0.036	0.001
1348	Michel	1933 FD	11.40	0.15	6	16.90	0.37	0.172	0.009
1349	Bechuana	1934 LJ	10.20	0.15	9	25.80	0.37	0.233	0.008
1350	Rosselia	1934 TA	10.78	0.15	8	21.22	0.38	0.199	0.008
1351	Uzbekistania	1934 TF	9.60	0.15	7	69.56	1.05	0.053	0.002
1352	Wawel	1935 CE	11.10	0.15	5	19.27	0.52	0.179	0.011
1353	Maartje	1935 CU	10.40	0.15	6	38.13	0.79	0.088	0.004
1354	Botha	1935 GK	11.30	0.15	7	42.54	0.69	0.030	0.001
1356	Nyanza	1935 JH	9.90	0.15	7	62.46	0.89	0.050	0.002
1357	Khama	1935 ND	11.03	0.15	4	38.12	1.11	0.048	0.003
1358	Gaika	1935 OB	12.20	0.15	5	23.13	0.59	0.044	0.003
1359	Prieska	1935 OC	10.50	0.15	5	52.64	1.07	0.042	0.002
1360	Tarka	1935 OD	11.00	0.15	8	32.92	0.41	0.065	0.002
1361	Leuschneria	1935 QA	10.80	0.15	8	33.47	0.55	0.077	0.003
1362	Griqua	1935 QG1	11.18	0.15	9	28.36	0.40	0.075	0.002
1363	Herberta	1935 RA	11.60	0.15	2	17.00	1.28	0.140	0.022
1364	Safara	1935 VB	10.60	0.15	8	24.35	0.47	0.173	0.007
1366	Piccolo	1932 WA	10.45	0.15	3	26.92	1.03	0.167	0.014
1367	Nongoma	1934 NA	12.00	0.15	2	10.82	0.72	0.242	0.034
1368	Numidia	1935 HD	10.92	0.15	1	20.66	0.82	0.177	0.016
1369	Ostanina	1935 QB	10.70	0.15	6	40.59	0.62	0.061	0.002
1371	Resi	1935 QJ	11.40	0.15	2	27.03	1.75	0.079	0.012
1372	Haremari	1935 QK	11.00	0.15	8	23.90	0.53	0.126	0.006
1373	Cincinnati	1935 QN	11.20	0.15	1	22.16	1.66	0.119	0.019
1375	Alfreda	1935 UB	11.60	0.15	4	14.53	0.53	0.198	0.016
1378	Leonce	1936 DB	12.10	0.15	7	22.20	0.33	0.053	0.002
1379	Lomonosowa	1936 FC	11.05	0.15	5	20.45	0.56	0.167	0.010
1381	Danubia	1930 QJ	12.29	0.15	2	23.78	1.11	0.038	0.004
1382	Gerti	1925 BB	12.20	0.15	1	9.14	0.95	0.278	0.059
1384	Kniertje	1934 RX	11.50	0.15	7	26.14	0.56	0.066	0.003
1385	Gelria	1935 MJ	10.70	0.15	1	20.15	1.28	0.228	0.031
1386	Storeria	1935 PA	12.60	0.15	1	14.00	0.93	0.082	0.012
1387	Kama	1935 QD	12.90	0.15	3	9.16	0.33	0.146	0.012
1388	Aphrodite	1935 SS	10.90	0.15	8	23.00	0.48	0.152	0.007
1390	Abastumani	1935 TA	9.40	0.15	4	98.30	2.03	0.033	0.002
1392	Pierre	1936 FO	11.72	0.15	9	26.16	0.34	0.054	0.002
1394	Algoa	1936 LK	12.50	0.15	1	13.51	0.94	0.097	0.014
1395	Aribeda	1936 OB	11.40	0.15	4	22.52	0.77	0.096	0.007
1396	Outeniqua	1936 PF	12.00	0.15	7	11.00	0.25	0.237	0.012
1397	Umtata	1936 PG	11.47	0.15	8	20.35	0.30	0.112	0.004
1398	Donnera	1936 QL	10.10	0.15	2	28.26	1.58	0.204	0.025
1400	Tirela	1936 WA	11.50	0.15	3	14.67	0.62	0.227	0.022
1402	Eri	1936 OC	13.00	0.15	5	18.58	0.42	0.033	0.002
1403	Idelsonia	1936 QA	10.60	0.15	6	25.66	0.62	0.164	0.009
1404	Ajax	1936 QW	9.00	0.15	4	96.34	2.25	0.050	0.003
1406	Komppa	1936 RF	10.60	0.15	8	25.41	0.39	0.160	0.006
1407	Lindelof	1936 WC	10.60	0.15	1	23.85	1.40	0.179	0.023
1408	Trusanda	1936 WF	11.00	0.15	10	35.65	0.50	0.056	0.002
1409	Isko	1937 AK	10.60	0.15	9	37.23	0.48	0.074	0.002
1410	Margret	1937 AL	11.10	0.15	1	15.86	1.59	0.255	0.052
1411	Brauna	1937 AM	10.90	0.15	5	33.54	0.78	0.070	0.004
1413	Roucarie	1937 CD	10.90	0.15	4	22.34	0.86	0.173	0.014
1414	Jerome	1937 CE	12.40	0.15	8	16.89	0.36	0.068	0.003
1415	Malautra	1937 EA	12.19	0.15	5	9.98	0.30	0.240	0.016
1416	Renauxa	1937 EC	10.40	0.15	5	34.42	0.90	0.112	0.006
1418	Fayeta	1903 RG	12.09	0.15	8	9.25	0.17	0.305	0.013
1419	Danzig	1929 RF	11.30	0.15	8	15.09	0.22	0.250	0.009
1420	Radcliffe	1931 RJ	11.50	0.15	3	24.75	1.00	0.087	0.008
1421	Esperanto	1936 FQ	10.30	0.15	6	56.68	0.96	0.042	0.002
1424	Sundmania	1937 AJ	9.50	0.15	10	73.40	0.86	0.052	0.001
1425	Tuorla	1937 GB	11.30	0.15	1	14.34	1.08	0.260	0.041
1426	Riviera	1937 GF	10.80	0.15	5	17.41	0.47	0.281	0.017
1427	Ruvuma	1937 KB	10.70	0.15	11	37.82	0.40	0.066	0.002
1428	Mombasa	1937 NO	10.90	0.15	11	55.34	0.70	0.025	0.001
1429	Pemba	1937 NH	12.50	0.15	2	10.75	0.67	0.154	0.021
1430	Somalia	1937 NK	12.80	0.15	4	9.44	0.36	0.162	0.014
1434	Margot	1936 FD1	10.43	0.15	7	30.84	0.62	0.132	0.006
1435	Garlena	1936 WE	12.80	0.15	2	14.58	1.16	0.063	0.010
1436	Salonta	1936 YA	10.30	0.15	8	60.95	0.91	0.037	0.001
1437	Diomedes	1937 PB	8.30	0.15	7	172.60	3.42	0.028	0.001
1438	Wendeline	1937 TC	11.40	0.15	5	37.89	0.79	0.035	0.002
1439	Vogtia	1937 TE	10.45	0.15	4	52.86	1.60	0.043	0.003
1443	Ruppina	1937 YG	11.40	0.15	3	16.67	0.75	0.176	0.017
1444	Pannonia	1938 AE	11.10	0.15	7	30.48	0.53	0.070	0.003
1445	Konkolya	1938 AF	11.84	0.15	6	22.29	0.55	0.070	0.004
1447	Utra	1938 BB	11.30	0.15	1	11.83	0.86	0.381	0.058
1448	Lindbladia	1938 DF	12.60	0.15	7	17.56	0.31	0.053	0.002
1450	Raimonda	1938 DP	11.90	0.15	2	20.80	1.15	0.074	0.009
1451	Grano	1938 DT	12.60	0.15	1	9.70	0.57	0.171	0.022
1453	Fennia	1938 ED1	12.69	0.15	4	8.98	0.28	0.186	0.013
1456	Saldanha	1937 NG	10.93	0.15	10	43.44	0.55	0.040	0.001
1457	Ankara	1937 PA	10.60	0.15	11	19.82	0.26	0.262	0.008
1458	Mineura	1937 RC	11.50	0.15	2	20.35	1.29	0.107	0.014
1460	Haltia	1937 WC	13.10	0.15	2	7.43	0.61	0.186	0.032
1461	Jean-Jacques	1937 YL	10.01	0.15	2	33.75	1.40	0.168	0.017
1462	Zamenhof	1938 CA	10.80	0.15	7	26.57	0.52	0.121	0.005
1463	Nordenmarkia	1938 CB	10.50	0.15	4	36.77	1.06	0.089	0.006
1464	Armisticia	1939 VO	11.00	0.15	6	24.16	0.58	0.128	0.007
1465	Autonoma	1938 FA	11.60	0.15	8	18.79	0.36	0.121	0.005
1466	Mundleria	1938 KA	11.90	0.15	7	23.08	0.34	0.058	0.002
1467	Mashona	1938 OE	8.57	0.15	7	95.08	1.30	0.074	0.002
1469	Linzia	1938 QD	9.60	0.15	9	67.66	0.80	0.056	0.002
1470	Carla	1938 SD	11.00	0.15	5	34.28	0.84	0.062	0.003
1471	Tornio	1938 SL1	10.70	0.15	7	42.21	0.58	0.052	0.002
1473	Ounas	1938 UT	11.80	0.15	2	17.42	1.38	0.112	0.019
1477	Bonsdorffia	1938 CC	11.59	0.15	10	35.87	0.66	0.033	0.001
1478	Vihuri	1938 CF	12.63	0.15	2	11.19	0.79	0.127	0.019
1479	Inkeri	1938 DE	11.40	0.15	5	22.70	0.56	0.095	0.005
1481	Tubingia	1938 DR	10.34	0.15	10	40.12	0.51	0.082	0.002
1482	Sebastiana	1938 DA1	11.04	0.15	6	17.46	0.49	0.230	0.014
1484	Postrema	1938 HC	10.90	0.15	9	47.00	0.62	0.035	0.001
1485	Isa	1938 OB	11.40	0.15	5	18.58	0.58	0.156	0.011
1487	Boda	1938 WC	10.60	0.15	6	28.54	0.55	0.133	0.006
1488	Aura	1938 XE	10.80	0.15	6	27.51	0.58	0.113	0.005
1489	Attila	1939 GC	11.10	0.15	9	26.77	0.45	0.094	0.004
1490	Limpopo	1936 LB	12.00	0.15	9	20.21	0.36	0.069	0.003
1491	Balduinus	1938 EJ	12.20	0.15	2	21.96	1.33	0.048	0.006
1493	Sigrid	1938 QB	11.99	0.15	5	25.10	0.42	0.048	0.002
1494	Savo	1938 SJ	12.70	0.15	3	9.23	0.43	0.173	0.017
1495	Helsinki	1938 SW	11.60	0.15	4	14.62	0.48	0.198	0.015
1497	Tampere	1938 SB1	11.90	0.15	1	13.68	1.00	0.164	0.025
1498	Lahti	1938 SK1	11.70	0.15	2	30.13	1.93	0.044	0.006
1499	Pori	1938 UF	11.20	0.15	2	13.37	0.89	0.330	0.046
1501	Baade	1938 UJ	12.10	0.15	3	11.84	0.48	0.184	0.016
1502	Arenda	1938 WB	11.60	0.15	5	32.42	0.65	0.040	0.002
1503	Kuopio	1938 XD	10.60	0.15	8	22.33	0.34	0.223	0.008
1504	Lappeenranta	1939 FM	11.88	0.15	4	12.42	0.48	0.213	0.020
1505	Koranna	1939 HH	11.60	0.15	3	22.83	0.88	0.082	0.007
1508	Kemi	1938 UP	12.03	0.15	1	17.98	1.34	0.084	0.013
1509	Esclangona	1938 YG	12.64	0.15	3	9.87	0.37	0.160	0.013
1510	Charlois	1939 DC	11.20	0.15	5	26.98	0.64	0.081	0.004
1511	Dalera	1939 FB	12.70	0.15	5	15.11	0.48	0.070	0.005
1512	Oulu	1939 FE	9.62	0.15	5	91.05	2.20	0.031	0.001
1516	Henry	1938 BG	11.80	0.15	10	28.55	0.36	0.042	0.001
1517	Beograd	1938 FD	11.10	0.15	8	37.90	0.48	0.045	0.001
1519	Kajaani	1938 UB	11.40	0.15	4	27.52	1.04	0.065	0.005
1520	Imatra	1938 UY	10.00	0.15	13	55.55	0.60	0.058	0.002
1524	Joensuu	1939 SB	10.80	0.15	7	44.87	0.78	0.043	0.002
1525	Savonlinna	1939 SC	12.40	0.15	1	17.60	0.90	0.063	0.007
1528	Conrada	1940 CA	12.40	0.15	1	12.46	0.89	0.125	0.019
1529	Oterma	1938 BC	10.05	0.15	7	60.16	1.11	0.047	0.002
1531	Hartmut	1938 SH	12.20	0.15	2	12.67	0.87	0.145	0.021
1532	Inari	1938 SM	11.50	0.15	7	29.53	0.56	0.060	0.003
1533	Saimaa	1939 BD	10.82	0.15	2	27.88	1.68	0.107	0.014
1534	Nasi	1939 BK	11.70	0.15	8	19.51	0.36	0.100	0.004
1535	Paijanne	1939 RC	10.70	0.15	9	26.12	0.42	0.140	0.005
1537	Transylvania	1940 QA	11.90	0.15	2	21.49	1.58	0.067	0.010
1539	Borrelly	1940 UB	10.60	0.15	3	27.09	0.92	0.166	0.014
1540	Kevola	1938 WK	10.80	0.15	7	40.16	0.59	0.053	0.002
1541	Estonia	1939 CK	11.20	0.15	2	23.89	1.35	0.104	0.012
1542	Schalen	1941 QE	10.30	0.15	7	48.09	0.66	0.058	0.002
1545	Thernoe	1941 UW	11.80	0.15	7	19.37	0.31	0.092	0.004
1546	Izsak	1941 SG1	10.60	0.15	1	26.08	1.45	0.149	0.018
1547	Nele	1929 CZ	10.75	0.15	2	16.83	1.00	0.313	0.040
1548	Palomaa	1935 FK	11.50	0.15	10	32.05	0.50	0.045	0.002
1550	Tito	1937 WD	11.80	0.15	11	11.98	0.15	0.239	0.007
1551	Argelander	1938 DC1	12.20	0.15	3	10.50	0.50	0.217	0.022
1554	Yugoslavia	1940 RE	11.90	0.15	2	21.39	1.31	0.070	0.009
1555	Dejan	1941 SA	11.70	0.15	6	24.04	0.48	0.068	0.003

Table E.2 (Continued.)

Asteroid			H	G	$N_{\rm ID}$	d	$\sigma(d)$	$p_{\rm V}$	$\sigma(p_{\rm V})$
1556	Wingolfia	1942 AA	10.55	0.15	2	33.88	2.12	0.093	0.012
1557	Roehla	1942 AD	11.30	0.15	3	19.64	0.86	0.144	0.014
1558	Jarnefelt	1942 BD	10.20	0.15	13	61.77	0.70	0.039	0.001
1559	Kustaanheimo	1942 BF	11.90	0.15	2	12.70	0.85	0.193	0.028
1560	Strattonia	1942 XB	11.50	0.15	6	26.09	0.69	0.068	0.004
1561	Fricke	1941 CG	11.60	0.15	3	24.79	1.18	0.069	0.007
1562	Gondolatsch	1943 EE	11.80	0.15	5	11.12	0.33	0.283	0.018
1564	Srbija	1936 TB	10.88	0.15	3	39.32	1.43	0.051	0.004
1565	Lemaitre	1948 WA	12.30	0.15	2	8.00	0.58	0.334	0.051
1567	Alikoski	1941 HN	9.47	0.15	12	70.06	0.80	0.059	0.002
1568	Aisleen	1946 QB	12.10	0.15	2	14.04	0.96	0.130	0.019
1569	Evita	1948 PA	11.10	0.15	6	39.21	0.90	0.043	0.002
1570	Brunonia	1948 TX	12.40	0.15	1	10.80	1.03	0.166	0.033
1572	Posnania	1949 SC	10.00	0.15	1	27.75	1.90	0.230	0.033
1574	Meyer	1949 FD	10.30	0.15	4	60.82	1.30	0.036	0.002
1576	Fabiola	1948 SA	11.04	0.15	2	26.22	1.79	0.100	0.015
1578	Kirkwood	1951 AT	10.26	0.15	5	57.14	1.27	0.044	0.002
1579	Herrick	1948 SB	10.68	0.15	8	48.43	0.62	0.041	0.001
1581	Abanderada	1950 LA1	10.85	0.15	8	36.49	0.64	0.061	0.002
1582	Martir	1950 LY	10.90	0.15	9	36.32	0.56	0.060	0.002
1583	Antilochus	1950 SA	8.60	0.15	3	111.69	3.86	0.053	0.004
1584	Fuji	1927 CR	10.67	0.15	7	16.74	0.34	0.344	0.016
1585	Union	1947 RG	10.66	0.15	7	50.68	0.88	0.038	0.001
1586	Thiele	1939 CJ	11.90	0.15	5	13.21	0.38	0.179	0.011
1587	Kahrstedt	1933 FS1	11.20	0.15	5	17.18	0.50	0.217	0.014
1588	Descamisada	1951 MH	11.10	0.15	1	25.13	1.33	0.102	0.012
1589	Fanatica	1950 RK	12.00	0.15	1	12.16	0.76	0.189	0.025
1590	Tsiolkovskaja	1933 NA	11.70	0.15	5	12.81	0.27	0.232	0.012
1591	Baize	1951 KA	11.70	0.15	12	15.17	0.21	0.162	0.005
1592	Mathieu	1951 LA	11.60	0.15	7	14.83	0.25	0.187	0.008
1594	Danjon	1949 WA	12.20	0.15	5	12.08	0.34	0.163	0.010
1595	Tanga	1930 ME	12.02	0.15	7	28.22	0.46	0.035	0.001
1596	Itzigsohn	1951 EV	10.40	0.15	8	48.36	0.70	0.053	0.002
1597	Laugier	1949 EB	12.00	0.15	1	15.36	0.94	0.119	0.016
1599	Giomus	1950 WA	11.00	0.15	7	46.02	0.70	0.034	0.001
1600	Vyssotsky	1947 UC	11.90	0.15	2	7.50	0.50	0.547	0.076
1601	Patry	1942 KA	12.32	0.15	7	10.93	0.25	0.178	0.009
1602	Indiana	1950 GF	12.49	0.15	2	8.41	0.59	0.259	0.040
1603	Neva	1926 VH	10.90	0.15	10	40.49	0.53	0.048	0.001
1604	Tombaugh	1931 FH	10.53	0.15	6	28.78	0.53	0.138	0.006
1605	Milankovitch	1936 GA	10.10	0.15	11	33.80	0.42	0.142	0.004
1606	Jekhovsky	1950 RH	12.17	0.15	4	25.43	0.80	0.042	0.003
1607	Mavis	1950 RA	11.60	0.15	7	14.91	0.25	0.189	0.007
1608	Munoz	1951 RZ	12.90	0.15	1	6.15	0.47	0.323	0.052
1609	Brenda	1951 NL	10.61	0.15	8	27.96	0.48	0.133	0.005
1611	Beyer	1950 DJ	11.30	0.15	2	23.25	1.77	0.101	0.017
1612	Hirose	1950 BJ	11.60	0.15	2	18.59	1.31	0.120	0.018
1613	Smiley	1950 SD	11.40	0.15	4	20.03	0.59	0.127	0.008
1614	Goldschmidt	1952 HA	10.70	0.15	5	48.58	1.04	0.040	0.002
1616	Filipoff	1950 EA	11.50	0.15	9	27.91	0.49	0.060	0.002
1618	Dawn	1948 NF	11.50	0.15	2	16.74	1.08	0.189	0.030
1621	Druzhba	1926 TM	11.63	0.15	10	11.70	0.20	0.312	0.012
1622	Chacornac	1952 EA	12.20	0.15	2	10.27	0.65	0.224	0.030
1623	Vivian	1948 PL	11.00	0.15	2	29.98	1.74	0.078	0.010
1624	Rabe	1931 TT1	11.20	0.15	3	23.56	0.81	0.110	0.009
1625	The NORC	1953 RB	10.34	0.15	2	44.66	2.09	0.065	0.006
1626	Sadeya	1927 AA	10.50	0.15	9	14.77	0.19	0.512	0.016
1628	Strobel	1923 OG	10.02	0.15	11	56.58	0.68	0.055	0.002
1629	Pecker	1952 DB	12.60	0.15	3	8.31	0.37	0.234	0.023
1631	Kopff	1936 UC	12.20	0.15	7	9.58	0.21	0.259	0.012
1632	Siebohme	1941 DF	11.30	0.15	6	27.71	0.58	0.070	0.003
1633	Chimay	1929 EC	10.50	0.15	5	36.26	0.86	0.088	0.005
1634	Ndola	1935 QP	13.00	0.15	1	7.35	0.58	0.206	0.034
1635	Bohrmann	1924 QW	11.10	0.15	4	19.12	0.70	0.187	0.015
1637	Swings	1936 QO	10.80	0.15	5	43.94	0.93	0.044	0.002
1638	Ruanda	1935 JF	11.50	0.15	3	16.58	0.89	0.162	0.018
1639	Bower	1951 RB	10.98	0.15	8	38.54	0.57	0.049	0.002
1641	Tana	1935 OJ	10.40	0.15	3	25.09	1.01	0.197	0.017
1642	Hill	1951 RU	10.50	0.15	5	19.10	0.54	0.320	0.020
1643	Brown	1951 RQ	12.80	0.15	4	10.96	0.39	0.129	0.010
1644	Rafita	1935 YA	11.82	0.15	2	17.69	1.08	0.106	0.014
1645	Waterfield	1933 OJ	10.70	0.15	5	30.36	0.83	0.102	0.006
1646	Rosseland	1939 BG	11.82	0.15	8	13.49	0.27	0.186	0.008
1650	Heckmann	1937 TG	11.56	0.15	1	35.15	1.66	0.034	0.004
1652	Herge	1953 PA	13.20	0.15	5	9.58	0.28	0.104	0.007
1654	Bojeva	1931 TL	10.80	0.15	5	28.97	0.73	0.110	0.007
1655	Comas Sola	1929 WG	11.04	0.15	6	32.80	0.69	0.065	0.003
1658	Innes	1953 NA	11.52	0.15	6	13.30	0.29	0.248	0.012
1659	Punkaharju	1940 YL	10.10	0.15	1	28.24	1.54	0.202	0.024
1663	van den Bos	1926 PE	12.20	0.15	1	7.58	0.67	0.406	0.074
1667	Pels	1930 SY	12.10	0.15	4	10.62	0.37	0.232	0.018
1668	Hanna	1933 OK	12.20	0.15	5	22.32	0.76	0.050	0.004
1669	Dagmar	1934 RS	10.97	0.15	8	43.00	0.77	0.039	0.002
1670	Minnaert	1934 RZ	11.38	0.15	2	17.52	1.31	0.162	0.025
1672	Gezelle	1935 BD	11.10	0.15	2	26.56	1.86	0.092	0.014
1673	van Houten	1937 TH	11.60	0.15	2	23.07	1.66	0.076	0.011
1674	Groeneveld	1938 DS	11.06	0.15	7	28.89	0.63	0.081	0.004
1675	Simonida	1938 FB	11.90	0.15	3	12.16	0.52	0.211	0.019
1678	Hveen	1940 YH	10.90	0.15	6	37.73	0.70	0.055	0.002
1679	Nevanlinna	1941 FR	10.60	0.15	8	42.85	0.66	0.056	0.002
1680	Per Brahe	1942 CH	11.20	0.15	3	18.29	0.70	0.178	0.015
1681	Steinmetz	1948 WE	11.56	0.15	2	14.58	0.75	0.204	0.024
1682	Karel	1949 PH	12.90	0.15	1	4.80	0.55	0.531	0.124
1684	Iguassu	1951 QE	10.80	0.15	3	29.84	1.17	0.102	0.009
1686	De Sitter	1935 SR1	10.90	0.15	5	32.66	0.77	0.078	0.004
1687	Glarona	1965 SC	10.25	0.15	4	36.75	0.93	0.107	0.006
1688	Wilkens	1951 EQ1	12.50	0.15	8	16.82	0.29	0.066	0.003
1689	Floris-Jan	1930 SO	11.82	0.15	7	13.99	0.23	0.184	0.007
1690	Mayrhofer	1948 VB	10.90	0.15	8	31.18	0.49	0.082	0.003
1691	Oort	1956 RB	10.95	0.15	5	37.37	0.74	0.053	0.002
1692	Subbotina	1936 QD	11.10	0.15	7	38.11	0.53	0.045	0.002
1693	Hertzsprung	1935 LA	10.97	0.15	7	35.27	0.47	0.059	0.002
1694	Kaiser	1934 SB	11.46	0.15	1	13.84	1.27	0.241	0.046
1695	Walbeck	1941 UO	12.40	0.15	8	19.84	0.29	0.051	0.002
1696	Nurmela	1939 FF	12.90	0.15	3	10.31	0.44	0.116	0.011
1697	Koskenniemi	1940 RM	12.60	0.15	2	10.52	0.66	0.150	0.021
1698	Christophe	1934 CS	11.20	0.15	4	28.12	0.83	0.079	0.005
1699	Honkasalo	1941 QD	12.50	0.15	2	8.17	0.53	0.265	0.037
1700	Zvezdara	1940 QC	12.47	0.15	5	21.71	0.41	0.039	0.002
1702	Kalahari	A924 NC	11.03	0.15	6	37.83	0.63	0.049	0.002
1703	Barry	1930 RB	12.40	0.15	6	9.50	0.24	0.216	0.012
1705	Tapio	1941 SL1	12.80	0.15	2	11.79	0.66	0.100	0.012
1708	Polit	1929 XA	11.80	0.15	3	33.44	1.53	0.035	0.004
1709	Ukraina	1925 QA	12.75	0.15	7	10.79	0.22	0.123	0.006
1711	Sandrine	1935 BB	11.01	0.15	9	25.09	0.42	0.114	0.004
1712	Angola	1935 KC	9.80	0.15	8	70.07	1.03	0.043	0.002
1715	Salli	1938 GK	12.10	0.15	8	23.09	0.47	0.049	0.002
1716	Peter	1934 GF	11.40	0.15	8	26.88	0.41	0.068	0.002
1717	Arlon	1954 AC	12.90	0.15	1	8.57	0.58	0.167	0.024
1718	Namibia	1942 RX	13.50	0.15	2	10.11	0.64	0.070	0.010
1721	Wells	1953 TD3	10.80	0.15	11	44.63	0.62	0.043	0.001
1723	Klemola	1936 FX	10.06	0.15	10	31.45	0.48	0.173	0.006
1724	Vladimir	1932 DC	11.30	0.15	9	32.85	0.42	0.051	0.002
1726	Hoffmeister	1933 OE	12.10	0.15	7	24.61	0.52	0.044	0.002
1728	Goethe Link	1964 TO	11.10	0.15	2	18.18	1.09	0.194	0.025
1730	Marceline	1936 UA	11.50	0.15	4	13.79	0.41	0.236	0.015
1731	Smuts	1948 PH	10.00	0.15	5	54.71	0.98	0.059	0.003
1732	Heike	1943 EY	11.10	0.15	2	24.31	1.45	0.114	0.015
1734	Zhongolovich	1928 TJ	11.70	0.15	4	33.04	0.71	0.035	0.002
1735	ITA	1948 RJ1	9.40	0.15	6	66.09	1.13	0.070	0.003
1736	Floirac	1967 RA	12.20	0.15	4	10.08	0.34	0.252	0.020
1737	Severny	1966 TJ	10.80	0.15	2	24.83	1.47	0.139	0.018
1738	Oosterhoff	1930 SP	12.30	0.15	3	7.62	0.37	0.370	0.038
1741	Giclas	1960 BC	11.20	0.15	2	15.06	1.04	0.265	0.039
1742	Schaifers	1934 RO	11.20	0.15	1	15.88	1.13	0.232	0.035
1743	Schmidt	4109 P-L	12.48	0.15	9	20.78	0.43	0.045	0.002
1746	Brouwer	1963 RF	9.95	0.15	4	61.50	1.80	0.051	0.003
1747	Wright	1947 NH	13.35	0.15	3	5.17	0.24	0.321	0.034
1748	Mauderli	1966 RA	10.65	0.15	6	51.91	1.28	0.037	0.002
1749	Telamon	1949 SB	9.20	0.15	2	69.14	4.57	0.078	0.011
1750	Eckert	1950 NA1	13.15	0.15	5	6.95	0.21	0.203	0.013
1753	Mieke	1934 JM	11.10	0.15	5	19.55	0.60	0.173	0.012
1754	Cunningham	1935 FE	9.77	0.15	5	83.55	1.66	0.031	0.001
1755	Lorbach	1936 VD	10.77	0.15	3	26.53	1.08	0.126	0.011
1756	Giacobini	1937 YA	12.20	0.15	4	10.18	0.33	0.226	0.016
1757	Porvoo	1939 FC	13.36	0.15	4	12.81	0.45	0.049	0.004
1758	Naantali	1942 DK	10.90	0.15	2	21.69	1.28	0.169	0.022
1760	Sandra	1950 GB	11.50	0.15	3	36.64	1.03	0.034	0.002
1761	Edmondson	1952 FN	11.40	0.15	3	21.94	0.94	0.102	0.009
1762	Russell	1953 TZ	11.80	0.15	2	16.93	0.97	0.118	0.015
1764	Cogshall	1953 VM1	11.20	0.15	5	25.14	0.64	0.094	0.005
1765	Wrubel	1957 XB	9.92	0.15	10	42.20	0.48	0.113	0.003
1766	Slipher	1962 RF	11.70	0.15	2	20.29	1.06	0.091	0.010
1768	Appenzella	1965 SA	12.70	0.15	8	18.04	0.36	0.047	0.002
1770	Schlesinger	1967 JR	12.20	0.15	1	11.73	0.87	0.169	0.026
1771	Makover	1968 BD	10.10	0.15	7	44.70	0.75	0.083	0.003
1775	Zimmerwald	1969 JA	12.10	0.15	1	10.17	0.69	0.247	0.035
1776	Kuiper	2520 P-L	11.00	0.15	8	48.87	0.74	0.030	0.001
1780	Kippes	A906 RA	10.68	0.15	4	25.77	0.80	0.143	0.010
1781	Van Biesbroeck	A906 UB	12.70	0.15	4	10.65	0.39	0.138	0.011
1782	Schneller	1931 TL1	11.30	0.15	5	23.51	0.57	0.102	0.005
1783	Albitskij	1935 FJ	11.80	0.15	4	24.68	0.76	0.057	0.004
1784	Benguella	1935 MG	12.30	0.15	4	11.80	0.41	0.156	0.012
1786	Raahe	1948 TL	11.40	0.15	6	23.02	0.51	0.095	0.005
1787	Chiny	1950 SK	11.70	0.15	4	24.00	0.75	0.067	0.005
1788	Kiess	1952 OZ	11.90	0.15	4	19.98	0.66	0.083	0.006
1790	Volkov	1967 ER	12.50	0.15	4	8.67	0.35	0.241	0.021
1791	Patsayev	1967 RE	11.80	0.15	4	29.88	0.67	0.038	0.002
1792	Reni	1968 BG	12.03	0.15	2	26.77	1.74	0.038	0.005
1794	Finsen	1970 GA	11.08	0.15	4	36.93	0.96	0.049	0.003
1795	Woltjer	4010 P-L	11.80	0.15	4	27.79	0.69	0.047	0.003
1796	Riga	1966 KB	9.84	0.15	5	85.79	1.57	0.028	0.001
1797	Schaumasse	1936 VH	12.30	0.15	1	6.62	0.75	0.485	0.112
1798	Watts	1949 GC	12.80	0.15	2	7.84	0.53	0.221	0.032
1799	Koussevitzky	1950 OE	10.90	0.15	1	17.88	1.23	0.241	0.035
1801	Titicaca	1952 SP1	11.00	0.15	1	19.72	1.19	0.181	0.023
1803	Zwicky	1967 CA	12.00	0.15	5	9.20	0.24	0.337	0.019
1805	Dirikis	1970 GD	11.00	0.15	2	22.05	1.37	0.145	0.019
1806	Derice	1971 LC	12.00	0.15	3	10.14	0.41	0.282	0.025
1808	Bellerophon	2517 P-L	12.10	0.15	8	17.14	0.31	0.088	0.004
1811	Bruwer	4576 P-L	10.70	0.15	3	31.52	1.16	0.096	0.008
1812	Gilgamesh	4645 P-L	11.30	0.15	4	19.69	0.79	0.142	0.012
1813	Imhotep	7589 P-L	11.60	0.15	9	23.69	0.35	0.077	0.003
1815	Beethoven	1932 CE1	11.36	0.15	3	32.74	1.30	0.048	0.004
1816	Liberia	1936 BD	12.30	0.15	2	12.49	0.76	0.155	0.022
1817	Katanga	1939 MB	11.80	0.15	1	9.76	1.21	0.353	0.089
1819	Laputa	1948 PC	10.20	0.15	6	52.43	1.02	0.055	0.002
1822	Waterman	1950 OO	13.60	0.15	1	7.07	0.52	0.128	0.020
1823	Gliese	1951 RD	12.90	0.15	4	9.08	0.33	0.153	0.012
1825	Klare	1954 QH	11.80	0.15	2	14.69	0.82	0.167	0.021
1826	Miller	1955 RC1	10.90	0.15	3	26.34	0.95	0.111	0.009
1828	Kashirina	1966 PH	10.90	0.15	4	31.27	0.87	0.081	0.005
1829	Dawson	1967 JJ	12.50	0.15	1	9.67	0.67	0.189	0.028
1832	Mrkos	1969 PC	11.00	0.15	3	27.18	1.23	0.097	0.010
1833	Shmakova	1969 PN	11.98	0.15	2	16.79	0.86	0.116	0.015
1834	Palach	1969 QP	11.50	0.15	3	20.23	0.87	0.109	0.010
1836	Komarov	1971 OT	11.30	0.15	5	22.86	0.73	0.103	0.007
1837	Osita	1971 QZ1	12.90	0.15	1	7.94	0.58	0.194	0.030
1838	Ursa	1971 UC	10.60	0.15	9	39.97	0.63	0.067	0.002
1841	Masaryk	1971 UO1	10.80	0.15	7	43.77	0.83	0.045	0.002

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{v}	$\sigma(p_{\mathrm{v}})$
1843	Jarmila	1972 AB	11.60	0.15	7	27.87	0.60	0.053	0.002
1844	Susilva	1972 UB	11.00	0.15	7	23.36	0.51	0.138	0.007
1847	Stobbe	A916 CA	11.00	0.15	4	23.33	0.64	0.136	0.008
1848	Delvaux	1933 QD	10.90	0.15	4	17.51	0.63	0.255	0.020
1849	Kresak	1942 AB	11.60	0.15	4	21.12	0.71	0.098	0.008
1852	Carpenter	1955 GA	11.10	0.15	3	21.32	1.03	0.168	0.020
1853	McElroy	1957 XE	10.50	0.15	5	21.09	0.67	0.261	0.018
1856	Ruzena	1969 TW1	12.60	0.15	1	9.14	0.80	0.193	0.035
1859	Kovalevskaya	1972 RS2	10.20	0.15	7	45.93	0.76	0.070	0.003
1860	Barbarossa	1973 SK	11.70	0.15	4	16.74	0.51	0.134	0.009
1861	Komensky	1970 WB	11.80	0.15	1	17.69	1.17	0.108	0.015
1866	Sisyphus	1972 XA	13.00	0.15	8	5.72	0.07	0.360	0.010
1867	Deiphobus	1971 EA	8.61	0.15	10	131.31	1.87	0.037	0.001
1868	Thersites	2008 P-L	9.30	0.15	4	78.89	2.02	0.055	0.003
1873	Agenor	1971 FH	10.50	0.15	5	54.38	1.62	0.038	0.003
1874	Kacivelia	A924 RC	11.00	0.15	2	20.32	1.22	0.200	0.029
1875	Neruda	1969 QQ	12.40	0.15	2	16.06	1.37	0.077	0.014
1877	Marsden	1971 FC	10.70	0.15	3	35.27	1.78	0.082	0.009
1879	Broederstroom	1935 UN	12.50	0.15	2	7.66	0.52	0.319	0.048
1880	McCrosky	1940 AN	12.10	0.15	1	13.46	1.02	0.141	0.022
1881	Shao	1940 PC	11.10	0.15	4	25.46	0.86	0.115	0.009
1882	Rauma	1941 UJ	11.10	0.15	1	19.99	1.22	0.161	0.021
1883	Rimito	1942 XA	13.10	0.15	4	8.53	0.29	0.141	0.011
1884	Skip	1943 EB1	11.70	0.15	9	10.21	0.17	0.359	0.013
1887	Virton	1950 TD	11.30	0.15	7	23.43	0.54	0.105	0.005
1888	Zu Chong-Zhi	1964 VO1	11.70	0.15	2	11.91	0.69	0.260	0.032
1889	Pakhmutova	1968 BE	10.80	0.15	5	37.47	0.84	0.061	0.003
1890	Konoshenkova	1968 CD	10.80	0.15	8	28.41	0.52	0.106	0.004
1892	Lucienne	1971 SD	12.10	0.15	5	11.21	0.37	0.207	0.015
1895	Larink	1971 UZ	11.80	0.15	5	20.47	0.59	0.089	0.006
1901	Moravia	1972 AD	11.20	0.15	1	24.86	1.43	0.095	0.012
1902	Shaposhnikov	1972 HU	9.51	0.15	6	91.60	1.54	0.034	0.001
1903	Adzhimushkaj	1972 JL	10.50	0.15	4	31.57	0.73	0.124	0.007
1908	Pobeda	1972 RL2	11.70	0.15	3	18.51	0.83	0.115	0.012
1909	Alekhin	1972 RW2	12.30	0.15	6	18.59	0.37	0.062	0.003
1910	Mikhailov	1972 TZ1	10.70	0.15	10	36.56	0.50	0.072	0.002
1911	Schubart	1973 UD	10.11	0.15	8	80.13	1.25	0.025	0.001
1912	Anubis	6534 P-L	11.40	0.15	1	15.43	1.18	0.204	0.033
1913	Sekanina	1928 SF	11.50	0.15	2	15.20	0.99	0.193	0.026
1923	Osiris	4011 P-L	13.10	0.15	4	14.80	0.51	0.048	0.004
1924	Horus	4023 P-L	12.80	0.15	2	12.12	0.93	0.091	0.015
1926	Demiddelaer	1935 JA	11.60	0.15	5	19.12	0.59	0.117	0.008
1930	Lucifer	1964 UA	10.90	0.15	10	39.61	0.50	0.050	0.001
1936	Lugano	1973 WD	11.10	0.15	4	27.95	0.87	0.093	0.007
1937	Locarno	1973 YA	11.90	0.15	3	13.36	0.72	0.172	0.019
1938	Lausanna	1974 HC	13.00	0.15	2	11.06	0.63	0.104	0.014
1939	Loretta	1974 UC	10.80	0.15	7	29.08	0.51	0.103	0.004
1940	Whipple	1975 CA	11.00	0.15	6	36.34	0.66	0.054	0.002
1942	Jablunka	1972 SA	13.00	0.15	5	15.77	0.43	0.048	0.003
1947	Iso-Heikkila	1935 EA	10.80	0.15	4	30.72	0.86	0.091	0.006
1952	Hesburgh	1951 JC	10.32	0.15	3	41.27	1.19	0.078	0.005
1953	Rupertwildt	1951 UK	11.80	0.15	8	20.92	0.39	0.078	0.003
1954	Kukarkin	1952 PH	11.30	0.15	1	26.29	1.56	0.077	0.010
1956	Artek	1969 TX1	11.90	0.15	3	17.97	0.91	0.099	0.011
1957	Angara	1970 GF	11.36	0.15	4	21.44	0.70	0.111	0.008
1958	Chandra	1970 SB	10.70	0.15	6	33.33	0.68	0.087	0.004
1960	Guisan	1973 UA	11.93	0.15	6	27.23	0.57	0.041	0.002
1961	Dufour	1973 WA	10.60	0.15	6	51.15	0.98	0.039	0.002
1962	Dunant	1973 WE	11.90	0.15	1	20.82	0.94	0.071	0.007
1963	Bezovec	1975 CB	10.91	0.15	4	39.93	0.83	0.049	0.002
1965	van de Kamp	2521 P-L	11.90	0.15	3	11.72	0.55	0.225	0.022
1969	Alain	1935 CG	11.60	0.15	6	22.84	0.46	0.079	0.004
1970	Sumeria	1954 ER	12.00	0.15	2	23.26	1.46	0.055	0.008
1973	Colocolo	1968 OA	11.60	0.15	3	21.98	1.08	0.084	0.008
1974	Caupolican	1968 OE	12.70	0.15	2	16.65	1.23	0.054	0.008
1977	Shura	1970 QY	11.40	0.15	3	16.27	0.65	0.185	0.016
1978	Patrice	1971 LD	13.00	0.15	2	7.54	0.50	0.196	0.027
1980	Tezcatlipoca	1950 LA	13.92	0.15	13	4.50	0.04	0.247	0.005
1981	Midas	1973 EA	15.50	0.15	2	1.95	0.07	0.293	0.025
1982	Cline	1975 VA	12.50	0.15	1	7.21	0.50	0.340	0.050
1983	Bok	1975 LB	12.60	0.15	3	15.45	0.64	0.071	0.007
1984	Fedynskij	1926 TN	11.10	0.15	3	38.36	1.21	0.046	0.003
1985	Hopmann	1929 AE	10.80	0.15	9	43.69	0.53	0.045	0.001
1986	Plaut	1935 SV1	11.80	0.15	6	19.84	0.43	0.087	0.004
1987	Kaplan	1952 RH	11.40	0.15	5	13.52	0.39	0.278	0.017
1989	Tatry	1955 FG	12.10	0.15	1	9.87	0.88	0.262	0.048
1994	Shane	1961 TE	11.60	0.15	3	17.91	0.93	0.129	0.014
1995	Hajek	1971 UP1	12.80	0.15	2	15.29	1.04	0.063	0.010
1996	Adams	1961 UA	12.10	0.15	4	12.05	0.44	0.177	0.014
1997	Leverrier	1963 RC	13.40	0.15	2	6.56	0.48	0.183	0.028
1998	Titius	1938 DX1	12.20	0.15	6	15.98	0.35	0.093	0.004
1999	Hirayama	1973 DR	10.60	0.15	9	35.68	0.55	0.082	0.003
2000	Herschel	1960 OA	11.25	0.15	2	16.86	1.17	0.197	0.029
2002	Euler	1973 QQ1	12.10	0.15	8	19.28	0.33	0.076	0.003
2003	Harding	6559 P-L	11.70	0.15	3	17.22	0.87	0.129	0.014
2007	McCuskey	1963 SQ	11.80	0.15	8	23.14	0.35	0.063	0.002
2008	Konstitutsiya	1973 SV4	10.20	0.15	7	51.37	0.80	0.056	0.002
2009	Voloshina	1968 UL	10.80	0.15	5	28.04	0.72	0.118	0.007
2010	Chebyshev	1969 TL4	11.62	0.15	5	23.11	0.66	0.076	0.005
2012	Guo Shou-Jing	1964 TE2	13.20	0.15	6	11.65	0.26	0.070	0.004
2013	Tucapel	1971 UH4	12.60	0.15	2	12.16	0.75	0.110	0.014
2014	Vasilevskis	1973 JA	11.70	0.15	2	11.84	0.81	0.265	0.038
2015	Kachuevskaya	1972 RA3	12.40	0.15	7	12.73	0.28	0.123	0.006
2016	Heinemann	1938 SE	11.40	0.15	2	25.52	1.41	0.075	0.009
2020	Ukko	1936 FR	11.40	0.15	2	20.12	1.44	0.121	0.018
2022	West	1938 CK	12.00	0.15	1	11.04	0.83	0.230	0.036
2023	Asaph	1952 SA	11.60	0.15	5	21.29	0.40	0.090	0.004
2025	Nortia	1953 LG	10.50	0.15	5	41.49	1.01	0.065	0.003
2026	Cottrell	1955 FF	12.80	0.15	5	13.19	0.55	0.088	0.009
2027	Shen Guo	1964 VR1	11.00	0.15	5	20.98	0.57	0.161	0.009
2031	BAM	1969 TG2	13.00	0.15	3	8.14	0.36	0.170	0.017
2032	Ethel	1970 OH	11.90	0.15	6	34.74	0.73	0.026	0.001
2036	Sheragul	1973 SY2	12.70	0.15	2	7.00	0.50	0.300	0.044
2038	Bistro	1973 WF	12.30	0.15	1	10.55	0.76	0.191	0.029
2040	Chalonge	1974 HA	11.10	0.15	8	35.97	0.54	0.050	0.002
2041	Lancelot	2523 P-L	12.20	0.15	2	15.94	1.21	0.092	0.014
2043	Ortutay	1936 TH	10.80	0.15	5	49.32	0.90	0.036	0.002
2046	Leningrad	1968 UD1	11.50	0.15	5	27.67	0.67	0.060	0.003
2050	Francis	1974 KA	12.68	0.15	5	9.78	0.26	0.162	0.010
2051	Chang	1976 UC	11.90	0.15	1	16.35	1.15	0.115	0.017
2052	Tamriko	1976 UN	10.48	0.15	7	27.51	0.50	0.150	0.006
2054	Gawain	4097 P-L	12.00	0.15	5	20.77	0.63	0.068	0.005
2058	Roka	1938 BH	11.00	0.15	6	23.40	0.52	0.130	0.006
2064	Thomsen	1942 RQ	13.10	0.15	7	8.09	0.12	0.162	0.006
2066	Palala	1934 LB	12.50	0.15	6	18.60	0.44	0.054	0.003
2067	Aksnes	1936 DD	10.48	0.15	2	49.26	1.96	0.049	0.004
2068	Dangreen	1948 AD	11.50	0.15	10	41.03	0.50	0.027	0.001
2069	Hubble	1955 FT	11.10	0.15	6	40.10	0.84	0.040	0.002
2077	Kiangsu	1974 YA	14.10	0.15	1	4.26	0.44	0.224	0.047
2081	Sazava	1976 DH	12.14	0.15	6	23.48	0.46	0.045	0.002
2084	Okayama	1935 CK	12.20	0.15	4	18.45	0.50	0.069	0.004
2085	Henan	1965 YA	11.40	0.15	1	18.34	1.20	0.145	0.020
2089	Cetacea	1977 VF	10.98	0.15	4	17.68	0.51	0.231	0.015
2090	Mizuho	1978 EA	10.99	0.15	3	18.92	0.79	0.207	0.019
2091	Sampo	1941 HO	10.20	0.15	10	35.47	0.45	0.118	0.003
2094	Magnitka	1971 TC2	12.00	0.15	2	9.91	0.58	0.285	0.036
2098	Zyskin	1972 QE	12.50	0.15	3	11.27	0.49	0.149	0.014
2100	Ra-Shalom	1978 RA	16.05	0.12	5	1.98	0.05	0.177	0.009
2103	Laverna	1960 FL	10.80	0.15	1	32.88	1.57	0.078	0.008
2104	Toronto	1963 PD	10.30	0.15	7	37.13	0.58	0.099	0.004
2105	Gudy	1976 DA	11.30	0.15	8	23.58	0.38	0.099	0.004
2106	Hugo	1936 UF	11.70	0.15	1	24.51	1.13	0.061	0.006
2107	Ilmari	1941 VA	11.40	0.15	3	14.28	0.72	0.239	0.025
2108	Otto Schmidt	1948 TR1	11.50	0.15	8	22.20	0.34	0.093	0.003
2109	Dhotel	1950 TH2	11.91	0.15	6	22.28	0.47	0.062	0.003
2111	Tselina	1969 LG	10.45	0.15	6	33.02	0.64	0.130	0.006
2112	Ulyanov	1972 NP	12.80	0.15	2	8.00	0.62	0.209	0.034
2114	Wallenquist	1976 HA	11.10	0.15	3	21.12	1.26	0.149	0.020
2115	Irakli	1976 UD	11.00	0.15	5	23.84	0.68	0.127	0.008
2116	Mtskheta	1976 UM	12.10	0.15	7	20.63	0.44	0.060	0.003
2120	Tyumenia	1967 RM	10.40	0.15	7	43.90	0.80	0.064	0.003
2121	Sevastopol	1971 ME	12.30	0.15	5	8.85	0.30	0.305	0.024
2122	Pyatiletka	1971 XB	12.10	0.15	1	11.00	0.83	0.211	0.033
2123	Vltava	1973 SL2	11.50	0.15	3	15.12	0.75	0.220	0.025
2124	Nissen	1974 MK	11.70	0.15	3	16.15	0.79	0.142	0.015
2126	Gerasimovich	1970 QZ	12.40	0.15	1	9.36	0.68	0.221	0.034
2127	Tanya	1971 KB1	10.70	0.15	4	41.19	1.05	0.055	0.003
2131	Mayall	1975 RA	12.72	0.15	7	7.91	0.17	0.234	0.011
2132	Zhukov	1975 TW3	11.40	0.15	9	30.84	0.51	0.053	0.002
2134	Dennispalm	1976 YB	12.90	0.15	1	7.10	0.71	0.243	0.050
2136	Jugta	1933 OC	11.60	0.15	2	19.56	1.30	0.109	0.016
2137	Priscilla	1936 QZ	11.10	0.15	7	38.29	0.62	0.044	0.002
2138	Swissair	1968 HB	11.50	0.15	1	12.92	1.05	0.266	0.045
2140	Kemerovo	1970 PE	10.90	0.15	8	32.11	0.52	0.076	0.003
2142	Landau	1972 GA	12.10	0.15	5	20.70	0.62	0.062	0.004
2144	Marietta	1975 BC1	11.00	0.15	2	17.84	1.10	0.222	0.029
2145	Blaauw	1976 UF	10.60	0.15	9	37.11	0.53	0.076	0.002
2147	Kharadze	1976 US	11.70	0.15	4	26.04	0.94	0.063	0.005
2149	Schwambraniya	1977 FX	11.70	0.15	3	12.26	0.51	0.259	0.024
2150	Nyctimene	1977 TA	13.40	0.15	2	6.08	0.47	0.209	0.034
2151	Hadwiger	1977 VX	11.10	0.15	3	17.53	0.67	0.209	0.018
2152	Hannibal	1978 WK	10.50	0.15	9	39.47	0.46	0.072	0.002
2158	Tietjen	1933 OS	11.80	0.15	2	20.90	1.34	0.078	0.011
2161	Grissom	1963 UD	12.40	0.15	1	21.97	1.49	0.040	0.006
2163	Korczak	1971 SP1	11.70	0.15	3	26.04	1.26	0.059	0.006
2164	Lyalya	1972 RM2	11.80	0.15	3	21.51	0.83	0.073	0.006
2165	Young	1956 RJ	11.00	0.15	4	30.59	0.82	0.082	0.005
2167	Erin	1971 LA	12.10	0.15	3	12.29	0.47	0.170	0.014
2169	Taiwan	1964 VP1	12.00	0.15	5	18.22	0.51	0.085	0.005
2171	Kiev	1973 QD1	13.60	0.15	1	8.85	0.58	0.082	0.011
2173	Maresjev	1974 QG1	11.40	0.15	6	27.90	0.61	0.068	0.004
2177	Oliver	6551 P-L	11.30	0.15	2	18.38	1.23	0.164	0.024
2179	Platzeck	1965 MA	11.50	0.15	3	21.95	1.06	0.094	0.010
2180	Marjaleena	1940 RJ	11.00	0.15	2	20.80	1.37	0.167	0.023
2181	Fogelin	1942 YA	12.10	0.15	1	11.29	0.85	0.200	0.031
2182	Semirot	1953 FH1	11.30	0.15	2	22.87	1.63	0.106	0.017
2183	Neufang	1959 OB	11.50	0.15	10	25.27	0.28	0.070	0.002
2184	Fujian	1964 TV2	11.50	0.15	3	25.06	1.18	0.071	0.007
2185	Guangdong	1965 WO	11.30	0.15	1	12.70	1.52	0.331	0.081
2187	La Silla	1976 UH	13.00	0.15	3	12.96	0.70	0.080	0.010
2188	Orlenok	1976 UL4	11.90	0.15	3	16.90	1.07	0.134	0.020
2190	Coubertin	1976 GV3	12.50	0.15	6	16.20	0.36	0.069	0.003
2192	Pyatigoriya	1972 HP	11.30	0.15	5	29.03	0.64	0.064	0.003
2193	Jackson	1926 KB	10.30	0.15	7	47.37	0.74	0.060	0.002
2196	Ellicott	1965 BC	10.25	0.15	6	57.51	1.13	0.043	0.002
2197	Shanghai	1965 YN	11.20	0.15	5	23.88	0.70	0.106	0.007
2203	van Rhijn	1935 SQ1	11.50	0.15	3	26.98	0.82	0.068	0.005
2204	Lyyli	1943 EQ	12.70	0.15	3	27.12	1.31	0.020	0.002
2207	Antenor	1977 QH1	8.89	0.15	4	91.32	2.22	0.059	0.003
2208	Pushkin	1977 QL3	10.96	0.15	6	44.11	1.10	0.038	0.002
2209	Tianjin	1978 US1	10.90	0.15	1	15.57	1.08	0.318	0.046
2211	Hanuman	1951 WO2	12.80	0.15	2	18.85	1.26	0.040	0.006
2212	Hephaistos	1978 SB	13.87	0.15	2	5.18	0.16	0.188	0.015
2214	Carol	1953 GF	12.00	0.15	3	27.47	1.13	0.039	0.004
2215	Sichuan	1964 VX2	11.90	0.15	11	11.91	0.21	0.228	0.009
2216	Kerch	1971 LF	10.80	0.15	2	21.39	1.48	0.197	0.030
2217	Eltigen	1971 SK2	10.80	0.15	3	30.99	1.20	0.091	0.008
2218	Wotho	1975 AK	11.20	0.15	9	30.95	0.49	0.062	0.002
2219	Mannucci	1975 LU	10.70	0.15	5	39.06	0.99	0.063	0.004
2222	Lermontov	1977 ST1	11.40	0.15	3	33.22	1.38	0.044	0.004

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{v}	$\sigma(p_{\mathrm{v}})$
2223	Sarpedon	1977 TL3	9.41	0.15	2	108.21	6.15	0.027	0.003
2228	Soyuz-Apollo	1977 OH	10.90	0.15	6	28.26	0.49	0.101	0.004
2233	Kuznetsov	1972 XE1	12.70	0.15	2	9.83	0.66	0.153	0.021
2235	Vittore	A924 GA	10.70	0.15	5	43.18	1.12	0.054	0.003
2236	Austrasia	1933 FX	12.30	0.15	2	10.38	0.62	0.203	0.027
2237	Melnikov	1938 TB	11.30	0.15	3	20.76	0.77	0.125	0.010
2239	Paracelsus	1978 RC	11.50	0.15	12	41.11	0.53	0.027	0.001
2240	Tsai	1978 YA	11.80	0.15	7	24.54	0.45	0.056	0.002
2241	Alcathous	1979 WM	8.64	0.15	6	118.87	2.27	0.044	0.002
2244	Tesla	1952 UW1	11.90	0.15	3	24.73	1.12	0.051	0.005
2245	Hekatostos	1968 BC	11.30	0.15	7	32.66	0.54	0.050	0.002
2246	Bowell	1979 XH	10.56	0.15	3	40.73	1.70	0.066	0.006
2249	Yamamoto	1942 GA	11.00	0.15	13	44.69	0.55	0.036	0.001
2250	Stalingrad	1972 HN	11.50	0.15	5	19.29	0.51	0.121	0.007
2251	Tikhov	1977 SU1	11.40	0.15	7	27.45	0.56	0.067	0.003
2252	CERGA	1978 VT	11.90	0.15	3	19.76	0.76	0.094	0.009
2255	Qinghai	1977 VK1	11.30	0.15	1	20.64	1.61	0.125	0.020
2257	Kaarina	1939 QB	12.90	0.15	1	9.26	0.53	0.143	0.018
2258	Viipuri	1939 TA	11.40	0.15	8	27.37	0.37	0.066	0.002
2259	Sofievka	1971 OG	12.60	0.15	10	21.19	0.25	0.036	0.001
2260	Neoptolemus	1975 WM1	9.31	0.15	2	81.28	3.75	0.051	0.005
2263	Shaanxi	1978 UW1	10.90	0.15	1	22.32	1.55	0.155	0.023
2264	Sabrina	1979 YK	10.50	0.15	4	37.05	1.14	0.084	0.006
2266	Tchaikovsky	1974 VK	10.80	0.15	7	43.58	0.69	0.045	0.002
2269	Efremiana	1976 JA2	10.50	0.15	6	26.79	0.58	0.159	0.008
2270	Yazhi	1980 ED	10.90	0.15	1	22.34	1.66	0.155	0.024
2271	Kiso	1976 UV5	11.10	0.15	7	31.22	0.56	0.066	0.003
2274	Ehrsson	1976 EA	12.30	0.15	2	8.19	0.55	0.344	0.052
2276	Warck	1933 QA	12.90	0.15	4	16.87	0.42	0.043	0.002
2278	Gotz	1953 GE	13.60	0.15	4	12.80	0.40	0.040	0.003
2279	Barto	1968 DL	12.97	0.15	4	14.34	0.37	0.059	0.004
2287	Kalmykia	1977 QK3	13.00	0.15	3	8.49	0.40	0.160	0.016
2288	Karolinum	1979 UZ	11.00	0.15	7	18.37	0.40	0.210	0.010
2289	McMillan	6567 P-L	13.60	0.15	4	10.73	0.45	0.057	0.005
2290	Helffrich	1932 CD1	12.20	0.15	7	18.20	0.36	0.070	0.003
2291	Kevo	1941 FS	10.80	0.15	5	38.21	0.83	0.060	0.003
2292	Seili	1942 RM	11.70	0.15	1	12.02	0.97	0.256	0.043
2293	Guernica	1977 EH1	10.90	0.15	2	23.96	1.81	0.161	0.031
2294	Andronikov	1977 PL1	11.50	0.15	5	14.06	0.38	0.225	0.013
2295	Matusovskij	1977 QD1	12.00	0.15	8	23.66	0.45	0.052	0.002
2296	Kugultinov	1975 BA1	11.30	0.15	1	21.07	1.77	0.120	0.021
2297	Daghestan	1978 RE	11.00	0.15	2	27.66	1.68	0.095	0.012
2300	Stebbins	1953 TG2	11.90	0.15	1	14.46	1.01	0.147	0.022
2301	Whitford	1965 WJ	10.80	0.15	1	19.47	1.37	0.223	0.033
2302	Florya	1972 TL2	12.10	0.15	5	12.41	0.38	0.170	0.011
2306	Bauschinger	1939 PM	11.40	0.15	5	20.13	0.50	0.129	0.007
2307	Garuda	1957 HJ	10.90	0.15	6	42.38	0.78	0.043	0.002
2309	Mr. Spock	1971 QX1	11.30	0.15	1	26.07	1.43	0.079	0.009
2310	Olshaniya	1974 SU4	11.30	0.15	2	25.55	1.66	0.083	0.011
2311	El Leoncito	1974 TA1	10.52	0.15	6	51.53	1.14	0.042	0.002
2312	Duboshin	1976 GU2	10.18	0.15	4	58.53	1.37	0.044	0.002
2313	Aruna	1976 TA	12.90	0.15	5	14.67	0.32	0.060	0.003
2315	Czechoslovakia	1980 DZ	10.70	0.15	5	25.00	0.80	0.158	0.011
2316	Jo-Ann	1980 RH	12.70	0.15	5	13.84	0.36	0.081	0.005
2320	Blarney	1979 QJ	10.50	0.15	7	37.07	0.61	0.083	0.003
2321	Luznice	1980 DB1	11.50	0.15	5	21.29	0.68	0.106	0.008
2322	Kitt Peak	1954 UQ2	12.70	0.15	8	13.98	0.27	0.075	0.003
2323	Zverev	1976 SF2	10.70	0.15	3	20.41	0.87	0.226	0.021
2324	Janice	1978 VS4	11.30	0.15	3	24.44	1.22	0.093	0.010
2325	Chernykh	1979 SP	11.90	0.15	3	21.36	0.86	0.068	0.006
2326	Tololo	1965 QC	11.10	0.15	14	44.37	0.55	0.034	0.001
2328	Robeson	1972 HW	12.50	0.15	4	13.30	0.46	0.105	0.008
2330	Ontake	1977 DS3	11.30	0.15	9	33.36	0.57	0.049	0.002
2332	Kalm	1940 GH	10.60	0.15	6	33.24	0.60	0.095	0.004
2333	Porthan	1943 EP	11.50	0.15	7	25.63	0.39	0.068	0.002
2336	Xinjiang	1975 WL1	11.40	0.15	3	22.46	1.09	0.100	0.011
2344	Xizang	1979 SC1	12.10	0.15	5	17.04	0.37	0.089	0.004
2345	Fucik	1974 OS	10.80	0.15	6	25.74	0.64	0.130	0.007
2347	Vinata	1936 TK	11.30	0.15	4	23.41	0.62	0.098	0.006
2349	Kurchenko	1970 OG	11.90	0.15	4	20.83	0.70	0.071	0.005
2352	Kurchatov	1969 RY	11.10	0.15	8	31.89	0.53	0.067	0.003
2354	Lavrov	1978 PZ3	11.80	0.15	2	14.92	1.00	0.154	0.022
2356	Hirons	1979 UJ	10.80	0.15	7	46.14	0.84	0.041	0.002
2357	Phereclos	1981 AC	8.94	0.15	5	98.45	1.92	0.049	0.002
2358	Bahner	1929 RE	11.00	0.15	2	18.25	1.40	0.211	0.034
2361	Gogol	1976 GQ1	11.70	0.15	2	22.02	1.46	0.076	0.011
2363	Cebriones	1977 TJ3	9.11	0.15	6	84.61	1.68	0.057	0.003
2364	Seillier	1978 GD	10.70	0.15	5	21.60	0.57	0.203	0.012
2365	Interkosmos	1980 YQ	11.70	0.15	2	16.69	0.96	0.137	0.017
2370	van Altena	1965 LA	12.60	0.15	5	15.81	0.42	0.065	0.004
2372	Proskurin	1977 RA8	11.60	0.15	5	24.58	0.72	0.071	0.005
2374	Vladvysotskij	1974 QE1	11.50	0.15	11	25.86	0.34	0.068	0.002
2375	Radek	1975 AA	10.61	0.15	7	34.58	0.79	0.086	0.004
2376	Martynov	1977 QG3	10.90	0.15	7	43.28	0.63	0.042	0.001
2378	Pannekoek	1935 CY	10.70	0.15	8	38.01	0.60	0.066	0.002
2379	Heiskanen	1941 ST	10.90	0.15	1	32.07	2.29	0.075	0.011
2381	Landi	1976 AF	11.40	0.15	1	12.78	1.05	0.298	0.051
2382	Nonie	1977 GA	11.40	0.15	1	20.14	1.49	0.120	0.019
2386	Nikonov	1974 SN1	12.20	0.15	4	13.32	0.54	0.141	0.013
2390	Nezarka	1980 PA1	12.20	0.15	6	23.32	0.48	0.043	0.002
2391	Tomita	1957 AA	12.40	0.15	5	17.90	0.41	0.062	0.003
2392	Jonathan Murray	1979 MN1	13.20	0.15	2	14.37	0.86	0.046	0.006
2393	Suzuki	1955 WB	10.50	0.15	6	51.26	0.78	0.043	0.002
2394	Nadeev	1973 SZ2	11.60	0.15	4	23.58	0.94	0.075	0.006
2395	Aho	1977 FA	12.60	0.15	3	24.95	1.03	0.027	0.002
2397	Lappajarvi	1938 DV	10.90	0.15	1	17.45	1.29	0.253	0.039
2398	Jilin	1965 UD2	13.60	0.15	8	11.68	0.21	0.048	0.002
2402	Satpaev	1979 OR13	13.20	0.15	1	5.39	0.58	0.320	0.070
2404	Antarctica	1980 TE	11.40	0.15	2	22.00	1.34	0.110	0.014
2405	Welch	1963 UF	12.09	0.15	7	26.41	0.62	0.038	0.002
2407	Haug	1973 DH	10.77	0.15	6	21.35	0.47	0.193	0.009
2408	Astapovich	1978 QK1	12.50	0.15	1	19.82	0.83	0.045	0.004
2409	Chapman	1979 UG	13.20	0.15	1	5.51	0.48	0.306	0.055
2413	van de Hulst	6816 P-L	10.80	0.15	1	16.14	1.46	0.325	0.061
2414	Vibeke	1931 UG	11.70	0.15	7	31.94	0.60	0.037	0.002
2415	Ganesa	1978 UJ	12.00	0.15	6	16.03	0.45	0.112	0.007
2416	Sharonov	1979 OF13	11.40	0.15	3	22.38	1.10	0.102	0.010
2421	Nininger	1979 UD	10.80	0.15	8	38.62	0.65	0.059	0.002
2425	Shenzhen	1975 FW	11.10	0.15	4	19.55	0.76	0.174	0.015
2426	Simonov	1976 KV	11.40	0.15	5	29.26	0.58	0.058	0.003
2428	Kamenyar	1977 RZ6	11.00	0.15	3	22.68	0.96	0.139	0.013
2429	Schurer	1977 TZ	12.20	0.15	6	15.95	0.38	0.096	0.005
2430	Bruce Helin	1977 VC	12.24	0.15	12	11.83	0.17	0.175	0.006
2433	Sootiyo	1981 GJ	11.80	0.15	5	14.85	0.37	0.156	0.009
2439	Ulugbek	1977 QX2	11.50	0.15	2	20.78	1.00	0.103	0.011
2441	Hibbs	1979 MN2	13.90	0.15	2	10.72	0.80	0.042	0.007
2443	Tomeileen	A906 BJ	10.20	0.15	5	34.07	0.65	0.127	0.005
2444	Lederle	1934 CD	11.80	0.15	6	32.88	0.76	0.031	0.002
2446	Lunacharsky	1971 TS2	12.90	0.15	9	13.01	0.25	0.076	0.003
2448	Sholokhov	1975 BU	10.40	0.15	8	35.00	0.55	0.100	0.004
2450	Ioannisiani	1978 RP	11.30	0.15	1	20.34	1.60	0.129	0.021
2451	Dollfus	1980 RQ	12.10	0.15	5	13.51	0.42	0.143	0.010
2453	Wabash	A921 SA	11.20	0.15	3	19.61	0.93	0.170	0.020
2456	Palamedes	1966 BA1	9.60	0.15	2	99.60	4.11	0.026	0.002
2458	Veniakaverin	1977 RC7	11.80	0.15	3	24.72	1.12	0.057	0.006
2459	Spellmann	1980 LB1	12.00	0.15	2	20.04	1.49	0.069	0.010
2461	Clavel	1981 EC1	11.40	0.15	4	28.01	0.66	0.062	0.003
2464	Nordenskiold	1939 BF	11.50	0.15	2	21.49	1.25	0.098	0.012
2465	Wilson	1949 PK	12.00	0.15	6	22.73	0.61	0.056	0.003
2466	Golson	1959 RJ	12.10	0.15	10	23.93	0.29	0.045	0.001
2471	Ultrajectum	6545 P-L	11.90	0.15	2	15.90	1.03	0.124	0.018
2474	Ruby	1979 PB	11.80	0.15	3	19.10	0.80	0.095	0.008
2477	Biryukov	1977 PY1	12.40	0.15	7	18.88	0.37	0.055	0.002
2478	Tokai	1981 JC	12.80	0.15	3	9.71	0.49	0.144	0.015
2480	Papanov	1976 YS1	12.80	0.15	1	6.75	0.53	0.295	0.048
2483	Guinevere	1928 QB	10.80	0.15	2	42.42	2.89	0.048	0.007
2484	Parenago	1928 TK	14.00	0.15	2	6.06	0.45	0.126	0.020
2487	Juhani	1940 RL	13.20	0.15	7	16.61	0.30	0.034	0.002
2489	Suvorov	1975 NY	12.00	0.15	1	21.51	1.14	0.061	0.007
2492	Kutuzov	1977 NT	11.30	0.15	4	26.23	0.84	0.079	0.005
2494	Inge	1981 LF	10.60	0.15	7	45.85	0.77	0.050	0.002
2501	Lohja	1942 GD	12.08	0.15	4	9.82	0.32	0.275	0.020
2505	Hebei	1975 UJ	11.30	0.15	6	23.49	0.51	0.100	0.005
2507	Bobone	1976 WB1	11.70	0.15	3	12.75	0.65	0.240	0.027
2509	Chukotka	1977 NG	12.60	0.15	3	18.29	0.72	0.048	0.004
2510	Shandong	1979 TH	12.60	0.15	3	7.09	0.33	0.345	0.036
2517	Orma	1968 SB	11.70	0.15	1	14.85	1.25	0.167	0.029
2519	Annagerman	1975 VD2	11.30	0.15	4	24.12	0.80	0.105	0.008
2520	Novorossijsk	1976 QF1	12.00	0.15	1	35.13	1.62	0.023	0.002
2521	Heidi	1979 DK	11.70	0.15	2	14.33	0.93	0.180	0.025
2524	Budovicium	1981 QB1	10.90	0.15	3	31.61	1.09	0.078	0.006
2525	O'Steen	1981 VG	10.50	0.15	4	30.21	0.97	0.124	0.009
2527	Gregory	1981 RE	13.00	0.15	1	14.82	1.15	0.051	0.008
2531	Cambridge	1980 LD	10.90	0.15	3	23.44	0.95	0.147	0.014
2534	Houzeau	1931 VD	10.90	0.15	4	33.87	1.09	0.071	0.005
2535	Hameenlinna	1939 DH	12.50	0.15	1	7.63	0.91	0.304	0.074
2536	Kozyrev	1939 PJ	13.00	0.15	4	10.81	0.30	0.097	0.006
2542	Calpurnia	1980 CF	11.40	0.15	1	18.29	1.24	0.146	0.021
2543	Machado	1980 LJ	11.00	0.15	1	18.49	1.07	0.206	0.026
2550	Houssay	1976 UP20	11.20	0.15	1	18.48	1.48	0.171	0.028
2554	Skiff	1980 OB	13.00	0.15	2	8.56	0.57	0.153	0.022
2559	Svoboda	1981 UH	12.40	0.15	1	19.12	1.30	0.053	0.008
2560	Siegma	1932 CW	11.70	0.15	5	22.59	0.63	0.074	0.004
2561	Margolin	1969 TK2	13.30	0.15	3	12.07	0.57	0.065	0.007
2562	Chaliapin	1973 FF1	11.30	0.15	2	18.85	1.40	0.171	0.030
2563	Boyarchuk	1977 FZ	11.30	0.15	3	24.33	1.06	0.102	0.011
2567	Elba	1979 KA	11.80	0.15	4	17.38	0.49	0.113	0.007
2569	Madeline	1980 MA	11.20	0.15	10	28.96	0.32	0.071	0.002
2570	Porphyro	1980 PG	12.20	0.15	6	23.64	0.58	0.044	0.002
2573	Hannu Olavi	1953 EN	11.40	0.15	3	18.34	0.78	0.148	0.014
2574	Ladoga	1968 UP	11.30	0.15	2	12.55	0.97	0.340	0.055
2576	Yesenin	1974 QL	11.30	0.15	4	29.94	0.68	0.060	0.003
2578	Saint-Exupery	1975 VW3	11.40	0.15	6	17.43	0.47	0.166	0.010
2580	Smilevskia	1977 QP4	13.30	0.15	3	7.72	0.33	0.142	0.013
2582	Harimaya-Bashi	1981 SA	10.50	0.15	7	34.63	0.72	0.095	0.004
2585	Irpedina	1979 OJ15	12.50	0.15	1	6.14	0.50	0.469	0.079
2587	Gardner	1980 OH	11.20	0.15	4	19.61	0.64	0.160	0.012
2600	Lumme	1980 VP	11.40	0.15	2	16.02	1.12	0.190	0.028
2603	Taylor	1982 BW1	12.30	0.15	2	16.67	1.10	0.081	0.012
2612	Kathryn	1979 DE	10.80	0.15	2	26.92	1.42	0.119	0.014
2613	Plzen	1979 QE	11.20	0.15	5	26.91	0.76	0.081	0.005
2615	Saito	1951 RJ	12.20	0.15	4	16.34	0.66	0.090	0.008
2617	Jiangxi	1975 WO1	10.40	0.15	6	60.33	1.39	0.037	0.002
2621	Goto	1981 CA	10.70	0.15	8	46.55	0.66	0.043	0.001
2624	Samitchell	1962 RE	10.70	0.15	3	33.24	1.46	0.085	0.008
2627	Churyumov	1978 PP3	12.00	0.15	8	20.19	0.41	0.071	0.003
2629	Rudra	1980 RB1	14.50	0.15	2	6.69	0.49	0.064	0.010
2630	Hermod	1980 TF3	11.80	0.15	3	31.97	0.87	0.045	0.003
2632	Guizhou	1980 VJ1	11.40	0.15	7	32.57	0.53	0.046	0.002
2634	James Bradley	1982 DL	10.20	0.15	5	35.91	0.85	0.115	0.006
2643	Bernhard	1973 SD	14.00	0.15	1	5.70	0.41	0.136	0.021
2645	Daphne Plane	1976 QD	12.30	0.15	11	19.73	0.24	0.056	0.002
2646	Abetti	1977 EC1	11.60	0.15	4	18.31	0.67	0.121	0.009
2649	Oongaq	1980 WA	11.80	0.15	1	11.39	0.73	0.260	0.035
2650	Elinor	1931 EG	11.50	0.15	9	17.23	0.30	0.164	0.006
2651	Karen	1949 QD	11.10	0.15	11	28.52	0.29	0.080	0.002
2658	Gingerich	1980 CK	12.40	0.15	3	13.24	0.53	0.111	0.010
2659	Millis	1981 JX	11.20	0.15	8	28.86	0.48	0.071	0.003
2661	Bydzovsky	1982 FC1	11.30	0.15	5	20.39	0.54	0.131	0.008
2662	Kandinsky	4021 P-L	14.40	0.15	3	9.78	0.49	0.033	0.004

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_V	$\sigma(p_V)$
2666	Gramme	1951 TA	11.70	0.15	4	33.15	0.96	0.036	0.002
2667	Oikawa	1967 UO	12.20	0.15	3	23.99	1.00	0.041	0.004
2670	Chuvashia	1977 PW1	10.50	0.15	5	19.86	0.63	0.302	0.022
2672	Pisek	1979 KC	11.70	0.15	4	26.45	0.77	0.053	0.003
2674	Pandarus	1982 BC3	9.00	0.15	5	101.72	2.13	0.044	0.002
2675	Tolkien	1982 GB	12.50	0.15	8	9.65	0.23	0.205	0.011
2677	Joan	1935 FF	11.60	0.15	3	18.56	0.91	0.125	0.014
2686	Linda Susan	1981 JW1	11.60	0.15	2	16.23	1.20	0.153	0.024
2687	Tortali	1982 HG	11.89	0.15	3	14.62	0.56	0.146	0.012
2688	Halley	1982 HG1	11.60	0.15	2	19.61	1.32	0.106	0.015
2692	Chkalov	1976 YT3	12.30	0.15	2	13.44	0.72	0.118	0.014
2695	Christabel	1979 UE	12.30	0.15	2	13.47	0.93	0.125	0.019
2696	Magion	1980 HB	12.00	0.15	4	22.74	0.53	0.054	0.003
2697	Albina	1969 TC3	10.20	0.15	9	52.74	0.93	0.053	0.002
2698	Azerbajdzhan	1971 TZ	11.90	0.15	7	17.65	0.42	0.107	0.006
2699	Kalinin	1976 YX	11.70	0.15	2	12.60	0.74	0.243	0.032
2701	Cherson	1978 RT	12.50	0.15	1	14.57	1.09	0.083	0.013
2702	Batrakov	1978 SZ2	11.50	0.15	5	26.49	0.82	0.065	0.004
2705	Wu	1980 TD4	13.60	0.15	3	7.82	0.35	0.105	0.010
2707	Ueferji	1981 QS3	11.60	0.15	3	22.48	1.09	0.083	0.009
2713	Luxembourg	1938 EA	11.50	0.15	1	16.95	1.09	0.155	0.021
2714	Matti	1938 GC	13.40	0.15	1	6.10	0.62	0.207	0.043
2715	Mielikki	1938 US	11.90	0.15	2	15.05	0.85	0.136	0.017
2718	Handley	1951 OM	11.70	0.15	6	25.72	0.51	0.058	0.003
2721	Vsekhsvyatskij	1973 SP2	12.00	0.15	1	17.69	1.43	0.090	0.015
2722	Abalakin	1976 GM2	12.10	0.15	2	21.30	1.39	0.059	0.009
2723	Gorshkov	1978 QL2	12.50	0.15	4	13.11	0.53	0.105	0.009
2724	Orlov	1978 RZ5	11.70	0.15	4	20.77	0.62	0.087	0.006
2725	David Bender	1978 VG3	10.40	0.15	10	42.89	0.58	0.067	0.002
2728	Yatskiv	1979 ST9	12.40	0.15	6	15.03	0.35	0.089	0.005
2730	Barks	1981 QH	11.60	0.15	4	14.97	0.50	0.196	0.015
2731	Cucula	1982 KJ	10.70	0.15	5	49.00	0.93	0.040	0.002
2734	Hasek	1976 GJ3	11.40	0.15	3	25.67	1.04	0.074	0.007
2739	Taguacipa	1952 UZ1	12.70	0.15	1	11.61	0.81	0.109	0.016
2740	Tsoj	1974 SY4	11.70	0.15	1	18.63	1.41	0.106	0.017
2741	Valdivia	1975 XG	12.00	0.15	2	10.73	0.64	0.244	0.032
2747	Cesky Krumlov	1980 DW	11.60	0.15	4	28.39	0.98	0.051	0.004
2750	Loviisa	1940 YK	13.10	0.15	1	6.49	0.68	0.242	0.052
2752	Wu Chien-Shiung	1965 SP	11.40	0.15	2	16.65	1.18	0.184	0.028
2753	Duncan	1966 DH	12.30	0.15	3	20.42	0.75	0.052	0.004
2757	Crisser	1977 VN	11.30	0.15	2	21.07	1.39	0.121	0.017
2759	Idomeneus	1980 GC	9.80	0.15	2	52.55	4.05	0.078	0.012
2760	Kacha	1980 TU6	10.04	0.15	7	61.16	1.03	0.046	0.002
2761	Eddington	1981 AE	12.10	0.15	3	18.81	0.85	0.076	0.008
2765	Dinant	1981 EY	11.80	0.15	2	20.83	1.45	0.077	0.011
2769	Mendeleev	1976 GZ2	12.10	0.15	1	20.97	1.75	0.058	0.010
2770	Tsvet	1977 SM1	13.50	0.15	1	6.57	0.73	0.163	0.037
2773	Brooks	1981 JZ2	13.30	0.15	3	12.50	0.46	0.055	0.004
2774	Tenojoki	1942 TJ	11.10	0.15	6	36.96	0.83	0.048	0.002
2776	Baikal	1976 SZ7	12.50	0.15	9	19.76	0.23	0.046	0.001
2778	Tangshan	1979 XP	13.00	0.15	9	12.95	0.23	0.070	0.003
2784	Domeyko	1975 GA	13.40	0.15	2	6.20	0.52	0.204	0.037
2791	Paradise	1977 CA	11.50	0.15	3	9.87	0.41	0.463	0.041
2792	Ponomarev	1977 EY1	13.30	0.15	7	13.29	0.29	0.051	0.003
2793	Valdaj	1977 QV	10.80	0.15	5	30.61	0.81	0.093	0.005
2796	Kron	1980 EC	12.30	0.15	3	10.71	0.58	0.194	0.023
2797	Teucer	1981 LK	8.40	0.15	4	113.99	2.78	0.059	0.003
2802	Weisell	1939 BU	11.00	0.15	2	17.56	1.14	0.229	0.031
2803	Vilho	1940 WG	11.80	0.15	3	22.96	0.93	0.068	0.006
2804	Yrjo	1941 HF	11.70	0.15	2	19.65	1.33	0.097	0.014
2805	Kalle	1941 UM	12.20	0.15	6	17.92	0.42	0.074	0.004
2806	Graz	1953 GG	13.30	0.15	1	13.39	0.78	0.047	0.006
2807	Karl Marx	1969 TH6	12.60	0.15	2	21.12	1.38	0.037	0.005
2808	Belgrano	1976 HS	11.00	0.15	1	14.36	1.22	0.341	0.060
2813	Zappala	1981 WZ	11.00	0.15	5	35.07	0.88	0.061	0.003
2816	Pien	1982 SO	11.70	0.15	4	20.80	0.81	0.087	0.007
2819	Ensor	1933 UR	12.20	0.15	6	12.56	0.36	0.153	0.009
2826	Ahti	1939 UJ	10.80	0.15	9	42.16	0.62	0.049	0.002
2829	Bobhope	1948 PK	10.30	0.15	9	40.98	0.54	0.080	0.003
2835	Ryoma	1982 WF	12.10	0.15	3	24.28	0.89	0.044	0.004
2836	Sobolev	1978 YQ	11.40	0.15	5	20.44	0.63	0.117	0.008
2842	Unsold	1950 OD	12.00	0.15	3	14.00	0.67	0.143	0.014
2846	Ylppo	1942 CJ	10.70	0.15	5	27.13	0.71	0.129	0.007
2848	ASP	1959 VF	11.10	0.15	1	22.18	1.74	0.130	0.021
2849	Shklovskij	1976 GN3	12.70	0.15	1	11.69	0.87	0.108	0.017
2852	Declercq	1981 QU2	12.30	0.15	1	12.47	1.42	0.136	0.032
2854	Rawson	1964 JE	13.20	0.15	1	7.68	0.62	0.157	0.026
2856	Roser	1933 GB	11.00	0.15	2	22.30	1.25	0.142	0.017
2861	Lambrecht	1981 VL2	12.40	0.15	2	16.09	1.07	0.080	0.011
2862	Vavilov	1977 JP	12.80	0.15	2	6.44	0.57	0.323	0.059
2864	Soderblom	1983 AZ	12.50	0.15	3	14.09	0.57	0.093	0.009
2865	Laurel	1935 OK	11.40	0.15	3	18.83	0.73	0.142	0.013
2866	Hardy	1961 TA	11.90	0.15	4	13.33	0.49	0.175	0.014
2870	Haupt	1981 LD	12.80	0.15	8	17.99	0.35	0.043	0.002
2872	Gentelec	1981 RU	12.40	0.15	1	13.17	0.94	0.112	0.017
2877	Likhachev	1969 TR2	12.10	0.15	7	19.73	0.42	0.070	0.003
2879	Shimizu	1932 CB1	11.70	0.15	8	27.39	0.44	0.050	0.002
2880	Nihondaira	1983 CA	12.60	0.15	2	6.61	0.50	0.370	0.058
2884	Reddish	1981 ES22	11.80	0.15	6	25.98	0.52	0.051	0.002
2889	Brno	1981 WT1	11.50	0.15	2	20.34	1.11	0.108	0.013
2891	McGetchin	1980 MD	11.20	0.15	9	37.17	0.55	0.043	0.002
2892	Filipenko	1983 AX2	10.20	0.15	10	57.37	0.93	0.045	0.002
2893	Peiroos	1975 QD	9.23	0.15	5	86.76	2.05	0.048	0.003
2896	Preiss	1931 RN	12.70	0.15	2	7.81	0.47	0.256	0.035
2898	Neuvo	1938 DN	12.50	0.15	1	8.42	1.06	0.249	0.064
2900	Lubos Perek	1972 AR	11.70	0.15	3	17.42	0.80	0.151	0.020
2903	Zhuhai	1981 UV9	12.00	0.15	2	14.01	0.86	0.146	0.020
2904	Millman	1981 YB	11.60	0.15	11	15.60	0.24	0.174	0.006
2905	Plaskett	1982 BZ2	12.10	0.15	1	9.24	0.97	0.299	0.064
2906	Caltech	1983 AE2	10.00	0.15	13	61.07	0.72	0.048	0.001
2907	Nekrasov	1975 TT2	11.50	0.15	3	16.75	0.74	0.173	0.018
2908	Shimoyama	1981 WA	11.50	0.15	8	30.85	0.49	0.049	0.002
2909	Hoshi-no-ie	1983 JA	10.90	0.15	5	25.70	0.67	0.123	0.007
2911	Miahelena	1938 GJ	11.30	0.15	1	16.34	1.14	0.200	0.029
2918	Salazar	1980 TU4	11.90	0.15	1	23.33	1.34	0.056	0.007
2920	Automedon	1981 JR	8.80	0.15	6	113.11	2.25	0.042	0.002
2928	Epstein	1976 GN8	11.30	0.15	2	17.49	1.20	0.176	0.026
2930	Euripides	6554 P-L	12.40	0.15	2	19.93	1.20	0.049	0.006
2931	Mayakovsky	1969 UC	11.70	0.15	1	9.99	1.14	0.370	0.086
2932	Kempchinsky	1980 TK4	11.60	0.15	1	22.63	1.77	0.079	0.013
2933	Amber	1983 HN	11.70	0.15	6	22.27	0.49	0.077	0.004
2934	Aristophanes	4006 P-L	11.20	0.15	4	23.91	0.86	0.103	0.008
2938	Hopi	1980 LB	11.50	0.15	1	20.21	1.56	0.109	0.018
2942	Cordie	1932 BG	13.20	0.15	1	9.54	0.59	0.102	0.013
2943	Heinrich	1933 QU	12.80	0.15	3	10.30	0.44	0.153	0.017
2945	Zanstra	1935 ST1	12.20	0.15	2	23.29	1.38	0.043	0.006
2946	Muchachos	1941 UV	13.00	0.15	3	13.56	0.63	0.062	0.006
2950	Rousseau	1974 VQ2	11.90	0.15	11	11.59	0.21	0.233	0.009
2951	Perepadin	1977 RB8	10.00	0.15	9	52.20	0.65	0.067	0.002
2957	Tatsuo	1934 CB1	10.20	0.15	1	19.13	1.34	0.402	0.059
2959	Scholl	1983 RE2	11.20	0.15	6	35.70	0.77	0.049	0.002
2962	Otto	1940 YF	11.30	0.15	5	15.11	0.43	0.251	0.016
2967	Vladisvyat	1977 SS1	11.00	0.15	9	35.17	0.48	0.058	0.002
2976	Lautaro	1974 HR	10.70	0.15	6	44.50	0.86	0.048	0.002
2979	Murmansk	1978 TB7	12.10	0.15	7	22.15	0.52	0.053	0.003
2983	Poltava	1981 RW2	11.20	0.15	6	30.86	0.63	0.064	0.003
2984	Chaucer	1981 YD	13.10	0.15	3	14.72	0.62	0.051	0.005
2986	Mrinalini	2525 P-L	11.90	0.15	5	21.46	0.62	0.068	0.004
2988	Korhonen	1943 EM	11.70	0.15	3	15.16	0.59	0.166	0.014
2989	Imago	1976 UF1	13.20	0.15	2	7.70	0.55	0.158	0.024
2990	Trimberger	1981 EN27	13.40	0.15	2	10.37	0.71	0.075	0.012
2991	Bilbo	1982 HV	13.50	0.15	1	9.13	0.59	0.084	0.012
2992	Vondel	2540 P-L	13.00	0.15	3	10.01	0.50	0.118	0.013
2995	Taratuta	1978 QK	12.40	0.15	5	18.10	0.52	0.060	0.004
2996	Bowman	1954 RJ	11.80	0.15	7	23.64	0.53	0.062	0.003
3001	Michelangelo	1982 BC1	12.40	0.15	2	9.49	0.67	0.220	0.033
3002	Delasalle	1982 FB3	12.80	0.15	1	9.17	0.58	0.159	0.021
3003	Koncek	1983 YH	11.30	0.15	1	24.03	1.54	0.092	0.013
3006	Livadia	1979 SF11	14.00	0.15	2	9.08	0.73	0.056	0.010
3007	Reaves	1979 UC	12.40	0.15	1	11.55	0.79	0.145	0.021
3008	Nojiri	1938 WA	12.00	0.15	3	15.73	0.76	0.119	0.013
3010	Ushakov	1978 SB5	12.20	0.15	1	16.64	0.99	0.084	0.011
3012	Minsk	1979 QU9	11.10	0.15	1	23.12	1.64	0.120	0.018
3017	Petrovic	1981 UL	11.40	0.15	2	13.22	1.08	0.289	0.051
3019	Kulin	1940 AC	11.70	0.15	2	14.65	1.06	0.180	0.028
3021	Lucubratio	1967 CB	11.90	0.15	3	23.99	0.84	0.058	0.005
3024	Hainan	1981 UW9	10.70	0.15	8	40.32	0.56	0.058	0.002
3025	Higson	1982 QR	10.20	0.15	6	47.34	0.77	0.067	0.003
3026	Sarastro	1977 TA1	11.90	0.15	1	16.98	1.35	0.106	0.018
3028	Zhangguoxi	1978 TA2	10.70	0.15	4	24.29	0.68	0.159	0.010
3032	Evans	1984 CA1	11.40	0.15	1	13.27	0.97	0.276	0.042
3035	Chambers	A924 EJ	12.40	0.15	1	16.64	0.98	0.070	0.009
3036	Krat	1937 TO	9.80	0.15	5	42.94	0.76	0.116	0.005
3037	Alku	1944 BA	11.60	0.15	7	26.44	0.61	0.061	0.003
3039	Yangel	1978 SP2	12.50	0.15	4	11.53	0.42	0.135	0.011
3044	Saltykov	1983 RE3	12.00	0.15	8	27.21	0.43	0.038	0.001
3045	Alois	1984 AW	11.40	0.15	2	23.51	1.58	0.095	0.015
3046	Moliere	4120 P-L	12.20	0.15	2	21.26	1.41	0.052	0.007
3049	Kuzbass	1968 FH	11.60	0.15	3	19.61	0.71	0.107	0.009
3051	Nantong	1974 YP	12.80	0.15	4	17.13	0.37	0.046	0.003
3052	Herzen	1976 YJ3	13.10	0.15	8	13.96	0.30	0.053	0.003
3061	Cook	1982 UB1	11.90	0.15	2	23.78	1.77	0.056	0.009
3062	Wren	1982 XC	10.80	0.15	4	24.18	0.75	0.146	0.010
3063	Makhaon	1983 PV	8.60	0.15	4	114.34	2.77	0.049	0.003
3064	Zimmer	1984 BB1	13.00	0.15	7	13.76	0.32	0.060	0.003
3065	Sarahill	1984 CV	11.80	0.15	4	20.30	0.63	0.082	0.006
3066	McFadden	1984 EO	11.20	0.15	4	15.63	0.44	0.240	0.015
3071	Nesterov	1973 FT1	11.80	0.15	2	19.94	1.31	0.086	0.012
3078	Horrocks	1984 FG	11.60	0.15	10	29.22	0.44	0.048	0.002
3080	Moisseiev	1935 TE	11.70	0.15	2	13.64	0.78	0.201	0.025
3082	Dzhalil	1972 KE	12.30	0.15	4	16.34	0.52	0.081	0.006
3088	Jinxiuzhonghua	1981 UX9	11.80	0.15	1	22.01	1.37	0.070	0.009
3089	Oujianquan	1981 XK2	11.00	0.15	3	40.21	1.22	0.046	0.003
3092	Herodotus	6550 P-L	11.00	0.15	7	33.68	0.68	0.064	0.003
3093	Bergholz	1971 MG	11.50	0.15	4	13.24	0.39	0.261	0.017
3094	Chukokkala	1979 FE2	12.00	0.15	9	23.20	0.40	0.053	0.002
3095	Omarkhayyam	1980 RT2	11.30	0.15	4	31.53	0.87	0.055	0.004
3096	Bezruc	1981 QC1	12.70	0.15	4	16.63	0.45	0.055	0.003
3097	Tacitus	2011 P-L	12.10	0.15	3	22.77	0.98	0.051	0.005
3103	Eger	1982 BB	15.38	0.15	1	1.24	0.04	0.807	0.064
3104	Durer	1982 BB1	11.10	0.15	3	16.75	0.74	0.237	0.023
3105	Stumpff	A907 PB	13.10	0.15	3	7.43	0.35	0.185	0.018
3106	Morabito	1981 EE	10.80	0.15	3	32.91	0.91	0.078	0.005
3109	Machin	1974 DC	11.60	0.15	7	24.13	0.37	0.071	0.003
3112	Velimir	1977 QC5	12.90	0.15	3	14.00	0.37	0.065	0.004
3115	Baily	1981 PL	11.30	0.15	4	20.03	0.60	0.138	0.009
3118	Claytonsmith	1974 OD	10.90	0.15	8	34.92	0.56	0.064	0.002
3120	Dangrania	1979 RZ	11.60	0.15	1	11.07	1.30	0.330	0.079
3124	Kansas	1981 VB	13.46	0.15	2	13.47	1.21	0.041	0.007
3125	Hay	1982 BJ1	12.30	0.15	9	16.23	0.24	0.085	0.003
3126	Davydov	1969 TP1	11.50	0.15	1	15.19	1.06	0.193	0.028
3127	Bagration	1973 ST4	12.20	0.15	1	9.34	0.63	0.267	0.038
3128	Obruchev	1979 FJ2	11.50	0.15	3	22.25	0.88	0.090	0.008
3132	Landgraf	1940 WL	11.60	0.15	7	32.42	0.60	0.039	0.002
3134	Kostinsky	A921 VA	10.70	0.15	6	53.47	1.27	0.035	0.002
3136	Anshan	1981 WD4	11.80	0.15	2	19.36	1.45	0.092	0.014
3139	Shantou	1980 VL1	10.60	0.15	8	40.33	0.67	0.066	0.003
3140	Stellafane	1983 AO	10.90	0.15	8	25.78	0.50	0.127	0.006
3141	Buchar	1984 RH	10.50	0.15	5	40.13	0.87	0.069	0.003
3146	Dato	1972 KG	13.20	0.15	5	10.03	0.28	0.094	0.006

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_V	$\sigma(p_V)$
3147	Samantha	1976 YU3	13.70	0.15	3	12.88	0.52	0.037	0.003
3148	Grechko	1979 SA12	11.80	0.15	2	18.76	1.18	0.096	0.013
3150	Tosa	1983 CB	11.00	0.15	8	35.77	0.59	0.057	0.002
3151	Talbot	1983 HF	12.10	0.15	3	14.49	0.64	0.122	0.012
3152	Jones	1983 LF	11.30	0.15	8	36.85	0.54	0.040	0.001
3154	Grant	1984 SO3	12.60	0.15	4	15.64	0.56	0.071	0.006
3156	Ellington	1953 EE	11.30	0.15	9	29.92	0.46	0.061	0.002
3157	Novikov	1973 SX3	11.50	0.15	7	31.85	0.53	0.045	0.002
3159	Prokof'ev	1976 US2	13.00	0.15	1	11.84	1.05	0.079	0.014
3162	Nostalgia	1980 YH	11.30	0.15	3	31.39	1.01	0.057	0.004
3164	Prast	6562 P-L	11.90	0.15	9	20.16	0.38	0.077	0.003
3166	Klondike	1940 FG	13.00	0.15	5	10.22	0.31	0.110	0.007
3167	Babcock	1955 RS	11.40	0.15	7	18.07	0.32	0.149	0.006
3168	Lomnicky Stit	1980 XM	11.80	0.15	1	14.22	1.48	0.167	0.036
3171	Wangshouguan	1979 WO	10.80	0.15	6	40.76	0.78	0.052	0.002
3174	Alcock	1984 UV	11.80	0.15	3	18.66	0.80	0.102	0.009
3176	Paolicchi	1980 VR1	10.90	0.15	5	31.84	0.68	0.081	0.004
3177	Chillicothe	1934 AK	11.90	0.15	6	21.25	0.40	0.068	0.003
3178	Yoshitsune	1984 WA	11.90	0.15	2	10.64	0.71	0.284	0.041
3183	Franzkaiser	1949 PP	12.70	0.15	3	17.72	0.85	0.047	0.005
3184	Raab	1949 QC	12.10	0.15	9	17.49	0.28	0.086	0.003
3185	Clintford	1953 VY1	14.00	0.15	1	11.15	0.86	0.036	0.006
3186	Manuilova	1973 SD3	12.30	0.15	3	14.48	0.69	0.103	0.010
3197	Weissman	1981 AD	11.70	0.15	10	19.27	0.26	0.103	0.003
3200	Phaethon	1983 TB	14.60	0.15	2	4.17	0.13	0.160	0.012
3202	Graff	A908 AA	11.00	0.15	2	33.05	2.58	0.065	0.010
3204	Lindgren	1978 RH	12.20	0.15	3	18.95	0.80	0.065	0.006
3205	Boksenberg	1979 MO6	13.40	0.15	7	14.90	0.32	0.036	0.002
3208	Lunn	1981 JM	12.00	0.15	4	21.67	0.75	0.063	0.005
3210	Lupishko	1983 WH1	11.20	0.15	1	14.87	1.19	0.264	0.044
3213	Smolensk	1977 NQ	12.20	0.15	3	19.24	0.78	0.064	0.006
3214	Makarenko	1978 TZ6	11.10	0.15	2	21.25	1.29	0.143	0.019
3215	Lapko	1980 BQ	12.10	0.15	3	21.59	0.76	0.057	0.005
3222	Liller	1983 NJ	11.40	0.15	4	44.69	1.29	0.025	0.001
3223	Forsius	1942 RN	11.00	0.15	9	18.31	0.27	0.218	0.008
3224	Irkutsk	1977 RL6	11.30	0.15	5	34.93	0.77	0.045	0.002
3228	Pire	1935 CL	12.50	0.15	4	17.92	0.62	0.058	0.005
3230	Vampilov	1972 LE	12.20	0.15	7	23.35	0.38	0.044	0.002
3231	Mila	1972 RU2	13.10	0.15	1	11.21	0.80	0.081	0.012
3232	Brest	1974 SL	11.70	0.15	2	20.29	1.23	0.091	0.012
3234	Hergiani	1978 QO2	12.50	0.15	3	17.33	0.73	0.059	0.005
3235	Melchior	1981 EL1	13.40	0.15	3	10.59	0.49	0.070	0.007
3237	Victorplatt	1984 SA5	10.60	0.15	3	24.61	0.99	0.171	0.015
3238	Timresovia	1975 VB9	13.40	0.15	2	10.42	0.78	0.073	0.011
3246	Bidstrup	1976 GQ3	11.30	0.15	2	16.41	1.47	0.203	0.039
3247	Di Martino	1981 YE	12.90	0.15	5	15.60	0.51	0.053	0.004
3248	Farinella	1982 FK	10.70	0.15	5	41.02	0.73	0.055	0.002
3250	Martebo	1979 EB	11.40	0.15	2	20.17	1.22	0.120	0.016
3254	Bus	1982 UM	11.00	0.15	5	35.07	0.95	0.058	0.003
3255	Tholen	1980 RA	13.60	0.15	6	6.76	0.17	0.142	0.008
3256	Daguerre	1981 SJ1	12.40	0.15	5	23.96	0.70	0.035	0.002
3259	Brownlee	1984 SZ4	10.00	0.15	2	21.84	1.62	0.370	0.058
3260	Vizbor	1974 SO2	12.60	0.15	2	8.58	0.60	0.220	0.033
3261	Tvardovskij	1979 SF9	11.70	0.15	1	14.93	1.26	0.166	0.029
3262	Miune	1983 WB	10.90	0.15	2	21.22	1.22	0.173	0.022
3264	Bounty	1934 AF	12.20	0.15	8	21.51	0.46	0.052	0.002
3266	Bernardus	1978 PA	13.50	0.15	2	6.25	0.46	0.180	0.028
3269	Vibert-Douglas	1981 EX16	12.70	0.15	1	9.72	0.86	0.156	0.029
3273	Drukar	1975 TS2	11.40	0.15	4	34.49	0.98	0.045	0.003
3275	Oberndorfer	1982 HE1	13.10	0.15	6	12.47	0.26	0.066	0.003
3278	Behounek	1984 BT	11.10	0.15	3	32.09	1.09	0.062	0.005
3279	Solon	9103 P-L	13.30	0.15	1	6.34	0.47	0.210	0.033
3285	Ruth Wolfe	1983 VW1	12.30	0.15	1	9.06	0.66	0.259	0.040
3291	Dunlap	1982 VX3	12.90	0.15	2	20.52	1.68	0.030	0.005
3295	Murakami	1950 DH	12.90	0.15	6	13.03	0.30	0.074	0.004
3297	Hong Kong	1978 WN14	12.30	0.15	2	18.75	1.07	0.060	0.007
3298	Massandra	1979 OB15	13.50	0.15	1	9.76	1.01	0.074	0.016
3300	McGlasson	1928 NA	10.40	0.15	8	24.53	0.41	0.205	0.008
3305	Ceadams	1985 KB	12.20	0.15	3	9.97	0.49	0.256	0.029
3306	Byron	1979 SM11	12.70	0.15	1	7.88	0.70	0.236	0.043
3310	Patsy	1931 TS2	10.80	0.15	4	21.50	0.71	0.185	0.013
3311	Podobed	1976 QM1	12.10	0.15	1	23.46	1.18	0.046	0.005
3312	Pedersen	1984 SN	11.40	0.15	1	14.37	1.58	0.236	0.053
3313	Mendel	1980 DG	12.30	0.15	1	14.36	0.94	0.103	0.014
3316	Herzberg	1984 CN1	11.70	0.15	5	21.61	0.62	0.080	0.005
3317	Paris	1984 KF	8.30	0.15	8	120.45	1.65	0.059	0.002
3318	Blixen	1985 HB	11.00	0.15	5	24.00	0.71	0.133	0.009
3324	Avsyuk	1983 CW1	11.70	0.15	5	19.04	0.53	0.103	0.006
3325	TARDIS	1984 JZ	11.40	0.15	6	27.08	0.67	0.071	0.004
3326	Agafonikov	1985 FL	12.80	0.15	5	14.53	0.37	0.069	0.004
3327	Campins	1985 PW	11.80	0.15	3	20.28	0.85	0.085	0.008
3328	Interposita	1985 QD1	11.70	0.15	2	19.36	1.02	0.105	0.013
3329	Golay	1985 RT1	11.40	0.15	4	16.78	0.65	0.176	0.015
3330	Gantrisch	1985 RU1	11.20	0.15	11	38.22	0.45	0.041	0.001
3332	Raksha	1978 NT1	11.70	0.15	3	14.59	0.58	0.181	0.016
3333	Schaber	1980 TG5	11.80	0.15	6	27.67	0.52	0.044	0.002
3339	Treshnikov	1978 LB	11.10	0.15	10	34.46	0.44	0.055	0.002
3341	Hartmann	1980 OD	12.60	0.15	1	12.05	0.92	0.111	0.018
3342	Fivesparks	1982 BD3	12.10	0.15	3	19.17	1.10	0.071	0.009
3345	Tarkovskij	1982 YC1	11.60	0.15	11	21.02	0.28	0.096	0.003
3346	Gerla	1951 SD	11.10	0.15	5	31.86	0.88	0.065	0.004
3348	Pokryshkin	1978 EA3	11.90	0.15	3	15.64	0.74	0.126	0.013
3353	Jarvis	1981 YC	13.50	0.15	4	12.49	0.29	0.046	0.003
3358	Anikushin	1978 RX	12.30	0.15	1	12.73	0.95	0.131	0.020
3365	Recogne	1985 CG2	12.10	0.15	1	15.70	1.38	0.104	0.019
3366	Godel	1985 SD1	11.30	0.15	3	19.25	0.87	0.144	0.014
3367	Alex	1983 CA3	12.00	0.15	2	16.96	1.11	0.099	0.013
3368	Duncombe	1985 QT	11.30	0.15	4	34.91	1.09	0.044	0.003
3369	Freuchen	1985 UZ	12.00	0.15	9	26.33	0.46	0.045	0.002
3372	Bratijchuk	1976 SP4	12.30	0.15	7	22.72	0.43	0.042	0.002
3379	Oishi	1931 TJ1	13.60	0.15	2	14.71	0.79	0.030	0.003
3383	Koyama	1951 AB	12.00	0.15	1	10.55	0.81	0.252	0.040
3386	Klementinum	1980 FA	12.70	0.15	1	9.33	1.08	0.169	0.040
3389	Sinzot	1984 DU	12.30	0.15	7	20.42	0.41	0.055	0.003
3396	Muazzez	A915 TE	11.00	0.15	2	36.27	2.15	0.053	0.007
3399	Kobzon	1979 SZ9	12.50	0.15	8	19.19	0.40	0.050	0.002
3405	Daiwensai	1964 UQ	12.20	0.15	7	27.14	0.45	0.032	0.001
3406	Omsk	1969 DA	11.30	0.15	4	16.59	0.48	0.201	0.013
3407	Jimmysimms	1973 DT	12.30	0.15	3	20.35	0.73	0.052	0.004
3415	Danby	1928 SL	10.80	0.15	4	42.93	1.30	0.048	0.003
3418	Izvekov	1973 QZ1	11.80	0.15	2	20.59	0.90	0.080	0.007
3419	Guth	1981 JZ	10.70	0.15	6	34.68	0.73	0.078	0.004
3420	Standish	1984 EB	11.90	0.15	2	14.49	1.13	0.147	0.024
3425	Hurukawa	1929 BD	10.90	0.15	7	27.81	0.54	0.100	0.004
3426	Seki	1932 CQ	12.50	0.15	3	16.95	0.78	0.062	0.006
3428	Roberts	1952 JH	12.00	0.15	1	18.47	1.31	0.082	0.012
3429	Chuvaev	1974 SU1	13.80	0.15	3	9.08	0.39	0.066	0.006
3431	Nakano	1984 QC	10.30	0.15	8	40.97	0.59	0.081	0.003
3434	Hurless	1981 VO	13.00	0.15	3	13.51	0.59	0.062	0.006
3435	Boury	1981 XC2	12.90	0.15	1	8.65	0.70	0.163	0.027
3437	Kapitsa	1982 UZ5	13.40	0.15	1	6.59	0.87	0.177	0.047
3438	Inarradas	1974 SD5	11.70	0.15	10	25.02	0.33	0.061	0.002
3442	Yashin	1978 TO7	11.40	0.15	11	29.04	0.38	0.059	0.002
3445	Pinson	1983 FC	12.20	0.15	3	22.96	0.94	0.046	0.004
3450	Dommanget	1983 QJ	12.50	0.15	3	15.58	0.72	0.073	0.007
3451	Mentor	1984 HA1	8.10	0.15	3	117.91	3.19	0.075	0.005
3460	Ashkova	1973 QB2	12.30	0.15	2	18.49	1.08	0.065	0.009
3463	Kaokuen	1981 XJ2	13.20	0.15	2	15.99	1.25	0.041	0.007
3468	Urgenta	1975 AM	11.70	0.15	1	15.32	1.43	0.157	0.030
3469	Bulgakov	1982 UL7	11.00	0.15	7	23.74	0.51	0.128	0.006
3470	Yaronika	1975 ES	13.10	0.15	5	14.79	0.42	0.049	0.003
3471	Amelin	1977 QK2	11.30	0.15	6	27.42	0.72	0.071	0.004
3475	Fichte	1972 TD	10.80	0.15	6	33.01	0.79	0.080	0.004
3476	Dongguan	1978 UF2	11.90	0.15	9	30.30	0.49	0.034	0.001
3479	Malaparte	1980 TQ	11.40	0.15	4	19.42	0.64	0.137	0.010
3485	Barucci	1983 NU	12.60	0.15	7	14.70	0.27	0.075	0.003
3487	Edgeworth	1978 UF	12.80	0.15	1	9.39	0.69	0.152	0.023
3492	Petra-Pepi	1985 DQ	11.80	0.15	1	11.70	0.83	0.246	0.037
3495	Colchagua	1981 NU	11.40	0.15	1	31.43	1.77	0.049	0.006
3497	Innanen	1941 HJ	12.00	0.15	8	17.45	0.31	0.093	0.004
3500	Kobayashi	A919 SD	12.70	0.15	1	8.93	0.50	0.185	0.022
3501	Olegiya	1971 QU	11.60	0.15	9	25.79	0.42	0.063	0.002
3502	Huangpu	1964 TR1	11.80	0.15	3	21.72	0.98	0.073	0.007
3504	Kholshevnikov	1981 RV3	11.70	0.15	2	18.31	1.08	0.110	0.014
3505	Byrd	1983 AM	11.70	0.15	1	14.29	1.05	0.181	0.028
3506	French	1984 CO1	11.40	0.15	2	19.09	1.21	0.140	0.020
3509	Sanshui	1978 UH2	12.10	0.15	1	11.98	0.71	0.178	0.023
3512	Eriepa	1984 AC1	13.60	0.15	1	6.18	0.50	0.168	0.028
3523	Arina	1975 TV2	12.20	0.15	1	6.26	0.65	0.595	0.127
3525	Paul	1983 CX2	12.10	0.15	1	19.06	1.56	0.070	0.012
3526	Jeffbell	1984 CN	12.10	0.15	6	25.90	0.59	0.040	0.002
3532	Tracie	1983 AS2	11.90	0.15	7	18.94	0.48	0.087	0.005
3535	Ditte	1979 SN11	13.90	0.15	1	7.21	0.54	0.094	0.015
3539	Weimar	1967 GF1	13.00	0.15	1	9.20	0.79	0.132	0.023
3540	Protesilaos	1973 UF5	9.00	0.15	3	87.66	3.46	0.062	0.006
3541	Graham	1984 ML	12.70	0.15	3	15.89	0.52	0.059	0.004
3542	Tanjiazhen	1964 TN2	11.70	0.15	1	21.00	1.46	0.084	0.012
3543	Ningbo	1964 VA3	11.50	0.15	3	20.88	0.93	0.103	0.010
3544	Borodino	1977 RD4	12.50	0.15	1	6.11	0.55	0.474	0.088
3548	Eurybates	1973 SO	9.50	0.15	2	68.40	3.92	0.060	0.007
3550	Link	1981 YS	11.90	0.15	8	28.35	0.43	0.039	0.001
3557	Sokolsky	1977 QE1	10.80	0.15	5	39.49	1.12	0.055	0.003
3558	Shishkin	1978 SQ2	12.50	0.15	1	8.89	0.99	0.223	0.051
3560	Chenqian	1980 RZ2	10.50	0.15	10	26.80	0.38	0.157	0.005
3561	Devine	1983 HO	10.70	0.15	5	31.62	1.05	0.098	0.007
3564	Talthybius	1985 TC1	9.00	0.15	3	74.11	2.65	0.081	0.006
3565	Ojima	1986 YD	11.30	0.15	4	27.82	1.03	0.070	0.006
3566	Levitan	1979 YA9	12.80	0.15	6	14.88	0.43	0.061	0.004
3568	ASCII	1936 UB	12.10	0.15	5	28.28	0.81	0.035	0.002
3570	Wuyeesun	1979 XO	11.40	0.15	2	21.78	1.48	0.103	0.015
3571	Milanstefanik	1982 EJ	11.10	0.15	7	38.09	0.82	0.045	0.002
3572	Leogoldberg	1954 UJ2	12.70	0.15	1	10.64	0.86	0.130	0.022
3575	Anyuta	1984 DU2	11.90	0.15	5	13.96	0.44	0.168	0.012
3577	Putilin	1969 TK	10.40	0.15	4	49.87	1.83	0.051	0.004
3578	Carestia	1977 CC	10.10	0.15	7	58.07	0.98	0.051	0.002
3582	Cyrano	1986 TT5	11.20	0.15	1	16.42	1.12	0.217	0.031
3584	Aisha	1981 TW	12.10	0.15	4	28.29	1.18	0.036	0.003
3591	Vladimirskij	1978 QJ2	11.50	0.15	2	14.90	1.08	0.201	0.030
3596	Meriones	1985 VO	9.30	0.15	5	73.28	1.91	0.064	0.004
3599	Basov	1978 PB3	11.80	0.15	2	18.55	1.43	0.099	0.016
3604	Berkhuijsen	5550 P-L	13.10	0.15	1	15.07	1.11	0.045	0.007
3606	Pohjola	1939 SF	12.40	0.15	2	8.96	0.60	0.241	0.034
3611	Dabu	1981 YY1	12.70	0.15	2	16.95	1.43	0.052	0.009
3614	Tumilty	1983 AE1	10.70	0.15	7	59.34	0.97	0.026	0.001
3615	Safronov	1983 WZ	11.20	0.15	1	20.83	1.64	0.135	0.022
3618	Kuprin	1979 QP8	12.50	0.15	4	14.50	0.59	0.088	0.008
3620	Platonov	1981 RU2	12.20	0.15	1	14.78	0.99	0.107	0.015
3621	Curtis	1981 SQ1	12.20	0.15	2	19.59	1.43	0.060	0.009
3622	Ilinsky	1981 SX7	11.40	0.15	1	21.29	1.52	0.107	0.016
3626	Ohsaki	1929 PA	12.10	0.15	2	20.69	1.21	0.060	0.007
3628	Boznemcova	1979 WD	12.60	0.15	3	8.14	0.34	0.256	0.024
3630	Lubomir	1984 QN	12.50	0.15	5	16.70	0.41	0.064	0.003
3631	Sigyn	1987 BV1	10.50	0.15	8	41.52	0.57	0.065	0.002
3633	Mira	1980 EE2	13.60	0.15	3	12.53	0.65	0.043	0.005
3638	Davis	1984 WX	11.40	0.15	1	14.09	1.38	0.245	0.049
3641	Williams Bay	A922 WC	11.40	0.15	5	33.76	0.85	0.043	0.002
3642	Frieden	1953 XL1	11.20	0.15	7	36.04	0.55	0.046	0.002
3645	Fabini	1981 QZ	12.10	0.15	2	17.19	1.13	0.087	0.012
3647	Dermott	1986 AD1	11.40	0.15	8	29.75	0.48	0.058	0.002
3649	Guillermina	1976 HQ	11.80	0.15	2	23.27	1.57	0.062	0.009

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_V	$\sigma(p_V)$
3650	Kunming	1978 UO2	11.90	0.15	6	28.01	0.63	0.042	0.002
3652	Soros	1981 TC3	13.00	0.15	6	13.12	0.24	0.065	0.003
3655	Eupraksia	1978 SA3	10.90	0.15	1	27.41	3.64	0.103	0.028
3657	Ermolova	1978 ST6	12.70	0.15	1	5.80	0.68	0.436	0.104
3660	Lazarev	1978 QX2	11.50	0.15	2	28.90	1.34	0.056	0.006
3662	Dezhnev	1980 RU2	12.00	0.15	3	10.08	0.52	0.285	0.032
3666	Holman	1979 HP	11.80	0.15	3	21.37	0.80	0.081	0.007
3667	Anne-Marie	1981 EF	11.80	0.15	7	23.15	0.47	0.064	0.003
3670	Northcott	1983 BN	12.00	0.15	4	18.58	0.60	0.082	0.006
3674	Erbisbuhl	1963 RH	12.10	0.15	2	10.32	0.71	0.249	0.037
3675	Kemstach	1982 YP1	11.00	0.15	1	17.35	1.46	0.234	0.041
3682	Welther	A923 NB	11.50	0.15	7	19.34	0.30	0.120	0.004
3683	Baumann	1987 MA	11.30	0.15	2	22.53	1.59	0.106	0.016
3684	Berry	1983 AK	13.40	0.15	1	9.43	0.63	0.087	0.012
3686	Antoku	1987 EB	12.40	0.15	5	18.80	0.53	0.059	0.004
3687	Dzus	A908 TC	11.50	0.15	10	32.36	0.40	0.043	0.001
3689	Yeates	1981 JJ2	12.00	0.15	1	16.17	0.96	0.107	0.014
3694	Sharon	1984 SH5	10.30	0.15	5	46.71	1.01	0.064	0.003
3696	Herald	1980 OF	12.40	0.15	3	20.63	0.97	0.056	0.006
3700	Geowilliams	1984 UL2	12.50	0.15	1	8.82	0.86	0.227	0.045
3702	Trubetskaya	1970 NB	11.60	0.15	1	17.40	1.37	0.134	0.022
3704	Gaoshiqi	1981 YX1	12.50	0.15	1	11.66	0.84	0.130	0.020
3708		1974 FV1	9.30	0.15	4	76.75	2.93	0.059	0.005
3709	Polypoites	1985 TL3	9.00	0.15	4	85.23	2.50	0.062	0.004
3712	Kraft	1984 YC	11.60	0.15	2	14.34	1.07	0.198	0.031
3713	Pieters	1985 FA2	11.30	0.15	3	16.52	0.84	0.198	0.021
3723	Voznesenskij	1976 GK2	13.60	0.15	2	10.31	0.57	0.061	0.008
3724	Annenskij	1979 YN8	11.60	0.15	6	13.55	0.37	0.227	0.013
3727	Maxhell	1981 PQ	11.40	0.15	8	30.84	0.63	0.052	0.002
3728	IRAS	1983 QF	11.50	0.15	8	21.40	0.38	0.101	0.004
3730	Hurban	1983 XM1	11.80	0.15	4	27.85	0.85	0.044	0.003
3731	Hancock	1984 DH1	10.30	0.15	6	50.16	0.87	0.054	0.002
3733	Yoshitomo	1985 AF	13.00	0.15	6	13.55	0.36	0.062	0.004
3735	Trebon	1983 XS	11.60	0.15	3	21.61	0.86	0.090	0.008
3736	Rokoske	1987 SY3	11.10	0.15	6	23.70	0.51	0.127	0.007
3738	Ots	1977 QA1	12.70	0.15	1	6.15	0.64	0.388	0.083
3745	Petaev	1949 SF	14.20	0.15	6	10.94	0.29	0.032	0.002
3747	Belinskij	1975 VY5	11.10	0.15	7	28.97	0.56	0.086	0.004
3751	Kiang	1983 NK	11.70	0.15	5	24.88	0.70	0.060	0.004
3753	Cruithne	1986 TO	15.60	0.15	4	1.74	0.06	0.354	0.027
3754	Kathleen	1931 FM	10.00	0.15	12	57.27	0.69	0.054	0.002
3759	Piironen	1984 AP	11.90	0.15	6	26.30	0.54	0.045	0.002
3761	Romanskaya	1936 OH	11.10	0.15	2	26.15	1.27	0.102	0.012
3763	Qianxuesen	1980 TA6	12.50	0.15	1	8.26	0.64	0.259	0.042
3766	Junepatterson	1983 BF	11.70	0.15	6	23.82	0.58	0.068	0.004
3767	DiMaggio	1986 LC	11.60	0.15	6	15.01	0.35	0.186	0.010
3768	Monroe	1937 RB	11.30	0.15	2	30.40	1.58	0.058	0.006
3772	Piaf	1982 UR7	11.20	0.15	6	20.79	0.50	0.147	0.008
3773	Smithsonian	1984 YY	13.30	0.15	2	7.26	0.53	0.164	0.026
3774	Megumi	1987 YC	11.30	0.15	2	21.53	1.34	0.118	0.016
3775	Ellenbeth	1931 TC4	12.80	0.15	2	14.63	0.90	0.062	0.008
3776	Vartiovuori	1938 GG	10.40	0.15	6	26.99	0.61	0.170	0.009
3779	Kieffer	1985 JV1	11.40	0.15	4	15.53	0.56	0.206	0.016
3784	Chopin	1986 UL1	11.00	0.15	7	30.13	0.54	0.079	0.003
3786	Yamada	1988 AE	11.20	0.15	7	15.61	0.35	0.260	0.014
3793	Leonteus	1985 TE3	8.80	0.15	4	87.58	2.53	0.070	0.004
3796	Lene	1986 XJ	11.90	0.15	10	19.70	0.30	0.084	0.003
3803	Tuchkova	1981 TP1	11.30	0.15	5	35.98	0.95	0.042	0.002
3811	Karma	1953 TH	11.70	0.15	6	26.15	0.45	0.054	0.002
3812	Lidaksum	1965 AK1	11.70	0.15	6	38.34	0.93	0.032	0.002
3815	Konig	1959 GG	12.40	0.15	8	21.84	0.45	0.044	0.002
3816	Chugainov	1975 VG9	11.90	0.15	3	14.29	0.58	0.151	0.013
3828	Hoshino	1986 WC	11.50	0.15	1	19.96	1.52	0.111	0.018
3829	Gunma	1988 EM	12.20	0.15	6	19.74	0.43	0.061	0.003
3830	Trelleborg	1986 RL	11.50	0.15	6	22.15	0.53	0.123	0.008
3845	Neyachenko	1979 SA10	11.70	0.15	1	24.91	1.54	0.059	0.008
3846	Hazel	1980 TK5	12.10	0.15	5	21.36	0.59	0.056	0.003
3847	Sindel	1982 DY1	11.60	0.15	4	19.66	0.77	0.113	0.010
3852	Glennford	1987 DR6	12.10	0.15	3	17.42	0.79	0.088	0.009
3855	Pasasymphonia	1986 NF1	13.10	0.15	1	5.65	0.46	0.318	0.054
3859	Borngen	1987 EW	12.00	0.15	1	25.68	1.92	0.042	0.007
3863	Gilyarovskij	1978 SJ3	13.10	0.15	2	7.75	0.56	0.181	0.029
3865	Lindbloom	1988 AY4	12.70	0.15	1	7.93	0.87	0.233	0.052
3866	Langley	1988 BH4	12.20	0.15	3	24.42	0.99	0.040	0.003
3870	Mayre	1988 CG3	12.20	0.15	2	10.86	0.84	0.214	0.036
3871	Reiz	1982 DR2	12.00	0.15	1	24.67	1.69	0.046	0.007
3872	Akirafujii	1983 AV	12.80	0.15	2	21.43	1.51	0.029	0.005
3873	Roddy	1984 WB	12.00	0.15	3	7.51	0.25	0.512	0.039
3881	Doumergua	1925 VF	13.00	0.15	5	13.20	0.41	0.066	0.005
3883	Verbano	1972 RQ	11.90	0.15	3	12.88	0.57	0.195	0.019
3885	Bogorodskij	1979 HG5	12.10	0.15	3	15.59	0.69	0.111	0.011
3886	Shcherbakovia	1981 RU3	12.50	0.15	4	17.18	0.71	0.062	0.005
3888	Hoyt	1984 FO	12.90	0.15	2	8.15	0.61	0.192	0.031
3889	Menshikov	1972 RT3	12.80	0.15	8	14.74	0.33	0.065	0.003
3893	DeLaeter	1980 FG12	13.30	0.15	9	12.12	0.17	0.059	0.002
3894	Williamcooke	1980 PQ2	12.20	0.15	1	7.95	0.71	0.369	0.068
3896	Pordenone	1987 WB	11.30	0.15	1	18.21	1.27	0.161	0.024
3901	Nanjingdaxue	1958 GQ	12.50	0.15	4	16.79	0.78	0.066	0.007
3902	Yoritomo	1986 AL	11.40	0.15	6	28.09	0.67	0.063	0.003
3904	Honda	1988 DQ	11.30	0.15	2	13.81	0.93	0.279	0.039
3906	Chao	1987 KE1	10.40	0.15	11	47.49	0.57	0.055	0.002
3913	Chemin	1986 XO2	12.20	0.15	1	8.23	0.86	0.344	0.074
3914	Kotogahama	1987 SE	11.50	0.15	2	15.22	1.14	0.194	0.031
3915	Fukushima	1988 PA1	12.20	0.15	8	22.82	0.38	0.046	0.002
3916	Maeva	1981 QA3	12.20	0.15	4	20.56	0.66	0.056	0.004
3921	Klement'ev	1971 OH	12.70	0.15	9	17.87	0.24	0.046	0.002
3924	Birch	1977 CU	12.00	0.15	5	16.53	0.49	0.107	0.007
3925	Tret'yakov	1977 SS2	10.90	0.15	5	46.97	0.99	0.035	0.002
3929	Carmelmaria	1981 WG9	13.60	0.15	1	11.09	0.85	0.052	0.008
3933	Portugal	1986 EN4	12.40	0.15	1	15.63	1.45	0.079	0.015
3937	Bretagnon	1932 EO	11.70	0.15	1	18.02	1.22	0.114	0.016
3939	Huruhata	1953 GO	11.40	0.15	8	36.92	0.74	0.036	0.002
3951	Zichichi	1986 CK1	12.80	0.15	1	7.38	0.59	0.246	0.041
3955	Bruckner	1988 RF3	11.30	0.15	2	22.75	1.45	0.104	0.014
3962	Valyaev	1967 CC	12.40	0.15	1	14.76	1.11	0.089	0.014
3967	Shekhtelia	1976 YW2	11.30	0.15	6	30.14	0.63	0.060	0.003
3971	Voronikhin	1979 YM8	11.80	0.15	10	30.74	0.42	0.036	0.001
3976	Lise	1983 JM	11.60	0.15	7	30.69	0.49	0.043	0.002
3978	Klepesta	1983 VP1	11.70	0.15	7	27.82	0.53	0.050	0.002
3979	Brorsen	1983 VV1	11.70	0.15	1	19.78	1.33	0.094	0.013
3981	Stodola	1984 BL	11.90	0.15	1	20.31	1.36	0.074	0.010
3983	Sakiko	1984 SX	12.40	0.15	7	18.00	0.37	0.062	0.003
3985	Raybatson	1985 CX	11.30	0.15	2	12.21	1.23	0.387	0.086
3987	Wujek	1986 EL1	12.00	0.15	1	15.51	0.86	0.116	0.014
3992	Wagner	1987 SA7	11.70	0.15	3	17.87	0.89	0.121	0.013
3997	Taga	1988 XP1	13.20	0.15	1	10.09	0.74	0.091	0.014
3999	Aristarchus	1989 AL	12.40	0.15	3	17.03	0.76	0.068	0.007
4000	Hipparchus	1989 AV	12.60	0.15	4	18.87	0.59	0.046	0.003
4002	Shinagawa	1950 JB	11.90	0.15	4	12.24	0.49	0.210	0.018
4003	Schumann	1964 ED	10.80	0.15	5	35.00	0.89	0.072	0.004
4006	Sandler	1972 YR	12.50	0.15	2	14.73	1.05	0.082	0.012
4007	Euryalos	1973 SR	10.00	0.15	2	53.89	3.94	0.061	0.009
4009	Drobyshevskij	1977 EN1	12.50	0.15	2	16.31	1.16	0.071	0.011
4013	Ogiria	1979 OM15	12.00	0.15	4	15.01	0.61	0.125	0.011
4024	Ronan	1981 WQ	12.90	0.15	5	12.68	0.37	0.079	0.005
4026	Beet	1982 BU1	13.40	0.15	3	13.64	0.66	0.043	0.004
4035		1986 WD	9.30	0.15	2	66.99	4.45	0.076	0.010
4036	Whitehouse	1987 DW5	12.50	0.15	1	13.21	0.99	0.101	0.016
4041	Miyamotoyohko	1988 DN1	11.40	0.15	5	19.53	0.67	0.132	0.010
4043	Perolof	1175 T-3	12.30	0.15	1	14.61	1.79	0.100	0.025
4045	Lowengrub	1953 RG	11.30	0.15	6	29.61	0.64	0.062	0.003
4047	Chang'E	1964 TT2	13.10	0.15	4	11.82	0.38	0.075	0.005
4049	Noragal'	1973 QD2	11.80	0.15	4	22.48	0.74	0.069	0.005
4059	Balder	1987 SB5	12.00	0.15	5	18.82	0.60	0.079	0.005
4060	Deipylos	1987 YT1	8.90	0.15	4	86.79	3.10	0.067	0.005
4061	Martelli	1988 FF3	11.80	0.15	3	20.19	0.88	0.083	0.008
4063	Euforbo	1989 CG2	8.60	0.15	2	106.38	4.56	0.057	0.005
4068	Menestheus	1973 SW	9.40	0.15	2	68.46	4.44	0.069	0.010
4071	Rostovdon	1981 RD2	12.10	0.15	4	31.46	1.09	0.026	0.002
4077	Asuka	1982 XV1	11.40	0.15	2	22.98	1.23	0.092	0.011
4078	Polakis	1983 AC	11.30	0.15	4	20.83	0.67	0.126	0.009
4082	Swann	1984 SW3	12.90	0.15	4	11.06	0.29	0.101	0.006
4085	Weir	1985 JR	12.30	0.15	1	9.66	0.77	0.228	0.038
4086	Podalirius	1985 VK2	9.10	0.15	3	85.98	2.73	0.056	0.004
4091	Lowe	1986 TL2	10.90	0.15	5	26.29	0.62	0.114	0.006
4093	Bennett	1986 VD	11.90	0.15	8	25.95	0.57	0.047	0.002
4094	Aoshima	1987 QC	13.20	0.15	3	13.94	0.67	0.050	0.005
4100	Sumiko	1988 BF	11.40	0.15	2	17.95	1.10	0.156	0.022
4103	Chahine	1989 EB	11.20	0.15	2	13.52	0.97	0.328	0.049
4105	Tsia	1989 EK	12.30	0.15	4	12.75	0.42	0.133	0.010
4106	Nada	1989 EW	12.00	0.15	1	9.46	0.90	0.313	0.061
4107	Rufino	1989 GT	11.60	0.15	1	14.27	0.97	0.199	0.029
4110	Keats	1977 CZ	11.60	0.15	2	22.36	1.37	0.081	0.011
4112	Hrabal	1981 ST	11.30	0.15	14	44.75	0.56	0.028	0.001
4113	Rascana	1982 BQ	13.60	0.15	1	7.39	0.58	0.118	0.019
4115	Peternorton	1982 QS3	11.70	0.15	1	14.82	1.17	0.168	0.028
4124	Herriot	1986 SE	12.50	0.15	8	20.48	0.45	0.043	0.002
4125	Lew Allen	1987 MO	13.50	0.15	2	7.65	0.49	0.135	0.021
4131	Stasik	1988 DR4	11.80	0.15	3	26.97	1.12	0.048	0.004
4135	Svetlanov	1966 PG	12.20	0.15	1	12.78	1.32	0.143	0.030
4136	Artmane	1968 FJ	13.40	0.15	1	10.79	0.80	0.066	0.010
4138	Kalchas	1973 SM	9.80	0.15	1	61.04	3.49	0.057	0.007
4140	Branham	1976 VA	10.90	0.15	9	35.71	0.49	0.061	0.002
4141	Nintanlena	1978 PG3	12.60	0.15	1	15.08	0.96	0.071	0.010
4142	Dersu-Uzala	1981 KE	13.60	0.15	5	6.34	0.19	0.164	0.011
4144	Vladvasil'ev	1981 SW6	11.60	0.15	8	30.65	0.64	0.045	0.002
4149	Harrison	1984 EZ	12.30	0.15	1	15.91	0.95	0.084	0.011
4151	Alanhale	1985 HV1	12.00	0.15	7	20.80	0.54	0.071	0.004
4152	Weber	1985 JF	12.40	0.15	4	21.01	0.73	0.045	0.003
4153	Roburnham	1985 JT1	12.10	0.15	4	17.21	0.65	0.088	0.007
4157	Izu	1988 XD2	11.90	0.15	1	20.03	1.29	0.077	0.011
4159	Freeman	1989 GK	10.80	0.15	7	17.53	0.35	0.287	0.013
4162	SAF	1940 WA	11.80	0.15	8	27.44	0.46	0.046	0.002
4163	Saaremaa	1941 HC	11.40	0.15	1	19.38	1.34	0.130	0.019
4167	Riemann	1978 TQ7	11.80	0.15	4	15.00	0.49	0.150	0.011
4169	Celsius	1980 FO3	10.90	0.15	5	37.75	1.01	0.057	0.003
4170	Semmelweis	1980 PT	11.40	0.15	2	17.82	1.11	0.165	0.024
4173	Thicksten	1982 KG1	13.10	0.15	7	10.87	0.28	0.087	0.005
4174	Pikulia	1982 SB6	11.60	0.15	1	19.44	1.74	0.107	0.020
4176	Sudek	1987 DS	11.90	0.15	4	17.87	0.77	0.097	0.009
4186	Tamashima	1977 DT1	11.50	0.15	4	29.86	1.12	0.054	0.004
4192	Breysacher	1981 DH	11.60	0.15	6	26.92	0.65	0.059	0.003
4194	Sweitzer	1982 RE	12.00	0.15	4	17.54	0.56	0.092	0.006
4196	Shuya	1982 SA13	10.70	0.15	5	38.28	0.97	0.065	0.004
4201	Orosz	1984 JA1	11.10	0.15	7	35.90	0.53	0.053	0.002
4202	Minitti	1985 CB2	11.00	0.15	2	14.26	1.07	0.347	0.055
4203	Brucato	1985 FD3	12.10	0.15	8	17.66	0.33	0.082	0.003
4207	Chernova	1986 RO2	11.20	0.15	1	18.50	1.35	0.171	0.026
4208	Kiselev	1986 RQ2	11.60	0.15	3	32.58	1.17	0.038	0.003
4209	Briggs	1986 TG4	10.80	0.15	6	28.92	0.71	0.103	0.006
4220	Flood	1988 DN	13.30	0.15	2	12.72	0.96	0.052	0.008
4221	Picasso	1988 EJ	12.70	0.15	2	12.05	0.96	0.110	0.020
4222	Nancita	1988 EK1	12.40	0.15	1	9.14	0.71	0.232	0.038
4223	Shikoku	1988 JM	11.30	0.15	4	22.25	0.73	0.110	0.008
4224	Susa	1988 KG	10.90	0.15	1	33.14	1.54	0.070	0.007
4226	Damiaan	1989 RE	11.30	0.15	6	32.83	0.78	0.054	0.003
4229	Plevitskaya	1971 BK	12.90	0.15	3	10.81	0.56	0.118	0.013
4230	van den Bergh	1973 ST1	11.70	0.15	2	42.63	2.24	0.021	0.002
4234	Evtushenko	1978 JT1	12.40	0.15	1	14.50	1.06	0.092	0.014
4236	Lidov	1979 FV1	11.40	0.15	2	30.20	1.82	0.061	0.009

Table E.2 (Continued.)

Asteroid			H	G	$N_{\rm ID}$	d	$\sigma(d)$	$p_{\rm V}$	$\sigma(p_{\rm V})$
4245	Nairc	1981 UC10	13.80	0.15	1	10.99	0.68	0.044	0.006
4247	Grahamsmith	1983 WC	13.10	0.15	1	11.82	0.90	0.073	0.012
4250	Perun	1984 UG	12.10	0.15	7	21.19	0.49	0.059	0.003
4252	Godwin	1985 RG4	12.70	0.15	1	13.81	0.89	0.077	0.011
4256	Kagamigawa	1986 TX	13.40	0.15	1	11.94	0.80	0.054	0.008
4257	Ubasti	1987 QA	16.20	0.15	2	1.30	0.09	0.376	0.053
4265	Kani	1989 TX	12.80	0.15	3	15.74	0.76	0.054	0.006
4266	Waltari	1940 YE	12.00	0.15	1	27.61	2.07	0.037	0.006
4270	Juanvictoria	1975 TJ6	13.90	0.15	1	11.93	0.93	0.034	0.006
4274	Karamanov	1980 RZ3	12.80	0.15	2	14.97	0.80	0.060	0.007
4277	Holubov	1982 AF	12.80	0.15	1	9.89	1.01	0.137	0.029
4282	Endate	1987 UQ1	13.30	0.15	4	12.12	0.49	0.058	0.005
4284	Kaho	1988 FL3	12.50	0.15	9	12.34	0.21	0.125	0.005
4288	Tokyotech	1989 TQ1	11.80	0.15	5	11.19	0.34	0.277	0.019
4290	Heisei	1989 UK3	11.50	0.15	2	15.76	1.47	0.179	0.034
4291	Kodaihasu	1989 VH	11.50	0.15	2	19.94	1.16	0.115	0.015
4292	Aoba	1989 VO	12.20	0.15	4	27.67	0.86	0.030	0.002
4295	Wisse	6032 P-L	13.40	0.15	1	10.90	0.64	0.065	0.008
4299	WIYN	1952 QX	13.10	0.15	3	7.11	0.35	0.202	0.021
4312	Knacke	1978 WW11	13.10	0.15	3	14.82	0.63	0.056	0.005
4313	Bouchet	1979 HK1	11.90	0.15	3	12.54	0.72	0.202	0.025
4318	Bata	1980 DE1	11.60	0.15	3	28.26	1.20	0.051	0.005
4327	Ries	1982 KB1	12.30	0.15	5	14.75	0.35	0.104	0.006
4334	Foo	1983 RO3	12.80	0.15	1	10.81	0.90	0.115	0.020
4337	Arecibo	1985 GB	11.90	0.15	1	17.62	1.75	0.099	0.020
4342	Freud	1987 QO9	12.10	0.15	3	18.76	0.76	0.074	0.007
4343	Tetsuya	1988 AC	11.90	0.15	5	16.67	0.46	0.111	0.007
4347	Reger	1988 PK2	11.80	0.15	1	16.78	1.19	0.120	0.018
4348	Poulydamas	1988 RU	9.20	0.15	1	87.51	5.02	0.048	0.006
4349	Tiburcio	1989 LX	11.70	0.15	10	24.91	0.28	0.061	0.002
4353	Onizaki	1989 WK1	12.40	0.15	3	10.84	0.47	0.167	0.016
4356	Marathon	9522 P-L	13.10	0.15	4	15.10	0.45	0.047	0.003
4357	Korinthos	2069 T-2	11.70	0.15	1	13.93	1.27	0.190	0.036
4360	Xuyi	1964 TG2	13.00	0.15	6	14.20	0.36	0.059	0.003
4361	Nezhdanova	1977 TG7	12.40	0.15	1	23.81	1.29	0.034	0.004
4366	Venikagan	1979 YV8	12.10	0.15	3	20.90	0.98	0.069	0.008
4368	Pillmore	1981 JC2	11.30	0.15	3	21.95	0.98	0.111	0.011
4374	Tadamori	1987 BJ	13.00	0.15	1	4.41	0.54	0.573	0.143
4378	Voigt	1988 JF	11.70	0.15	1	11.93	1.03	0.259	0.046
4379	Snelling	1988 PT1	12.10	0.15	6	23.36	0.57	0.048	0.003
4381	Uenohara	1989 WD1	11.20	0.15	2	19.12	1.43	0.160	0.025
4386	Lust	6829 P-L	12.70	0.15	7	17.91	0.41	0.048	0.002
4390	Madreteresa	1976 GO8	13.50	0.15	5	10.26	0.29	0.067	0.004
4409	Kissling	1989 MD	12.20	0.15	1	12.51	1.03	0.149	0.025
4419	Allancook	1932 HD	12.60	0.15	4	15.05	0.59	0.073	0.006
4420	Alandreev	1936 PB	12.20	0.15	8	16.25	0.22	0.091	0.003
4421	Kayor	1942 AC	12.60	0.15	2	9.27	0.67	0.194	0.030
4422	Jarre	1942 UA	12.60	0.15	1	7.85	0.56	0.261	0.039
4424	Arkhipova	1967 DB	11.50	0.15	10	23.29	0.44	0.088	0.004
4431	Holeungholee	1978 WU14	10.90	0.15	6	31.17	0.72	0.081	0.004
4436	Ortizmoreno	1983 EX	11.00	0.15	11	31.31	0.51	0.072	0.002
4438	Sykes	1983 WR	11.50	0.15	9	31.44	0.60	0.045	0.002
4439	Muroto	1984 VA	13.00	0.15	1	13.98	0.79	0.057	0.007
4446	Carolyn	1985 TT	11.10	0.15	3	31.57	1.44	0.075	0.008
4449	Sobinov	1987 RX3	11.20	0.15	4	32.01	0.88	0.059	0.004
4452	Ullacharles	1988 RN	12.00	0.15	1	14.19	0.88	0.139	0.018
4456	Mawson	1989 OG	13.40	0.15	1	8.40	0.62	0.109	0.017
4460	Bihoro	1990 DS	11.00	0.15	11	42.33	0.50	0.041	0.001
4461	Sayama	1990 EL	11.60	0.15	4	19.04	0.56	0.116	0.008
4462	Vaughan	1952 HJ2	12.10	0.15	5	19.98	0.51	0.066	0.004
4467	Kaidanovskij	1975 VN2	11.70	0.15	3	13.01	0.59	0.226	0.022
4470	Sergeev-Censkij	1978 QP1	11.90	0.15	3	17.07	0.70	0.112	0.010
4483	Petofi	1986 RC2	13.00	0.15	1	6.62	0.62	0.254	0.049
4484	Sif	1987 DD	12.10	0.15	6	19.36	0.48	0.070	0.004
4489		1988 AK	9.00	0.15	4	95.02	2.47	0.050	0.003
4490	Bambery	1988 ND	12.70	0.15	1	8.01	0.52	0.229	0.032
4492	Debussy	1988 SH	12.90	0.15	2	14.75	0.91	0.058	0.008
4493	Naitomitsu	1988 TG1	11.00	0.15	1	21.15	1.45	0.157	0.023
4495		1988 VS	11.30	0.15	1	34.71	2.79	0.044	0.007
4498	Shinkoyama	1989 AG1	11.10	0.15	2	16.97	1.11	0.226	0.032
4505	Okamura	1990 DV1	11.10	0.15	2	16.26	1.20	0.261	0.044
4511	Rembrandt	1935 SP1	12.20	0.15	1	9.72	0.72	0.246	0.038
4521	Akimov	1979 FU2	11.50	0.15	4	20.76	0.70	0.109	0.008
4522	Britastra	1980 BM	12.10	0.15	1	21.26	1.43	0.057	0.008
4523	MIT	1981 DM1	12.30	0.15	8	16.04	0.32	0.085	0.004
4524	Barklajdetolli	1981 RV4	13.20	0.15	9	13.59	0.26	0.052	0.002
4525	Johnbauer	1982 JB3	13.00	0.15	2	12.49	0.72	0.072	0.009
4530	Smoluchowski	1984 EP	12.00	0.15	1	13.30	1.11	0.158	0.027
4537	Valgrirasp	1987 RR3	12.10	0.15	2	20.50	1.14	0.069	0.010
4540	Oriani	1988 VY1	12.10	0.15	9	16.51	0.27	0.095	0.004
4542	Mossotti	1989 BO	11.00	0.15	3	21.74	0.82	0.149	0.012
4543	Phoinix	1989 CQ1	9.70	0.15	4	69.54	2.20	0.049	0.003
4545	Primolevi	1989 SB11	11.50	0.15	1	10.36	1.33	0.413	0.108
4547	Massachusetts	1990 KP	11.00	0.15	4	31.69	0.72	0.073	0.004
4550	Royclarke	1977 HH1	12.80	0.15	3	14.75	0.70	0.066	0.008
4554	Fanynka	1986 UT	11.40	0.15	6	26.88	0.60	0.068	0.003
4557	Mika	1987 XD	11.70	0.15	1	20.60	1.39	0.087	0.012
4560	Klyuchevskij	1976 YD2	11.90	0.15	1	15.19	1.12	0.133	0.021
4562	Poleungkuk	1979 UD2	13.00	0.15	9	15.12	0.29	0.052	0.002
4567	Becvar	1982 SO1	13.30	0.15	4	11.29	0.44	0.070	0.006
4568	Menkaure	1983 RY3	11.90	0.15	2	16.80	1.30	0.110	0.018
4569	Baerbel	1985 GV1	11.80	0.15	1	13.50	0.92	0.185	0.027
4571	Grumiaux	1985 RY3	12.00	0.15	1	16.76	1.06	0.100	0.013
4573	Piestany	1986 TP6	11.70	0.15	1	19.86	1.33	0.094	0.013
4575	Broman	1987 ME1	11.40	0.15	4	15.04	0.67	0.239	0.025
4578	Kurashiki	1988 XL1	13.40	0.15	7	11.02	0.28	0.068	0.004
4582	Hank	1989 FW	12.60	0.15	5	16.49	0.40	0.062	0.004
4583	Lugo	1989 RL4	13.20	0.15	8	12.62	0.21	0.059	0.002
4588	Wislicenus	1931 EE	11.80	0.15	1	15.58	1.06	0.139	0.020
4597	Consolmagno	1983 UA1	12.10	0.15	3	15.17	0.57	0.118	0.010
4599	Rowan	1985 RZ2	12.70	0.15	1	12.89	0.98	0.088	0.014
4603	Bertaud	1986 WM3	11.90	0.15	8	23.87	0.33	0.055	0.002
4609	Pizarro	1988 CT3	11.50	0.15	6	27.18	0.58	0.062	0.003
4615	Zinner	A923 RH	12.30	0.15	1	12.33	0.76	0.140	0.018
4617	Zadunaisky	1976 DK	11.20	0.15	8	33.99	0.69	0.052	0.002
4618	Shakhovskoj	1977 RJ3	12.90	0.15	4	10.48	0.34	0.112	0.008
4628	Laplace	1986 RU4	11.00	0.15	4	21.54	0.61	0.155	0.010
4633		1988 AJ5	12.90	0.15	3	17.45	0.86	0.041	0.004
4642	Murchie	1990 QG4	12.10	0.15	1	17.98	1.04	0.079	0.010
4645	Tentaikojo	1990 SP4	12.60	0.15	1	13.62	1.16	0.087	0.015
4648	Tirion	1931 UE	13.20	0.15	1	16.16	0.97	0.036	0.005
4657	Lopez	1979 SU9	11.90	0.15	3	18.99	0.84	0.091	0.009
4662	Runk	1984 HL	12.30	0.15	2	15.34	0.86	0.104	0.014
4663	Falta	1984 SM1	12.00	0.15	5	29.48	0.71	0.033	0.002
4668		1987 DX5	11.70	0.15	3	14.78	0.70	0.175	0.018
4672	Takuboku	1988 HB	10.90	0.15	4	30.37	0.92	0.085	0.006
4677	Hiroshi	1990 SQ4	12.00	0.15	2	14.10	1.20	0.142	0.024
4679	Sybil	1990 TR4	11.70	0.15	1	17.70	1.21	0.118	0.017
4681	Ermak	1969 TC2	11.80	0.15	1	15.80	1.01	0.135	0.018
4685	Karetnikov	1978 SP6	12.50	0.15	5	18.82	0.62	0.051	0.004
4691	Toyen	1983 TU	13.50	0.15	1	4.76	0.59	0.311	0.078
4695		1985 RU3	12.10	0.15	1	13.04	0.93	0.150	0.022
4709	Ennomos	1988 TU2	8.90	0.15	4	80.03	2.17	0.078	0.005
4712	Iwaizumi	1989 QE	10.90	0.15	7	31.45	0.59	0.079	0.003
4713	Steel	1989 QL	12.80	0.15	1	5.62	0.53	0.424	0.082
4715		1989 TS1	9.30	0.15	6	65.93	1.80	0.079	0.005
4717	Kaneko	1989 WX	11.20	0.15	1	21.10	1.51	0.131	0.020
4722	Agelaos	4271 T-3	9.70	0.15	2	59.47	4.39	0.067	0.010
4723	Wolfgangmattig	1937 TB	13.80	0.15	2	11.29	0.73	0.042	0.006
4730	Xingmingzhou	1980 XZ	11.10	0.15	1	28.52	1.80	0.079	0.011
4731	Monicagrady	1981 EE9	14.10	0.15	3	13.48	0.80	0.024	0.003
4732	Froeschle	1981 JG	11.30	0.15	6	30.17	0.65	0.060	0.003
4741	Leskov	1985 VP3	11.80	0.15	3	16.74	0.84	0.124	0.013
4742	Caliumi	1986 WG	13.30	0.15	2	6.68	0.51	0.193	0.031
4744		1988 RF5	11.10	0.15	3	19.62	0.88	0.200	0.023
4746	Doi	1989 TP1	11.70	0.15	9	19.91	0.39	0.096	0.004
4750	Mukai	1990 XC1	13.60	0.15	6	9.48	0.27	0.078	0.005
4752	Myron	1309 T-2	12.20	0.15	4	15.65	0.59	0.096	0.008
4754	Panthoos	5010 T-3	10.10	0.15	3	56.96	2.84	0.051	0.005
4758	Hermitage	1978 SN4	12.10	0.15	4	19.65	0.61	0.070	0.005
4759	Aretta	1978 VG10	11.90	0.15	7	18.10	0.45	0.095	0.005
4768	Hartley	1988 PH1	11.30	0.15	8	38.01	0.58	0.038	0.001
4771	Hayashi	1989 RM2	12.60	0.15	2	12.64	0.79	0.103	0.014
4772		1989 VM	11.80	0.15	6	30.95	0.69	0.036	0.002
4778	Fuss	1978 TV8	12.80	0.15	1	12.40	1.06	0.087	0.015
4790	Petrpravec	1988 PP	11.80	0.15	1	14.53	1.05	0.160	0.024
4791	Iphidamas	1988 PB1	9.90	0.15	6	59.96	1.79	0.055	0.004
4801	Ohre	1989 UR4	12.50	0.15	5	17.21	0.51	0.061	0.004
4804	Pasteur	1989 XC1	11.60	0.15	7	21.38	0.40	0.089	0.004
4805	Asteropaios	1990 VH7	10.10	0.15	1	43.44	4.91	0.085	0.020
4808	Ballaero	1925 BA	12.00	0.15	7	20.81	0.45	0.068	0.003
4814	Casacci	1978 RW	12.70	0.15	2	16.55	1.06	0.053	0.007
4816	Connelly	1981 PK	12.80	0.15	2	8.06	0.50	0.210	0.028
4821	Bianucci	1986 EE5	12.50	0.15	2	17.71	1.24	0.057	0.008
4826	Wilhelms	1988 JO	12.20	0.15	1	7.59	0.52	0.405	0.059
4828	Misenus	1988 RV	10.00	0.15	3	43.22	2.53	0.098	0.012
4831	Baldwin	1988 RX11	12.40	0.15	1	18.46	1.30	0.057	0.008
4833	Meges	1989 AL2	9.10	0.15	5	89.39	2.27	0.054	0.003
4834	Thoas	1989 AM2	9.20	0.15	5	96.21	2.26	0.040	0.002
4836	Medon	1989 CK1	9.50	0.15	3	78.70	3.18	0.045	0.004
4837	Bickerton	1989 ME	11.60	0.15	6	26.48	0.66	0.061	0.004
4838	Billmclaughlin	1989 NJ	12.70	0.15	3	9.08	0.41	0.189	0.019
4840	Otaynang	1989 UY	11.90	0.15	5	26.97	0.64	0.045	0.002
4843	Megantic	1990 DR4	11.00	0.15	3	26.88	1.10	0.098	0.009
4845	Tsubetsu	1991 EC1	13.00	0.15	1	8.61	0.77	0.150	0.028
4848	Tutenchamun	3233 T-2	11.60	0.15	8	25.22	0.55	0.066	0.003
4860	Gubbio	1987 EP	11.80	0.15	7	21.28	0.35	0.076	0.003
4864		1988 RA5	13.20	0.15	1	15.50	1.09	0.039	0.006
4867	Polites	1989 SZ	9.40	0.15	5	64.29	1.82	0.078	0.005
4870	Shcherban'	1989 UK8	11.30	0.15	3	20.81	0.92	0.124	0.012
4889	Praetorius	1982 UW3	11.90	0.15	3	20.22	0.87	0.078	0.007
4891	Blaga	1984 GR	12.00	0.15	5	22.97	0.70	0.054	0.004
4893	Seitter	1986 PT4	11.80	0.15	1	16.10	1.21	0.130	0.020
4896	Tomoegozen	1986 YA	10.80	0.15	4	26.27	0.72	0.135	0.009
4899	Candace	1988 JU	13.60	0.15	1	8.56	0.66	0.087	0.014
4902	Thessandrus	1989 AN2	9.60	0.15	3	71.79	2.84	0.060	0.006
4903	Ichikawa	1989 UD	12.10	0.15	1	15.58	1.07	0.105	0.015
4907	Zoser	7618 P-L	12.10	0.15	4	25.27	0.82	0.040	0.003
4925	Zhoushan	1981 XH2	11.60	0.15	3	15.29	0.76	0.181	0.020
4930	Rephiltim	1983 AO2	11.00	0.15	8	34.37	0.60	0.061	0.002
4931	Tomsk	1983 CN3	12.00	0.15	2	8.47	0.54	0.407	0.056
4932	Texstapa	1984 EA1	12.00	0.15	3	25.85	1.03	0.042	0.004
4937	Lintott	1986 CL1	11.80	0.15	2	10.93	0.77	0.284	0.042
4944	Kozlovskij	1987 RP3	12.80	0.15	1	9.25	1.11	0.157	0.038
4946	Askalaphus	1988 BW1	9.90	0.15	3	66.10	2.73	0.046	0.004
4952	Kibeshigemaro	1990 FC1	11.50	0.15	7	22.89	0.52	0.087	0.004
4955	Gold	1990 SF2	11.30	0.15	5	23.02	0.57	0.104	0.006
4958	Wellnitz	1991 NT1	11.50	0.15	1	15.74	1.41	0.179	0.033
4959	Niinoama	1991 PA1	10.80	0.15	5	36.21	0.80	0.066	0.003
4963	Kanroku	1977 DR1	12.40	0.15	1	10.35	0.67	0.181	0.025
4967	Glia	1983 CF1	10.70	0.15	3	31.14	1.07	0.095	0.007
4973	Showa	1990 FT	11.30	0.15	4	30.82	0.92	0.057	0.004
4975	Dohmoto	1990 SZ1	11.80	0.15	4	17.34	0.64	0.120	0.011
4976	Choukyongchol	1991 PM	11.30	0.15	2	17.24	1.11	0.179	0.024
4997	Ksana	1986 TM	11.90	0.15	4	9.97	0.33	0.312	0.022
4998	Kabashima	1986 VG	11.60	0.15	1	19.32	1.16	0.109	0.014
5014	Gorchakov	1974 ST	12.30	0.15	1	22.32	1.11	0.043	0.005
5017	Tenchi	1977 DS2	12.40	0.15	2	23.08	1.44	0.036	0.005
5022	Roccapalumba	1984 HE1	11.70	0.15	6	35.61	0.73	0.031	0.001
5024	Bechmann	1985 VP	11.50	0.15	4	29.75	1.07	0.057	0.004

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
5036	Tuttle	1991 US2	11.40	0.15	1	25.40	1.96	0.075	0.012
5040	Rabinowitz	1972 RF	13.20	0.15	1	6.15	0.53	0.246	0.044
5042	Colpa	1974 ME	11.30	0.15	1	20.29	1.19	0.130	0.016
5043	Zadornov	1974 SB5	12.40	0.15	3	17.49	0.75	0.064	0.006
5045	Hoyin	1978 UL2	12.70	0.15	5	13.61	0.49	0.083	0.006
5048	Moriarty	1981 GC	13.20	0.15	1	14.90	0.81	0.042	0.005
5053	Chladni	1985 FB2	13.10	0.15	8	12.02	0.25	0.076	0.004
5057		1987 DC6	11.80	0.15	1	19.56	1.21	0.088	0.012
5065	Johnstone	1990 FP1	12.90	0.15	3	14.15	0.64	0.065	0.007
5070	Arai	1991 XT	11.10	0.15	5	29.99	0.82	0.072	0.004
5074	Goetzoertel	1949 QQ1	11.70	0.15	1	14.87	1.04	0.167	0.025
5076	Lebedev-Kumach	1973 SG4	13.00	0.15	3	6.86	0.35	0.239	0.026
5079	Brubeck	1975 DB	12.60	0.15	4	16.21	0.79	0.062	0.006
5081	Sanguin	1976 WC1	12.10	0.15	5	17.32	0.32	0.091	0.004
5091	Isakovskij	1981 SD4	12.10	0.15	3	17.28	0.86	0.088	0.009
5092	Manara	1982 FJ	11.00	0.15	2	24.59	1.57	0.117	0.016
5095	Escalante	1983 NL	13.20	0.15	9	10.85	0.21	0.083	0.004
5102	Benfranklin	1986 RD1	12.70	0.15	1	15.21	1.19	0.064	0.010
5103	Divis	1986 RP1	12.60	0.15	1	13.77	1.07	0.085	0.014
5104	Skripnichenko	1986 RU5	11.60	0.15	1	10.40	0.79	0.374	0.059
5115	Frimout	1988 CD4	12.30	0.15	1	11.94	1.05	0.149	0.027
5126	Achaemenides	1989 CH2	10.10	0.15	1	48.57	4.08	0.068	0.012
5128	Wakabayashi	1989 FJ	12.20	0.15	3	16.13	0.66	0.090	0.008
5130	Ilioneus	1989 SC7	9.80	0.15	1	52.49	3.94	0.077	0.012
5133	Phillipadams	1990 PA	11.50	0.15	3	23.01	1.00	0.084	0.008
5134	Ebilson	1990 SM2	12.00	0.15	1	11.49	1.05	0.212	0.040
5136	Baggaley	1990 UG2	11.60	0.15	2	13.18	0.99	0.236	0.037
5140	Kida	1990 XH	11.40	0.15	9	21.26	0.42	0.115	0.005
5142	Okutama	1990 YD	11.80	0.15	2	7.32	0.53	0.632	0.097
5143	Heracles	1991 VL	14.00	0.15	1	3.28	0.09	0.412	0.030
5144	Achates	1991 XX	8.90	0.15	3	89.85	3.90	0.061	0.006
5146	Moiwa	1992 BP	11.90	0.15	8	14.75	0.32	0.146	0.007
5149	Leibniz	6582 P-L	12.60	0.15	1	11.53	1.03	0.121	0.022
5153		1940 GO	11.20	0.15	6	31.67	0.56	0.059	0.002
5154	Leonov	1969 TL1	12.20	0.15	1	14.68	1.09	0.108	0.017
5155	Denisyuk	1972 HR	11.90	0.15	1	14.69	1.15	0.142	0.023
5158	Ogarev	1976 YY	14.10	0.15	2	7.78	0.66	0.067	0.012
5162	Piemonte	1982 BW	11.50	0.15	1	13.25	1.30	0.253	0.051
5166	Olson	1985 FU1	13.00	0.15	2	11.59	0.73	0.083	0.012
5167	Joeharms	1985 GU1	12.30	0.15	6	16.92	0.34	0.076	0.003
5171	Augustesen	1987 SQ3	13.20	0.15	5	9.41	0.33	0.108	0.008
5176	Yoichi	1989 AU	12.20	0.15	2	19.49	1.15	0.061	0.008
5177	Hugowolf	1989 AY6	13.90	0.15	1	11.29	0.80	0.038	0.006
5183	Robyn	1990 OA1	11.90	0.15	3	11.61	0.61	0.253	0.029
5185	Alerossi	1990 RV2	12.20	0.15	1	12.63	1.16	0.146	0.028
5186	Donalu	1990 SB4	11.80	0.15	1	11.31	1.01	0.263	0.049
5192	Yabuki	1991 CC	10.40	0.15	9	36.75	0.51	0.091	0.003
5193	Tanakawataru	1992 ET	11.80	0.15	1	25.66	1.81	0.051	0.008
5198	Fongyunwah	1975 BP1	12.10	0.15	3	15.53	0.72	0.107	0.011
5199	Dortmund	1981 RP2	12.10	0.15	2	12.77	0.73	0.158	0.020
5209		1989 CW1	10.10	0.15	2	46.68	3.76	0.074	0.012
5212		1989 SS	11.60	0.15	1	13.40	1.05	0.225	0.037
5215	Tsurui	1991 AE	11.20	0.15	3	12.80	0.59	0.365	0.037
5222	Ioffe	1980 TL13	11.00	0.15	4	22.46	0.69	0.139	0.009
5228	Maca	1986 VT	12.20	0.15	1	11.70	0.99	0.170	0.030
5229		1987 DE6	11.80	0.15	3	18.19	0.74	0.105	0.009
5231	Verne	1988 JV	11.10	0.15	4	13.48	0.44	0.376	0.028
5232	Jordaens	1988 PR1	12.00	0.15	4	12.64	0.52	0.202	0.020
5234	Sechenov	1989 VP	11.40	0.15	2	15.12	0.98	0.213	0.029
5241		1990 YL	11.90	0.15	2	18.52	1.04	0.090	0.011
5247	Krylov	1982 UP6	12.50	0.15	4	10.44	0.37	0.171	0.013
5254	Ulysses	1986 VG1	9.20	0.15	4	80.00	2.59	0.058	0.004
5255	Johnsophie	1988 KF	12.10	0.15	4	18.14	0.66	0.093	0.008
5259	Epeigeus	1989 BB1	10.30	0.15	3	44.42	2.34	0.069	0.008
5262	Brucegoldberg	1990 XB1	10.90	0.15	6	31.62	0.58	0.079	0.003
5263	Arrius	1991 GY9	11.60	0.15	5	23.91	0.71	0.072	0.005
5264	Telephus	1991 KC	9.50	0.15	2	81.38	4.78	0.043	0.005
5266	Rauch	4047 T-2	13.90	0.15	2	9.21	0.91	0.059	0.012
5274	Degewij	1985 RS	12.30	0.15	2	18.80	0.99	0.064	0.007
5283	Pyrrhus	1989 BW	9.30	0.15	3	69.93	3.30	0.072	0.007
5285	Krethon	1989 EO11	9.80	0.15	2	52.61	3.58	0.077	0.011
5290	Langevin	1990 OD4	11.80	0.15	3	16.83	0.81	0.122	0.013
5292		1991 AJ1	11.90	0.15	1	9.90	0.73	0.313	0.048
5295	Masayo	1991 CE	11.50	0.15	3	16.82	0.89	0.158	0.018
5299	Bittesini	1969 LB	11.90	0.15	3	18.92	1.02	0.089	0.010
5301	Novobranets	1974 SD3	11.30	0.15	3	24.86	1.17	0.091	0.010
5304	Bazhenov	1978 TA7	12.00	0.15	2	20.78	1.33	0.066	0.009
5316	Filatov	1982 UB7	11.50	0.15	5	27.86	0.75	0.058	0.003
5320	Lisbeth	1985 VD	12.10	0.15	3	16.75	0.77	0.092	0.009
5325	Silver	1988 JQ	12.50	0.15	7	8.72	0.20	0.234	0.012
5327		1989 EX1	13.70	0.15	4	12.52	0.36	0.039	0.003
5329	Decaro	1989 YP	12.40	0.15	10	14.45	0.23	0.097	0.003
5330	Senrikyu	1990 BQ1	11.80	0.15	5	13.10	0.41	0.201	0.014
5331	Erimomisaki	1990 BT1	12.00	0.15	8	10.57	0.15	0.253	0.009
5333	Kanaya	1990 UH	13.10	0.15	4	14.21	0.41	0.051	0.003
5336		1991 JE1	11.80	0.15	3	24.36	0.87	0.059	0.004
5337	Aoki	1991 LD	11.50	0.15	7	35.58	0.76	0.036	0.002
5348	Kennoguchi	1988 BB	12.70	0.15	5	17.44	0.47	0.051	0.003
5356		1991 FF1	12.20	0.15	2	9.39	0.70	0.273	0.044
5357	Sekiguchi	1992 EL	10.90	0.15	1	15.19	1.13	0.334	0.052
5358		1992 QH	11.50	0.15	4	14.49	0.51	0.221	0.017
5361	Goncharov	1976 YC2	11.50	0.15	6	26.12	0.65	0.071	0.004
5362		1978 CH	11.50	0.15	2	21.93	1.57	0.093	0.014
5364		1980 RC1	12.90	0.15	4	12.80	0.43	0.076	0.005
5368	Vitagliano	1984 SW5	11.00	0.15	1	38.23	2.52	0.048	0.007
5374	Hokutosei	1989 AM1	11.20	0.15	4	32.29	0.90	0.060	0.004
5384	Changjiangcun	1957 VA	13.80	0.15	9	8.96	0.17	0.069	0.003
5397	Vojislava	1988 VB5	12.70	0.15	1	13.84	0.97	0.077	0.011
5399	Awa	1989 BT	11.90	0.15	9	19.77	0.37	0.087	0.004
5404	Uemura	1991 EE1	12.50	0.15	2	9.44	0.66	0.199	0.029
5406	Jonjoseph	1991 PH11	12.00	0.15	1	15.69	0.88	0.114	0.014
5407		1992 AX	13.90	0.15	6	4.18	0.12	0.294	0.019
5416	Estremadoyro	1978 VE5	12.20	0.15	5	19.28	0.49	0.068	0.004
5418	Joyce	1981 QG1	13.00	0.15	4	14.79	0.45	0.055	0.004
5422	Hodgkin	1982 YL1	12.30	0.15	1	17.09	1.45	0.073	0.013
5430	Luu	1988 JA1	12.80	0.15	6	8.05	0.22	0.212	0.012
5431	Maxinehelin	1988 MB	13.00	0.15	2	7.36	0.48	0.228	0.034
5435	Kameoka	1990 BS1	11.40	0.15	10	24.69	0.41	0.081	0.003
5438	Lorre	1990 QJ	11.20	0.15	8	30.13	0.37	0.069	0.002
5439	Couturier	1990 RW	11.70	0.15	4	26.85	0.96	0.054	0.004
5441		1991 JZ1	11.40	0.15	1	20.70	1.18	0.114	0.014
5443	Encrenaz	1991 NX1	12.90	0.15	3	13.37	0.64	0.083	0.009
5445	Williwaw	1991 PA12	12.30	0.15	2	8.99	0.64	0.263	0.039
5450	Sokrates	2780 P-L	12.00	0.15	3	24.44	1.05	0.049	0.005
5457	Queen's	1980 TW5	12.40	0.15	3	21.32	0.99	0.044	0.004
5458	Aizman	1980 TB12	11.70	0.15	1	25.09	1.38	0.059	0.007
5461	Autumn	1983 HB1	11.30	0.15	8	25.35	0.46	0.087	0.003
5467		1988 AG	12.90	0.15	2	14.84	0.74	0.056	0.006
5468	Hamatonbetsu	1988 BK	11.70	0.15	5	23.61	0.68	0.069	0.004
5471	Tunguska	1988 PK1	12.00	0.15	1	18.42	1.22	0.083	0.012
5484	Inoda	1990 VH1	12.60	0.15	6	10.27	0.29	0.167	0.011
5488	Kiyosato	1991 VK5	11.30	0.15	1	18.96	1.17	0.148	0.019
5492	Thoma	3227 T-1	12.40	0.15	2	12.01	0.85	0.135	0.020
5495	Rumyantsev	1972 RY3	11.10	0.15	3	25.79	1.24	0.108	0.012
5502	Brashear	1984 EC	12.60	0.15	1	9.41	0.75	0.182	0.030
5505	Rundetaarn	1986 VD1	11.60	0.15	4	22.18	0.60	0.086	0.005
5506		1987 SV11	13.20	0.15	3	13.20	0.66	0.054	0.005
5508	Gomyou	1988 EB	12.00	0.15	6	15.13	0.33	0.124	0.006
5519	Lellouch	1990 QB4	12.30	0.15	1	19.67	1.43	0.055	0.008
5528		1992 AJ	10.90	0.15	3	24.85	1.08	0.126	0.012
5539	Limporyen	1965 UA1	13.60	0.15	1	10.15	1.04	0.062	0.013
5553	Chodas	1984 CM1	13.00	0.15	1	9.71	0.73	0.118	0.019
5556		1988 AL	13.40	0.15	1	9.71	0.78	0.082	0.014
5567	Durisen	1953 FK1	10.80	0.15	3	33.93	1.01	0.075	0.005
5572	Bliskunov	1978 SS2	12.00	0.15	4	21.24	0.83	0.068	0.006
5573		1981 QX	13.40	0.15	4	10.82	0.34	0.069	0.005
5576	Albanese	1986 UM1	12.20	0.15	6	22.84	0.59	0.047	0.003
5591	Koyo	1990 VF2	12.50	0.15	1	14.73	1.20	0.081	0.014
5592	Oshima	1990 VB4	11.50	0.15	3	22.96	0.87	0.086	0.007
5594	Jimmiller	1991 NK1	11.50	0.15	6	24.66	0.64	0.082	0.005
5603	Rausudake	1992 CE	10.50	0.15	2	43.74	2.24	0.058	0.006
5605	Kushida	1993 DB	13.20	0.15	1	7.98	0.58	0.146	0.022
5611		1943 DL	12.40	0.15	2	13.96	0.97	0.101	0.014
5616	Vogtland	1987 ST10	13.50	0.15	1	9.63	0.78	0.076	0.013
5623	Iwamori	1990 UY	11.70	0.15	1	13.25	1.06	0.210	0.035
5625		1991 AO2	12.30	0.15	1	16.64	0.81	0.077	0.008
5626		1991 FE	14.70	0.15	7	3.58	0.08	0.188	0.010
5629	Kuwana	1993 DA1	11.40	0.15	1	15.63	1.37	0.199	0.036
5638	Deikoon	1988 TA3	10.00	0.15	1	63.33	3.32	0.044	0.005
5639		1989 PE	14.10	0.15	1	5.87	0.47	0.117	0.019
5647		1990 TZ	11.30	0.15	1	10.41	0.67	0.493	0.067
5650	Mochihito-o	1990 XK	11.80	0.15	1	12.10	1.25	0.230	0.049
5651	Traversa	1991 CA2	11.70	0.15	8	32.12	0.52	0.036	0.001
5652	Amphimachus	1992 HS3	9.80	0.15	1	52.48	3.67	0.077	0.011
5654	Terni	1993 KG	12.10	0.15	8	20.11	0.35	0.066	0.002
5658	Clausbaader	1950 DO	12.80	0.15	3	19.27	0.78	0.039	0.004
5661	Hildebrand	1977 PO1	10.80	0.15	5	42.29	1.26	0.049	0.003
5666	Rabelais	1982 TP1	13.20	0.15	8	15.17	0.30	0.043	0.002
5670	Rosstaylor	1985 VF2	11.30	0.15	3	27.40	1.18	0.072	0.007
5676	Voltaire	1986 RH12	12.40	0.15	5	10.88	0.34	0.170	0.012
5685	Sanenobufukui	1990 XA	11.70	0.15	2	13.78	1.03	0.224	0.045
5704	Schumacher	1950 DE	11.80	0.15	5	24.87	0.70	0.058	0.004
5711	Eneev	1978 SO4	11.10	0.15	3	34.78	1.79	0.055	0.006
5750	Kandatai	1991 GG1	11.30	0.15	1	15.16	1.13	0.232	0.036
5755		1992 OP7	11.50	0.15	1	16.34	1.60	0.166	0.033
5757	Ticha	1967 JN	12.00	0.15	4	22.22	0.66	0.060	0.004
5764		1985 CS1	13.20	0.15	1	5.82	0.48	0.274	0.047
5765	Izett	1986 GU	12.90	0.15	3	7.92	0.41	0.195	0.021
5768	Pittich	1986 TN1	13.00	0.15	2	11.63	0.77	0.082	0.011
5771	Somerville	1987 ST1	12.40	0.15	1	33.60	2.18	0.017	0.002
5780	Lafontaine	1990 EJ2	11.80	0.15	2	23.51	1.55	0.061	0.009
5788		1992 NJ	12.20	0.15	1	20.40	1.46	0.056	0.008
5792	Unstrut	1964 BF	13.60	0.15	1	15.01	1.19	0.028	0.005
5801	Vasarely	1984 BK	13.10	0.15	1	10.57	0.87	0.091	0.016
5803	Otzi	1984 OA	12.00	0.15	6	15.75	0.33	0.118	0.006
5820	Babelsberg	1989 UF7	13.60	0.15	1	10.25	0.68	0.061	0.009
5824	Inagaki	1989 YM	12.40	0.15	1	9.53	0.75	0.213	0.035
5825	Rakuyou	1990 BR1	12.50	0.15	1	10.79	0.73	0.152	0.022
5826		1990 DB	11.50	0.15	6	18.28	0.48	0.135	0.008
5832	Martaprincipe	1991 LE1	11.60	0.15	6	20.02	0.53	0.103	0.006
5833	Peterson	1991 PQ	10.70	0.15	6	34.30	0.77	0.080	0.004
5839	GOI	1974 SJ3	11.80	0.15	6	29.22	0.64	0.044	0.002
5840	Raybrown	1978 ON	12.20	0.15	1	13.33	0.87	0.131	0.018
5845		1988 QP	12.20	0.15	2	16.49	1.27	0.089	0.015
5849		1990 HF1	10.20	0.15	3	30.42	1.06	0.163	0.013
5852	Nanette	1991 HO	12.30	0.15	6	25.83	0.62	0.033	0.002
5854		1992 UP	11.30	0.15	2	15.81	1.14	0.218	0.033
5870	Baltimore	1989 CC1	12.90	0.15	1	7.00	0.51	0.249	0.038
5884	Dolezal	6045 P-L	13.10	0.15	6	13.94	0.45	0.055	0.004
5885	Apeldoorn	3137 T-2	11.90	0.15	1	17.79	1.45	0.097	0.016
5886	Rutger	1975 LR	11.60	0.15	4	16.61	0.67	0.149	0.013
5889	Mickiewicz	1979 FA3	11.70	0.15	8	22.83	0.48	0.076	0.004
5890	Carlsberg	1979 KG	12.10	0.15	3	10.31	0.49	0.241	0.025
5898		1985 KE	13.10	0.15	2	15.00	1.09	0.045	0.007
5900	Jensen	1986 TL	12.10	0.15	4	24.36	0.80	0.045	0.004
5914	Kathywhaler	1990 WK	10.80	0.15	4	39.23	1.19	0.056	0.004
5919	Patrickmartin	1991 PW12	11.60	0.15	1	13.41	1.12	0.225	0.039
5922	Shouichi	1992 UV	11.80	0.15	7	27.94	0.65	0.044	0.002
5924	Teruo	1994 CH1	13.00	0.15	5	14.78	0.49	0.054	0.004
5931	Zhvanetskij	1976 GK3	11.50	0.15	2	23.40	1.73	0.081	0.013

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
5936	Khadzhinov	1979 FQ2	11.90	0.15	1	16.76	1.23	0.109	0.017
5947	Bonnie	1985 FD	12.50	0.15	3	12.51	0.57	0.115	0.011
5959	Shaklan	1989 NB1	11.00	0.15	2	21.29	1.18	0.157	0.019
5964		1990 QN4	12.00	0.15	1	17.18	1.09	0.095	0.013
5999	Plescia	1987 HA	14.30	0.15	1	10.99	0.71	0.028	0.004
6005		1989 BD	12.30	0.15	1	12.40	0.77	0.138	0.018
6025	Naotosato	1992 YA3	11.20	0.15	3	19.90	0.91	0.162	0.016
6031	Ryokan	1982 BQ4	11.60	0.15	2	14.61	1.33	0.189	0.035
6033		1984 SQ4	12.20	0.15	1	20.04	1.12	0.058	0.007
6038		1989 EQ	12.20	0.15	2	25.62	1.78	0.036	0.005
6039	Parmenides	1989 RS	11.30	0.15	1	24.65	1.53	0.088	0.012
6042	Cheshirecat	1990 WW2	12.30	0.15	6	14.12	0.20	0.109	0.004
6052	Junichi	1992 CE1	11.00	0.15	3	28.26	1.03	0.089	0.007
6056	Donatello	2318 T-3	13.20	0.15	5	10.45	0.34	0.087	0.006
6057	Robbia	5182 T-3	11.10	0.15	3	29.77	1.14	0.073	0.006
6059		1979 TA	14.50	0.15	4	8.70	0.40	0.043	0.005
6072	Hooghoudt	1280 T-1	12.00	0.15	1	16.70	1.33	0.100	0.017
6076	Plavec	1980 CR	12.80	0.15	9	17.93	0.29	0.042	0.002
6079	Gerokurat	1981 DG3	11.30	0.15	1	22.59	1.54	0.105	0.015
6088	Hoshigakubo	1988 UH	12.50	0.15	2	18.61	1.04	0.053	0.006
6090		1989 DJ	9.40	0.15	4	81.92	2.45	0.046	0.003
6094	Hisako	1990 VQ1	12.50	0.15	3	9.89	0.55	0.201	0.026
6103		1993 HV	11.80	0.15	8	32.07	0.53	0.033	0.001
6111	Davemckay	1979 SP13	12.90	0.15	12	13.18	0.20	0.080	0.003
6113	Tsap	1982 SX5	12.60	0.15	2	12.64	0.86	0.104	0.015
6125		1989 CN	13.70	0.15	1	7.19	0.64	0.113	0.021
6128	Lasorda	1989 LA	13.00	0.15	5	15.02	0.40	0.050	0.003
6129	Demokritos	1989 RB2	12.30	0.15	2	14.32	0.84	0.106	0.014
6135	Billowen	1990 RD9	12.70	0.15	1	12.98	0.99	0.087	0.014
6137	Johnfletcher	1991 BY	11.00	0.15	8	29.65	0.57	0.082	0.004
6150	Neukum	1980 FR1	12.20	0.15	2	14.70	1.09	0.108	0.017
6152	Empedocles	1989 GB3	12.70	0.15	2	9.50	0.63	0.210	0.038
6175	Cori	1983 XW	12.60	0.15	3	14.72	0.73	0.075	0.008
6222		1980 PB3	11.30	0.15	8	29.38	0.57	0.063	0.003
6223	Dahl	1980 RD1	12.60	0.15	4	18.80	0.71	0.048	0.004
6237	Chikushi	1989 CV	11.50	0.15	4	33.23	1.16	0.041	0.003
6248		1991 BM2	13.10	0.15	3	14.01	0.72	0.053	0.006
6255	Kuma	1994 XT	12.50	0.15	6	17.86	0.52	0.058	0.004
6273	Kiruna	1992 ER31	13.60	0.15	8	9.17	0.21	0.079	0.004
6297		1988 VZ1	11.60	0.15	4	17.41	0.64	0.136	0.011
6301		1989 BR1	11.80	0.15	3	17.90	0.81	0.123	0.013
6306	Nishimura	1989 UL3	12.20	0.15	8	21.88	0.40	0.050	0.002
6327		1991 GP1	11.90	0.15	1	14.08	1.12	0.155	0.026
6328		1991 NL1	11.90	0.15	4	20.53	0.77	0.075	0.006
6332	Vorarlberg	1992 FP3	12.90	0.15	1	9.23	0.97	0.144	0.031
6338	Isaosato	1992 UO4	11.80	0.15	5	23.03	0.69	0.065	0.004
6340	Kathmandu	1993 TF2	12.00	0.15	5	20.82	0.57	0.067	0.004
6349	Acapulco	1995 CN1	12.00	0.15	5	22.54	0.69	0.057	0.004
6350	Schluter	3526 P-L	11.60	0.15	1	20.50	1.61	0.096	0.016
6354	Vangelis	1934 GA	11.80	0.15	1	10.30	0.66	0.318	0.043
6355	Univermoscow	1969 TX5	11.30	0.15	5	24.09	0.73	0.097	0.006
6356	Tairov	1976 QR	12.60	0.15	1	9.47	0.66	0.180	0.026
6357	Glushko	1976 SK3	12.20	0.15	2	14.39	1.05	0.115	0.018
6359	Dubinin	1977 AZ1	11.50	0.15	8	36.11	0.64	0.035	0.001
6371	Heinlein	1985 GS	11.60	0.15	3	23.05	0.83	0.077	0.006
6372	Walker	1985 JW1	11.10	0.15	5	42.82	0.89	0.036	0.002
6374	Beslan	1986 PY4	11.70	0.15	2	22.27	1.61	0.074	0.011
6375	Fredharris	1986 TB5	12.40	0.15	2	16.61	1.19	0.072	0.011
6383	Tokushima	1988 XU1	11.40	0.15	2	14.48	1.08	0.232	0.036
6392	Takashimizuno	1990 HR	11.00	0.15	3	28.02	0.98	0.094	0.007
6397		1991 BJ	13.20	0.15	1	7.21	0.92	0.178	0.046
6404	Vanavara	1991 PS6	12.90	0.15	1	24.52	1.67	0.020	0.003
6408	Saijo	1992 UT5	11.60	0.15	1	9.86	1.21	0.417	0.104
6410	Fujiwara	1992 WO4	12.20	0.15	2	16.28	1.07	0.090	0.013
6415		1993 VR3	11.80	0.15	1	16.55	1.25	0.123	0.019
6425		1994 WZ3	11.80	0.15	7	12.19	0.26	0.231	0.011
6432	Temirkanov	1975 TR2	12.50	0.15	8	23.38	0.51	0.034	0.002
6459	Hidesan	1992 UY5	12.30	0.15	1	10.34	1.40	0.199	0.055
6465	Zvezdotchet	1995 EP	12.20	0.15	4	21.04	0.55	0.053	0.003
6467	Prilepina	1979 TS2	12.90	0.15	1	14.29	0.96	0.060	0.009
6472	Rosema	1985 TL	12.50	0.15	1	11.14	0.99	0.142	0.026
6474	Choate	1987 SG1	14.00	0.15	4	8.99	0.33	0.057	0.005
6475	Refugium	1987 SZ6	10.40	0.15	3	33.02	1.28	0.116	0.010
6476		1987 VT	11.80	0.15	2	14.33	1.22	0.191	0.038
6479	Leoconnolly	1988 LC	12.70	0.15	1	15.33	1.22	0.063	0.010
6485	Wendeesther	1990 UR1	14.10	0.15	1	5.33	0.34	0.143	0.019
6516	Gruss	1988 TC2	14.70	0.15	2	5.99	0.48	0.065	0.011
6518	Vernon	1990 FR	12.40	0.15	4	12.94	0.35	0.118	0.007
6541	Yuan	1984 DY	12.30	0.15	1	16.16	1.08	0.081	0.011
6542	Jacquescousteau	1985 CH1	13.80	0.15	5	8.51	0.33	0.074	0.006
6546	Kaye	1987 DY4	11.40	0.15	1	22.02	1.49	0.100	0.014
6548		1988 BO4	11.20	0.15	1	18.02	1.22	0.180	0.026
6557	Yokonomura	1990 VR3	12.10	0.15	1	22.94	1.26	0.049	0.006
6559	Nomura	1991 JP	14.10	0.15	5	10.52	0.33	0.037	0.003
6570	Tomohiro	1994 JO	12.10	0.15	1	23.20	1.56	0.047	0.007
6572	Carson	1938 SX	12.40	0.15	1	9.21	0.57	0.228	0.030
6574	Gvishiani	1976 QE1	11.50	0.15	6	30.45	0.62	0.048	0.002
6576	Kievtech	1978 RK1	12.50	0.15	4	15.48	0.59	0.079	0.007
6582	Flagsymphony	1981 VS	12.70	0.15	1	17.81	1.38	0.046	0.007
6583	Destinn	1984 DE	12.40	0.15	2	16.21	1.12	0.074	0.011
6590	Barolo	1985 TA2	11.60	0.15	1	12.96	1.10	0.241	0.042
6603	Marycragg	1990 KG	12.70	0.15	2	11.63	0.71	0.109	0.014
6606	Makino	1990 UF	12.40	0.15	4	14.63	0.59	0.094	0.008
6613	Williamcarl	1994 LK	12.30	0.15	4	17.10	0.67	0.075	0.007
6614	Antisthenes	6530 P-L	13.50	0.15	4	13.10	0.47	0.042	0.003
6618		1936 SO	13.30	0.15	7	10.59	0.22	0.076	0.003
6619	Kolya	1973 SS4	10.70	0.15	6	35.00	0.88	0.095	0.006
6621	Timchuk	1975 VN5	13.50	0.15	3	14.78	0.68	0.035	0.004
6622	Matvienko	1978 RG1	13.20	0.15	1	9.88	0.86	0.095	0.017
6625	Nyquist	1981 EX41	12.90	0.15	1	9.85	1.27	0.126	0.033
6631	Pyatnitskij	1983 RQ4	13.10	0.15	4	15.17	0.49	0.045	0.003
6634		1987 KB	12.90	0.15	1	12.46	0.68	0.079	0.009
6639	Marchis	1989 SO8	12.40	0.15	1	15.09	1.18	0.085	0.014
6643	Morikubo	1990 VZ	12.40	0.15	3	15.18	0.69	0.092	0.010
6649	Yokotatakao	1991 RN	12.90	0.15	1	7.48	0.55	0.218	0.034
6652		1991 SJ1	12.80	0.15	1	10.20	0.95	0.129	0.025
6655	Nagahama	1992 EL1	11.40	0.15	1	19.55	1.19	0.127	0.017
6661	Ikemura	1993 BO	13.20	0.15	8	10.92	0.23	0.087	0.004
6662		1993 BP13	11.40	0.15	1	11.34	1.17	0.378	0.080
6673	Degas	2246 T-1	13.00	0.15	8	12.31	0.21	0.076	0.003
6674	Cezanne	4272 T-1	13.40	0.15	4	11.40	0.40	0.060	0.004
6683	Karachentsov	1976 GQ2	11.40	0.15	2	18.00	1.16	0.161	0.024
6693		1986 CC2	13.80	0.15	7	8.91	0.19	0.071	0.004
6696	Eubanks	1986 RC1	12.80	0.15	1	12.07	0.77	0.092	0.012
6698	Malhotra	1987 SL1	13.60	0.15	3	8.25	0.45	0.097	0.011
6702		1988 BP3	12.60	0.15	1	11.25	0.83	0.127	0.020
6708	Bobbievaile	1989 AA5	12.80	0.15	3	9.07	0.41	0.164	0.016
6712	Hornstein	1990 DS1	14.20	0.15	1	8.48	0.85	0.051	0.010
6716		1990 RO1	12.80	0.15	2	16.12	1.17	0.052	0.007
6720	Gifu	1990 VP2	11.50	0.15	5	15.40	0.52	0.201	0.015
6723	Chrisclark	1991 CL3	11.50	0.15	1	20.07	1.32	0.110	0.015
6724		1991 CX5	11.80	0.15	6	25.71	0.52	0.053	0.002
6739	Tarendo	1993 FU38	13.10	0.15	1	16.70	1.25	0.036	0.006
6746	Zagar	1994 NP	12.70	0.15	1	6.04	0.80	0.403	0.108
6748	Bratton	1995 UV30	12.90	0.15	4	12.04	0.39	0.085	0.006
6752	Ashley	4150 T-1	13.50	0.15	2	9.76	0.73	0.075	0.011
6758	Jesseowens	1980 GL	13.50	0.15	6	12.11	0.36	0.049	0.003
6769	Brokoff	1985 CJ1	13.30	0.15	1	12.79	0.66	0.052	0.006
6777	Balakirev	1989 SV1	12.70	0.15	1	9.93	0.84	0.149	0.026
6785		1990 VA7	11.10	0.15	6	27.34	0.75	0.088	0.005
6786	Doudantsutsuji	1991 DT	12.40	0.15	1	14.96	1.15	0.087	0.014
6794	Masuisakura	1992 DK	11.00	0.15	9	28.83	0.37	0.088	0.003
6806	Kaufmann	6048 P-L	13.40	0.15	1	10.78	0.87	0.066	0.011
6857		1990 QQ	13.60	0.15	5	8.39	0.26	0.091	0.006
6860	Sims	1991 CS1	12.70	0.15	1	14.41	1.01	0.071	0.010
6862	Virgiliomarcon	1991 GL	11.40	0.15	5	29.19	0.78	0.058	0.003
6868	Seiyauyeda	1992 HD	13.00	0.15	2	18.00	1.17	0.035	0.005
6869	Funada	1992 JP	11.40	0.15	1	31.93	1.42	0.048	0.005
6879	Hyogo	1994 TC15	12.20	0.15	2	15.96	1.22	0.093	0.015
6883	Hiuchigatake	1996 AF	12.70	0.15	1	11.36	1.00	0.114	0.021
6895		1987 DG6	13.50	0.15	1	12.02	1.15	0.049	0.010
6905	Miyazaki	1990 TW	11.40	0.15	6	13.65	0.32	0.275	0.015
6910	Ikeguchi	1991 FJ	12.30	0.15	1	12.29	1.32	0.141	0.031
6916	Lewispearce	1992 OJ	12.00	0.15	4	11.62	0.38	0.210	0.015
6924	Fukui	1993 TP	11.20	0.15	4	33.27	1.07	0.055	0.004
6925	Susumu	1993 UW2	12.30	0.15	6	23.71	0.51	0.039	0.002
6930		1994 VJ3	12.30	0.15	1	9.50	1.15	0.235	0.058
6933	Azumayasan	1994 YW	13.40	0.15	3	13.32	0.53	0.044	0.004
6934		1994 YN2	12.00	0.15	2	11.76	0.68	0.203	0.025
6937	Valadon	1010 T-2	12.10	0.15	1	12.84	1.02	0.155	0.026
6952	Niccolo	1986 JT	13.10	0.15	3	16.25	0.60	0.039	0.003
6953	Davepierce	1986 PC1	12.20	0.15	1	17.28	1.10	0.078	0.011
6975	Hiroaki	1992 QM	12.50	0.15	8	21.47	0.36	0.043	0.002
6979	Shigefumi	1993 RH	12.40	0.15	5	11.39	0.31	0.151	0.009
6982		1993 UA3	12.60	0.15	4	9.93	0.39	0.170	0.014
6984	Lewiscarroll	1994 AO	10.80	0.15	2	41.04	2.79	0.051	0.007
6990	Toya	1994 XU4	12.30	0.15	1	16.11	1.14	0.082	0.012
6992	Minano-machi	1995 BT1	11.30	0.15	2	14.98	1.18	0.238	0.039
7019	Tagayuichan	1992 EM1	13.20	0.15	1	10.49	0.83	0.084	0.014
7036	Kentarohirata	1995 BH3	11.80	0.15	3	20.40	0.65	0.088	0.006
7037	Davidlean	1995 BK3	11.20	0.15	6	18.12	0.52	0.195	0.013
7050		1982 FE3	13.00	0.15	5	16.60	0.44	0.041	0.002
7052		1988 VQ2	12.40	0.15	2	10.25	0.68	0.184	0.026
7065		1992 PU2	12.40	0.15	1	16.45	1.03	0.072	0.010
7071		1995 BH4	12.70	0.15	5	18.00	0.55	0.045	0.003
7083	Kant	1989 CL3	12.50	0.15	6	13.19	0.34	0.105	0.006
7085		1991 PE	12.50	0.15	2	12.87	0.89	0.106	0.015
7096	Napier	1992 VM	15.30	0.15	15	5.10	0.07	0.053	0.002
7102	Neilbone	1936 NB	12.30	0.15	9	21.87	0.36	0.045	0.002
7108	Nefedov	1981 RM3	13.00	0.15	1	7.34	0.98	0.207	0.056
7110	Johnpearse	1983 XH1	12.50	0.15	7	18.94	0.41	0.050	0.002
7113	Ostapbender	1986 SD2	11.60	0.15	3	16.37	0.81	0.159	0.017
7114	Weinek	1986 WN7	13.20	0.15	2	17.59	1.73	0.030	0.006
7119	Hiera	1989 AV2	9.80	0.15	1	77.29	4.66	0.036	0.005
7124	Glinos	1990 OJ4	11.00	0.15	1	15.96	1.21	0.276	0.044
7128	Misawa	1991 SM1	12.80	0.15	1	12.49	1.02	0.086	0.015
7131	Longtom	1992 YL	11.40	0.15	3	35.62	1.30	0.039	0.003
7132	Casulli	1993 SE	13.80	0.15	1	7.32	0.48	0.100	0.014
7133	Kasahara	1993 TX1	12.80	0.15	2	10.12	0.67	0.147	0.022
7143	Haramura	1995 WU41	11.80	0.15	1	14.75	1.02	0.155	0.023
7167	Laupheim	1985 TD3	12.30	0.15	4	20.03	0.78	0.058	0.005
7171	Arthurkraus	1988 AT1	14.00	0.15	5	10.62	0.30	0.040	0.003
7186	Tomioka	1991 YF	12.90	0.15	10	14.31	0.22	0.066	0.002
7191		1993 MA1	11.90	0.15	1	17.72	0.99	0.098	0.012
7200		1994 NO	14.00	0.15	1	10.30	0.86	0.042	0.007
7215	Gerhard	1977 FS	11.80	0.15	2	29.74	1.45	0.038	0.004
7217	Dacke	1979 QX3	11.50	0.15	5	29.63	0.75	0.051	0.003
7231	Porco	1985 TQ1	11.90	0.15	2	19.39	1.51	0.084	0.014
7262	Sofue	1995 BX1	12.90	0.15	1	7.23	0.41	0.234	0.029
7270	Punkin	1978 NY7	12.50	0.15	2	16.55	1.11	0.068	0.010
7274	Washioyama	1982 FC	13.70	0.15	6	10.37	0.28	0.058	0.004
7275		1983 CY2	11.90	0.15	2	12.95	1.32	0.183	0.039
7278	Shtokolov	1985 UW4	12.00	0.15	9	21.83	0.42	0.060	0.002
7282		1989 BC	11.90	0.15	1	15.70	1.18	0.124	0.019
7286		1990 QZ4	11.90	0.15	3	25.37	0.74	0.048	0.003
7287	Yokokurayama	1990 VN2	13.20	0.15	1	12.84	1.01	0.056	0.009
7291	Hyakutake	1991 XC1	12.20	0.15	2	17.98	1.12	0.072	0.009
7305	Ossakajusto	1994 CX1	11.60	0.15	2	22.88	1.58	0.077	0.011
7308	Hattori	1995 BQ4	12.30	0.15	1	12.32	1.33	0.140	0.031
7322	Lavrentina	1979 SW2	12.20	0.15	1	20.49	1.35	0.055	0.008

Table E.2 (Continued.)

Asteroid			H	G	$N_{\rm ID}$	d	$\sigma(d)$	$p_{\rm V}$	$\sigma(p_{\rm V})$
7331	Balindblad	1985 TV	11.50	0.15	5	21.88	0.70	0.096	0.007
7341		1991 VK	16.70	0.15	3	0.78	0.03	0.625	0.044
7352		1994 CO	9.00	0.15	4	47.07	2.06	0.207	0.020
7360	Moberg	1996 BQ17	12.80	0.15	1	6.93	0.58	0.279	0.048
7363	Esquibel	1996 FA1	12.40	0.15	1	38.08	2.67	0.013	0.002
7366	Agata	1996 UY	11.60	0.15	4	20.78	0.65	0.095	0.007
7385	Aktsynovia	1981 UQ11	14.00	0.15	1	8.04	0.65	0.069	0.012
7392	Kowalski	1984 EX	12.40	0.15	1	10.26	0.81	0.184	0.030
7394	Xanthomalitia	1985 QX4	11.10	0.15	4	37.70	1.32	0.046	0.004
7402		1987 YH	13.10	0.15	2	15.99	1.12	0.042	0.006
7404		1988 AA5	13.50	0.15	3	13.80	0.56	0.037	0.003
7405		1988 FF	12.80	0.15	5	16.69	0.45	0.049	0.003
7406		1988 TD	13.60	0.15	1	7.37	0.58	0.118	0.019
7410	Kawazoe	1990 QG	14.10	0.15	3	7.45	0.40	0.075	0.009
7412	Linnaeus	1990 SL9	12.70	0.15	1	11.43	0.97	0.113	0.020
7414	Bosch	1990 TD8	12.60	0.15	1	13.73	0.95	0.085	0.012
7432		1993 HL5	12.10	0.15	1	16.18	0.99	0.098	0.013
7450	Shilling	1968 OZ	13.00	0.15	6	16.01	0.48	0.046	0.003
7451	Verbitskaya	1978 PU2	12.70	0.15	1	8.14	0.84	0.221	0.047
7456	Doressoundiram	1982 OD	13.10	0.15	1	10.27	0.76	0.096	0.015
7458		1984 DE1	11.90	0.15	1	32.87	1.64	0.028	0.003
7466		1989 VC2	12.00	0.15	3	21.95	1.04	0.059	0.006
7469	Krikalev	1990 VU14	11.80	0.15	4	18.07	0.73	0.118	0.011
7483	Sekitakakazu	1994 VO2	12.40	0.15	2	20.08	1.16	0.050	0.007
7496	Miroslavholub	1995 WN6	12.10	0.15	8	21.67	0.29	0.055	0.002
7498	Blanik	1996 BF	12.20	0.15	1	17.78	1.34	0.074	0.012
7501	Farra	1996 VD3	12.20	0.15	1	21.26	1.34	0.052	0.007
7512	Monicalazzarin	1983 CA1	12.80	0.15	1	11.24	0.93	0.106	0.018
7517		1989 AD	13.10	0.15	2	9.31	0.56	0.128	0.018
7526		1993 AA	13.70	0.15	3	9.79	0.44	0.062	0.006
7536	Fahrenheit	1995 WB7	11.80	0.15	4	22.71	0.80	0.068	0.005
7551	Edstolper	1981 EF26	12.30	0.15	1	21.20	1.78	0.047	0.008
7563		1988 BC	12.30	0.15	3	17.27	0.64	0.073	0.006
7565	Zipfel	1988 RD11	13.40	0.15	1	14.92	1.19	0.035	0.006
7571	Weisse Rose	1989 EH6	13.00	0.15	3	16.93	0.81	0.048	0.005
7574		1989 WO1	11.30	0.15	3	24.12	1.24	0.099	0.011
7581	Yudovich	1990 VY13	11.80	0.15	3	17.67	0.83	0.112	0.012
7585		1991 PK8	12.00	0.15	1	21.94	1.68	0.058	0.009
7588		1992 FJ1	11.20	0.15	7	39.79	0.94	0.037	0.002
7595	Vaxjo	1993 FN26	12.70	0.15	3	14.75	0.66	0.078	0.008
7604	Kridsadaporn	1995 QY2	13.70	0.15	3	13.30	0.34	0.033	0.002
7605		1995 SR1	11.60	0.15	9	37.83	0.66	0.029	0.001
7607	Billmerline	1995 SB13	12.60	0.15	1	16.12	1.26	0.062	0.010
7611	Hashitatsu	1996 BW1	11.80	0.15	6	23.72	0.57	0.061	0.003
7612		1996 CN2	11.50	0.15	2	23.01	1.28	0.087	0.011
7616	Sadako	1996 VF2	11.80	0.15	2	12.99	0.99	0.203	0.033
7625	Louisspohr	2150 T-2	13.70	0.15	1	9.78	0.78	0.061	0.010
7641		1986 TT6	9.30	0.15	4	75.28	2.43	0.062	0.005
7650	Kaname	1990 UG	12.30	0.15	3	16.85	0.80	0.079	0.008
7662		1994 RM1	11.60	0.15	2	23.44	1.41	0.074	0.010
7690	Sackler	2291 T-1	13.50	0.15	5	10.96	0.34	0.062	0.004
7692	Edhenderson	1981 EZ25	12.40	0.15	1	11.94	0.90	0.136	0.021
7725	Sel'vinskij	1972 RX1	14.00	0.15	2	13.65	0.77	0.025	0.003
7727	Chepurova	1975 EA3	13.50	0.15	2	11.17	0.77	0.060	0.009
7730	Sergerasimov	1978 NN1	13.50	0.15	6	17.04	0.33	0.024	0.001
7749	Jackschmitt	1988 JP	12.90	0.15	6	9.39	0.19	0.141	0.006
7750	McEwen	1988 QD1	12.60	0.15	6	14.41	0.26	0.079	0.003
7764		1991 AB	13.00	0.15	4	15.06	0.50	0.055	0.004
7773		1992 FS	12.80	0.15	1	11.31	0.94	0.105	0.018
7801	Goretti	1996 GG2	14.40	0.15	3	9.66	0.41	0.033	0.003
7812	Billward	1984 UT	13.30	0.15	4	18.61	0.75	0.025	0.002
7814		1986 CF2	12.30	0.15	6	18.72	0.38	0.061	0.003
7817	Zibiturtle	1988 RH10	12.90	0.15	1	10.80	1.09	0.105	0.022
7837	Mutsumi	1993 TX	13.50	0.15	6	12.80	0.32	0.044	0.002
7843		1994 YE1	12.30	0.15	11	20.13	0.27	0.054	0.002
7864		1982 EE	12.70	0.15	5	15.88	0.57	0.060	0.004
7868	Barker	1984 UX2	12.80	0.15	5	16.19	0.36	0.053	0.003
7874		1991 BE	12.50	0.15	3	14.11	0.75	0.096	0.011
7875		1991 ES1	12.30	0.15	5	15.95	0.45	0.087	0.005
7880		1992 OM7	12.80	0.15	2	18.49	1.19	0.040	0.006
7887	Bratfest	1993 SU2	12.00	0.15	2	12.58	0.82	0.179	0.025
7895	Kaseda	1995 DK1	10.90	0.15	9	31.91	0.47	0.077	0.003
7911	Carlpilcher	1977 RZ8	12.40	0.15	3	16.93	0.64	0.074	0.007
7928	Bijaoui	1986 WM5	11.60	0.15	2	19.87	1.42	0.103	0.015
7943		1991 PQ12	12.60	0.15	2	14.58	1.16	0.081	0.014
7949		1992 SU	12.40	0.15	1	21.39	1.59	0.042	0.007
7950	Berezov	1992 SS26	11.40	0.15	2	22.73	1.42	0.098	0.013
7965	Katsuhiko	1996 BD1	12.00	0.15	4	22.05	0.72	0.058	0.004
7977		1977 QQ5	15.40	0.15	3	2.67	0.12	0.173	0.016
7984		1980 SM	13.70	0.15	2	10.72	0.72	0.051	0.007
7995	Khvorostovsky	1983 PX	13.50	0.15	1	7.04	0.62	0.142	0.026
7999	Nesvorny	1986 RA3	12.00	0.15	3	21.57	1.05	0.062	0.007
8008		1988 TQ4	12.90	0.15	1	12.94	1.02	0.073	0.012
8022	Scottcrossfield	1990 VD7	13.70	0.15	1	13.90	0.85	0.030	0.004
8027	Robertrushworth	1991 PB12	12.10	0.15	7	23.03	0.54	0.052	0.003
8028	Joeengle	1991 QE	12.30	0.15	3	20.52	0.77	0.051	0.004
8029	Miltthompson	1991 RR30	12.00	0.15	1	18.84	1.66	0.079	0.014
8030	Williamknight	1991 SK	11.80	0.15	1	23.40	1.72	0.061	0.009
8032	Michaeladams	1992 ES1	14.00	0.15	4	8.31	0.34	0.065	0.006
8036	Maehara	1992 UG4	12.00	0.15	2	15.12	0.97	0.128	0.018
8044	Tsuchiyama	1994 YT	13.70	0.15	6	10.40	0.33	0.061	0.005
8062	Okhotsymskij	1977 EZ	12.60	0.15	4	16.66	0.52	0.058	0.004
8064	Lisitsa	1978 RR	13.30	0.15	6	15.65	0.43	0.038	0.003
8066	Poldimeri	1980 PB2	12.40	0.15	2	18.69	1.28	0.056	0.008
8070	DeMeo	1981 EM30	14.00	0.15	1	8.36	0.65	0.063	0.010
8077	Hoyle	1986 AW2	12.90	0.15	1	8.51	0.74	0.169	0.030
8081	Leopardi	1988 DD	14.20	0.15	1	10.84	0.79	0.031	0.005
8083	Mayeda	1988 VB	13.20	0.15	1	14.53	0.76	0.044	0.005
8086	Peterthomas	1989 RB6	11.50	0.15	2	31.12	2.19	0.051	0.008
8091		1992 BG	13.40	0.15	1	10.34	0.59	0.072	0.009
8106	Carpino	1994 YB	13.50	0.15	2	9.56	0.72	0.080	0.012
8126	Chanwainam	1966 BL	12.80	0.15	1	12.35	1.25	0.088	0.018
8146	Jimbell	1983 WG	12.80	0.15	3	18.26	0.92	0.042	0.005
8150	Kaluga	1985 QL4	12.00	0.15	1	19.06	1.33	0.077	0.011
8152		1986 VY	14.30	0.15	1	12.00	1.13	0.023	0.004
8155	Battaglini	1988 QA	13.50	0.15	2	10.29	0.71	0.068	0.010
8157		1988 XG2	13.20	0.15	1	13.45	0.84	0.051	0.007
8174		1991 SL2	11.80	0.15	2	24.00	1.74	0.068	0.012
8181	Rossini	1992 ST26	12.50	0.15	1	13.33	0.96	0.099	0.015
8188	Okegaya	1992 YE3	12.10	0.15	2	25.68	1.58	0.040	0.005
8200	Souten	1994 AY1	13.40	0.15	1	11.54	0.80	0.058	0.008
8227		1996 VD4	13.00	0.15	2	14.34	1.09	0.055	0.008
8229	Kozelsky	1996 YU2	12.50	0.15	1	15.75	0.91	0.071	0.009
8233	Asada	1997 VZ2	14.00	0.15	1	11.71	0.82	0.032	0.005
8278		1991 JJ	11.80	0.15	1	10.27	0.84	0.319	0.054
8281		1991 PC18	13.00	0.15	1	18.61	1.07	0.032	0.004
8292		1992 SU14	12.20	0.15	1	8.53	0.99	0.320	0.076
8316	Wolkenstein	3002 P-L	11.40	0.15	2	15.80	1.02	0.196	0.027
8323	Krimigis	1979 UH	13.40	0.15	2	11.87	0.65	0.057	0.007
8336	Safarik	1984 SK1	13.00	0.15	1	9.56	0.94	0.122	0.025
8340	Mumma	1985 TS1	12.20	0.15	5	20.31	0.64	0.060	0.004
8348	Bhattacharyya	1988 BX	13.70	0.15	10	9.10	0.18	0.073	0.003
8350		1989 AG	12.70	0.15	3	15.18	0.57	0.068	0.006
8354		1989 RF	12.60	0.15	2	15.84	1.14	0.084	0.017
8356	Wadhwa	1989 RO2	12.80	0.15	1	33.20	2.48	0.012	0.002
8363		1990 RV	12.70	0.15	1	12.35	1.35	0.096	0.021
8376		1992 OZ9	11.50	0.15	3	30.83	1.26	0.047	0.004
8380	Tooting	1992 SW17	12.00	0.15	1	11.39	0.80	0.216	0.032
8402		1994 GH9	13.40	0.15	1	12.58	0.91	0.049	0.007
8415		1996 UT	12.40	0.15	3	18.64	0.85	0.056	0.005
8423	Macao	1997 AO22	13.40	0.15	1	11.60	0.98	0.057	0.010
8429		1997 YK4	12.50	0.15	2	17.25	1.16	0.067	0.010
8450	Egorov	1977 QL1	12.80	0.15	1	14.41	1.11	0.065	0.010
8454		1981 EG1	13.60	0.15	1	10.90	0.81	0.054	0.008
8456	Davegriep	1981 EJ7	12.50	0.15	1	20.71	1.37	0.041	0.006
8475	Vsevoivanov	1985 PC2	12.90	0.15	4	17.11	0.50	0.043	0.003
8478		1987 DO6	12.20	0.15	8	21.64	0.49	0.059	0.003
8482	Wayneolm	1988 RA11	13.10	0.15	1	16.28	1.33	0.038	0.006
8498	Ufa	1990 RM17	12.30	0.15	1	13.27	0.98	0.121	0.019
8532		1992 YW3	12.30	0.15	1	10.60	0.73	0.189	0.027
8551	Daitarabochi	1994 VC7	10.80	0.15	2	35.25	2.19	0.069	0.009
8560	Tsubaki	1995 SD5	12.30	0.15	3	16.06	0.90	0.084	0.010
8561	Sikoruk	1995 SO29	13.30	0.15	1	10.69	0.89	0.074	0.013
8563		1995 US	11.90	0.15	1	14.43	1.39	0.147	0.029
8564	Anomalocaris	1995 UL3	12.20	0.15	4	17.99	0.67	0.073	0.006
8579	Hieizan	1996 XV19	13.60	0.15	5	12.02	0.31	0.045	0.003
8580	Pinsky	1996 XZ25	13.00	0.15	3	12.96	0.79	0.070	0.009
8582	Kazuhisa	1997 AY	12.00	0.15	5	16.06	0.45	0.114	0.007
8595	Dougallii	3233 T-1	14.10	0.15	1	9.79	0.82	0.042	0.007
8609	Shuvalov	1977 QH3	13.30	0.15	1	8.70	0.62	0.112	0.017
8614		1978 VP11	12.70	0.15	2	12.22	0.95	0.100	0.017
8660	Sano	1990 TM1	10.90	0.15	1	14.65	1.36	0.359	0.069
8662		1990 UT10	13.00	0.15	1	11.54	0.96	0.084	0.015
8673		1991 RN5	13.50	0.15	1	13.88	1.04	0.037	0.006
8679	Tingstade	1992 EG8	13.10	0.15	2	12.37	1.01	0.075	0.013
8680	Rone	1992 EJ9	13.10	0.15	1	14.70	0.99	0.047	0.007
8701		1993 LG2	12.70	0.15	2	18.60	1.44	0.042	0.007
8708		1994 DD	13.50	0.15	4	10.92	0.44	0.060	0.005
8710	Hawley	1994 JK9	13.90	0.15	1	12.04	0.77	0.034	0.005
8711		1994 LL	13.50	0.15	1	13.12	0.99	0.041	0.006
8721	AMOS	1996 AO3	11.20	0.15	4	37.59	1.29	0.043	0.003
8737	Takehiro	1997 AL13	12.00	0.15	1	25.71	1.67	0.042	0.006
8743	Keneke	1998 EH12	11.50	0.15	3	25.43	1.21	0.071	0.007
8750	Nettarufina	2197 P-L	14.20	0.15	5	9.77	0.34	0.044	0.004
8773	Torquilla	5006 T-2	12.90	0.15	2	15.53	0.95	0.051	0.007
8776	Campestris	2287 T-3	13.90	0.15	1	10.74	0.80	0.042	0.007
8782	Bakhrakh	1976 UG2	14.20	0.15	4	9.88	0.36	0.038	0.003
8787	Ignatenko	1978 TL4	12.40	0.15	6	20.02	0.51	0.052	0.003
8813	Leviathan	1983 WF1	11.90	0.15	2	21.32	1.09	0.068	0.007
8814	Rosseven	1983 XG	12.40	0.15	2	20.42	1.21	0.051	0.007
8823		1987 WS3	13.00	0.15	1	16.35	1.07	0.042	0.006
8824	Genta	1988 BH	13.20	0.15	3	12.10	0.55	0.067	0.007
8828		1988 RC7	13.00	0.15	4	13.18	0.36	0.065	0.004
8830		1988 VZ	11.80	0.15	1	19.90	1.55	0.085	0.014
8833	Acer	1989 RW	13.20	0.15	2	17.17	1.21	0.036	0.006
8844		1990 QR2	12.60	0.15	1	12.55	1.03	0.102	0.017
8861	Jenskandler	1991 TF7	13.50	0.15	4	12.28	0.38	0.048	0.003
8888		1994 NT1	13.60	0.15	1	11.43	0.93	0.049	0.008
8889	Mockturtle	1994 OC	11.60	0.15	4	24.88	0.75	0.067	0.004
8891	Irokawa	1994 RC1	12.60	0.15	4	15.65	0.68	0.067	0.006
8901		1995 UJ4	12.10	0.15	1	19.87	1.16	0.065	0.008
8906	Yano	1995 WF2	12.60	0.15	2	11.65	0.94	0.126	0.023
8910		1995 WV42	12.30	0.15	1	13.76	0.99	0.112	0.017
8915	Sawaishujiro	1995 YK3	11.90	0.15	3	33.03	1.47	0.029	0.003
8917		1996 EU2	11.30	0.15	7	40.34	0.73	0.035	0.001
8927	Ryojiro	1996 YT	14.70	0.15	4	8.04	0.34	0.036	0.003
8934	Nishimurajun	1997 AQ12	12.40	0.15	2	19.53	1.24	0.056	0.008
8941	Junsaito	1997 BL2	11.90	0.15	1	19.34	1.37	0.082	0.012
8950		1997 EG46	11.70	0.15	1	14.45	1.09	0.177	0.028
8962	Noctua	2771 P-L	12.50	0.15	1	17.01	1.24	0.061	0.009
9003		1981 UW21	12.70	0.15	2	19.59	1.21	0.039	0.005
9005	Sidorova	1982 UU5	13.50	0.15	2	13.02	0.72	0.042	0.005
9006	Voytkevych	1982 UA7	12.80	0.15	1	7.85	0.66	0.218	0.038
9015		1985 VK	12.80	0.15	2	17.89	1.42	0.042	0.006
9021	Fagus	1988 CT5	12.30	0.15	1	12.13	0.66	0.144	0.017
9023	Mnesthus	1988 RG1	10.40	0.15	1	60.80	4.15	0.033	0.005
9034	Oleyuria	1990 QZ17	13.10	0.15	2	9.93	0.82	0.104	0.018
9043		1991 EJ4	12.20	0.15	3	21.63	1.11	0.052	0.006
9045		1991 PG15	14.70	0.15	1	7.96	0.60	0.037	0.006
9052	Uhland	1991 UJ4	13.90	0.15	4	10.19	0.36	0.047	0.004

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
9065		1993 FN1	13.00	0.15	3	12.75	0.49	0.076	0.007
9072		1993 RX3	11.40	0.15	2	25.04	1.52	0.078	0.010
9090	Chirotenmondai	1995 UW8	12.40	0.15	3	21.76	0.87	0.042	0.004
9104	Matsuo	1996 YB	13.90	0.15	1	13.54	1.12	0.027	0.005
9107	Narukospa	1997 AE4	13.20	0.15	2	13.12	0.82	0.055	0.008
9121	Stefanovalentini	1998 DJ11	11.40	0.15	5	31.32	1.06	0.051	0.004
9123	Yoshiko	1998 FQ11	14.00	0.15	1	8.81	0.86	0.057	0.011
9144	Hollisjohnson	1955 UN1	13.60	0.15	1	9.59	0.73	0.070	0.011
9145	Shustov	1976 GG3	12.70	0.15	1	8.79	0.71	0.190	0.032
9175	Graun	1990 OO2	12.40	0.15	2	10.35	0.71	0.183	0.027
9180	Samsagan	1991 GQ	12.30	0.15	3	17.86	0.92	0.067	0.007
9190	Masako	1991 VR1	13.40	0.15	3	10.60	0.51	0.070	0.007
9209		1994 UK1	13.30	0.15	1	9.19	0.73	0.100	0.017
9228	Nakahiroshi	1996 CG1	12.30	0.15	5	21.09	0.73	0.050	0.004
9247		1998 MO19	12.10	0.15	5	21.39	0.59	0.056	0.003
9262	Bordovitsyna	1973 RF	13.00	0.15	2	8.45	0.78	0.161	0.033
9298	Geake	1985 JM	13.60	0.15	5	11.54	0.27	0.049	0.002
9314		1988 DJ1	13.70	0.15	3	8.19	0.40	0.090	0.010
9327	Duerbeck	1989 SW2	12.90	0.15	3	13.51	0.59	0.068	0.006
9333	Hiraimasa	1990 TK3	12.90	0.15	1	8.64	0.78	0.164	0.031
9364	Clusius	1992 HZ3	13.20	0.15	3	12.75	0.73	0.059	0.007
9402		1994 UN1	12.30	0.15	4	21.93	0.73	0.045	0.003
9410		1995 BJ1	12.40	0.15	2	12.14	1.22	0.136	0.030
9413	Eichendorff	1995 SQ54	15.10	0.15	1	6.97	0.64	0.033	0.006
9414	Masamimurakami	1995 UV4	12.50	0.15	1	13.55	1.06	0.096	0.016
9417		1995 WU	13.70	0.15	6	9.49	0.25	0.066	0.004
9423	Abt	1996 AT7	12.20	0.15	1	12.84	0.86	0.141	0.020
9428	Angelalouise	1996 DW2	13.10	0.15	4	17.64	0.59	0.034	0.002
9431		1996 PS1	10.50	0.15	2	42.77	3.67	0.061	0.011
9501	Ywain	2071 T-2	14.80	0.15	1	7.58	0.55	0.037	0.006
9513		1971 UN	13.00	0.15	1	9.98	0.82	0.112	0.019
9533	Aleksejleonov	1981 SA7	13.70	0.15	1	10.49	0.79	0.053	0.008
9544	Scottbirney	1984 EL	12.60	0.15	2	12.58	1.22	0.103	0.021
9545	Petrovedomosti	1984 MQ	13.20	0.15	1	7.95	0.64	0.147	0.025
9550	Victorblanco	1985 TY1	13.30	0.15	3	14.60	0.61	0.041	0.004
9552		1985 UY	12.30	0.15	1	18.13	1.78	0.065	0.013
9557		1986 QL2	12.40	0.15	1	18.80	1.23	0.055	0.008
9559		1987 DH6	13.20	0.15	4	16.21	0.60	0.037	0.003
9628		1993 OB2	12.60	0.15	1	6.96	0.80	0.332	0.078
9656		1996 DK1	14.10	0.15	5	10.16	0.31	0.041	0.003
9661	Hohmann	1996 FU13	11.40	0.15	6	30.13	0.68	0.056	0.003
9670	Magni	1997 NJ10	12.50	0.15	1	14.63	1.09	0.083	0.013
9699	Baumhauer	3036 T-1	13.30	0.15	3	11.22	0.44	0.072	0.006
9714		1975 LF1	12.50	0.15	1	20.97	1.42	0.040	0.006
9789		1995 GO7	12.50	0.15	7	22.05	0.49	0.038	0.002
9792		1996 BX1	13.80	0.15	2	9.48	0.57	0.060	0.008
9799		1996 RJ	9.90	0.15	2	72.42	4.03	0.037	0.004
9827		1958 TL1	12.50	0.15	1	19.07	1.52	0.049	0.008
9838	Falz-Fein	1987 RN6	12.80	0.15	1	14.11	1.36	0.067	0.013
9853		1991 AN2	12.90	0.15	2	10.58	0.68	0.109	0.014
9857		1991 EN	10.30	0.15	1	38.63	3.36	0.090	0.016
9860	Archaeopteryx	1991 PW9	12.90	0.15	1	13.16	1.27	0.071	0.014
9864		1991 RT17	12.80	0.15	1	13.79	1.05	0.070	0.011
9877		1993 ST3	13.10	0.15	1	8.66	0.62	0.136	0.020
9935		1986 CP1	13.40	0.15	1	14.86	0.96	0.035	0.005
9936	Al-Biruni	1986 PN4	11.70	0.15	2	27.81	1.61	0.048	0.006
9968	Serpe	1992 JS2	12.70	0.15	2	13.36	1.10	0.091	0.016
9970		1992 ST1	12.40	0.15	5	18.99	0.52	0.056	0.004
9972	Minoruoda	1993 KQ	13.60	0.15	3	7.69	0.35	0.110	0.011
9976		1993 TQ	13.20	0.15	4	12.31	0.42	0.062	0.005
9984	Gregbryant	1996 HT	13.60	0.15	1	14.64	0.89	0.030	0.004
9992		1997 TG19	14.40	0.15	2	4.75	0.36	0.137	0.022
9996	ANS	9070 P-L	13.00	0.15	2	11.36	0.67	0.091	0.012
10007	Malytheatre	1976 YF3	11.60	0.15	4	26.05	0.83	0.064	0.005
10013	Stenholm	1978 RR8	14.40	0.15	1	8.90	0.52	0.039	0.005
10034	Birlan	1981 YG	13.40	0.15	2	11.22	0.81	0.061	0.009
10039	Keet Seel	1984 LK	12.80	0.15	6	15.71	0.28	0.055	0.002
10045		1985 RJ3	12.80	0.15	1	16.11	1.01	0.052	0.007
10058		1988 DD5	14.70	0.15	1	7.59	0.59	0.040	0.006
10061	Ndolaprata	1988 PG1	13.50	0.15	5	10.78	0.37	0.065	0.005
10064	Hirosetamotsu	1988 UO	12.10	0.15	4	11.62	0.44	0.218	0.020
10076		1989 PK	13.60	0.15	3	8.45	0.41	0.099	0.011
10080		1990 OF1	12.30	0.15	5	15.68	0.48	0.087	0.006
10085		1990 QF5	12.50	0.15	3	19.30	1.00	0.051	0.006
10121	Arzamas	1993 BS4	13.50	0.15	1	15.75	1.25	0.028	0.005
10142	Sakka	1993 VG1	12.10	0.15	1	15.09	0.81	0.112	0.013
10164	Akusekijima	1995 BS1	12.90	0.15	1	12.32	0.66	0.081	0.009
10171	Takaotengu	1995 EE8	12.50	0.15	4	11.33	0.47	0.140	0.012
10189	Normanrockwell	1996 JK16	13.30	0.15	1	10.12	0.82	0.083	0.014
10195	Nebraska	1996 RS5	12.20	0.15	2	11.22	0.78	0.198	0.031
10226	Seishika	1997 VK5	12.80	0.15	5	16.13	0.44	0.055	0.003
10227	Izanami	1997 VO6	12.20	0.15	2	17.87	1.43	0.078	0.014
10235		1998 QR37	12.60	0.15	1	16.69	1.28	0.058	0.009
10258		1940 AB	12.00	0.15	1	10.59	1.29	0.249	0.062
10259	Osipovyurij	1972 HL	12.30	0.15	4	18.34	0.91	0.072	0.008
10261	Nikdollezhal'	1974 QF1	13.00	0.15	1	11.48	1.15	0.085	0.017
10263	Vadimsimona	1976 SE5	13.20	0.15	4	15.50	0.74	0.040	0.004
10264	Marov	1978 PH3	13.00	0.15	1	16.69	0.95	0.040	0.005
10266	Vladishukhov	1978 SA7	13.60	0.15	6	9.93	0.31	0.069	0.005
10269	Tusi	1979 SU11	12.70	0.15	2	15.38	1.04	0.063	0.009
10275		1981 EC16	14.60	0.15	2	7.19	0.52	0.052	0.008
10291		1985 UT	11.80	0.15	3	21.80	0.87	0.088	0.011
10293	Pribina	1986 TU6	12.00	0.15	1	11.18	1.20	0.224	0.049
10314		1990 RF	11.90	0.15	2	20.00	1.51	0.077	0.012
10328		1991 GC1	14.10	0.15	2	10.31	0.60	0.040	0.006
10369	Sinden	1995 CE2	12.90	0.15	1	13.36	0.96	0.069	0.010
10381	Malinsmith	1996 RB	13.50	0.15	8	13.02	0.25	0.044	0.002
10386	Romulus	1996 TS15	12.00	0.15	3	19.40	0.88	0.084	0.009
10388	Zhuguangya	1996 YH3	12.00	0.15	6	23.40	0.62	0.052	0.003
10422		1999 AN22	11.90	0.15	2	20.38	1.30	0.074	0.010
10426	Charlierouse	1999 BB27	12.40	0.15	3	9.89	0.53	0.199	0.022
10446	Siegbahn	3006 T-3	13.90	0.15	3	9.04	0.42	0.061	0.006
10449	Takuma	1936 UD	12.80	0.15	7	14.37	0.31	0.073	0.003
10450	Girard	1967 JQ	14.10	0.15	1	8.72	0.53	0.053	0.007
10465		1980 WE5	12.10	0.15	4	18.26	0.81	0.080	0.007
10487	Danpeterson	1985 GP1	13.00	0.15	3	9.55	0.45	0.142	0.016
10490		1985 VL	12.20	0.15	1	21.62	1.42	0.050	0.007
10512		1989 TP11	13.80	0.15	2	9.87	0.89	0.055	0.010
10513		1989 TJ14	11.70	0.15	5	22.23	0.65	0.077	0.005
10514		1989 TD16	13.50	0.15	1	13.92	1.04	0.036	0.006
10520		1990 RS2	14.00	0.15	2	9.86	0.59	0.049	0.007
10527		1990 UN1	14.30	0.15	1	7.56	0.94	0.059	0.015
10539		1991 VH4	13.00	0.15	1	14.36	0.96	0.054	0.008
10542	Ruckers	1992 CN3	14.50	0.15	1	11.07	0.80	0.023	0.003
10561	Shimizumasahiro	1993 TE2	12.90	0.15	2	11.52	0.76	0.095	0.014
10565		1994 AT1	12.30	0.15	5	17.45	0.53	0.072	0.005
10582	Harumi	1995 TG	12.50	0.15	5	17.92	0.49	0.058	0.004
10583	Kanetugu	1995 WC4	11.90	0.15	4	25.88	0.67	0.046	0.003
10597		1996 TR10	13.40	0.15	5	12.42	0.24	0.057	0.003
10601	Hiwatashi	1996 UC	13.30	0.15	1	12.84	1.00	0.051	0.008
10611	Yanjici	1997 BB1	11.70	0.15	2	20.75	1.52	0.086	0.013
10623		1997 YP7	12.50	0.15	2	15.11	1.04	0.080	0.012
10631		1998 BM15	13.10	0.15	2	21.55	1.47	0.022	0.003
10658	Gretadevries	2281 T-1	13.60	0.15	5	16.11	0.56	0.025	0.002
10668		1976 UB1	13.20	0.15	3	11.52	0.50	0.074	0.007
10672	Kostyukova	1978 QE	11.70	0.15	3	23.10	1.07	0.072	0.007
10688		1981 DK	12.80	0.15	5	15.20	0.54	0.061	0.005
10701		1981 PF	14.20	0.15	2	5.86	0.50	0.108	0.019
10716	Olivermorton	1983 WQ	13.10	0.15	1	20.34	1.33	0.025	0.003
10748		1989 CE8	13.00	0.15	2	14.80	0.94	0.052	0.007
10751		1989 UV1	13.40	0.15	1	15.08	1.00	0.034	0.005
10766		1990 UB1	12.00	0.15	8	29.56	0.58	0.034	0.001
10779		1991 LW	13.60	0.15	4	13.71	0.51	0.034	0.003
10791		1992 CS	12.70	0.15	3	20.17	1.01	0.036	0.004
10795	Babben	1992 EB5	12.00	0.15	1	18.83	1.47	0.079	0.013
10804	Amenouzume	1992 WN3	13.30	0.15	6	11.98	0.34	0.062	0.004
10811	Lau	1993 FM19	12.60	0.15	1	8.22	0.76	0.239	0.046
10817		1993 FR44	12.30	0.15	1	15.86	1.33	0.084	0.015
10826		1993 SK16	13.20	0.15	1	8.31	0.58	0.134	0.020
10840		1994 LR	12.20	0.15	5	23.84	0.73	0.042	0.003
10856	Bechstein	1995 EG8	12.70	0.15	3	19.39	0.88	0.040	0.004
10862		1995 QE2	13.60	0.15	7	12.03	0.35	0.047	0.003
10864	Yamagatashi	1995 QS3	11.80	0.15	5	21.87	0.67	0.078	0.005
10886	Mitsuroohba	1996 VR30	12.40	0.15	2	22.48	1.47	0.040	0.006
10889		1997 AO1	11.50	0.15	2	23.12	1.98	0.085	0.016
10890		1997 AY2	12.50	0.15	2	14.43	1.00	0.086	0.013
10908	Kallestroetzel	1997 XH9	13.20	0.15	1	13.76	0.93	0.049	0.007
10928	Caprara	1998 BW43	13.30	0.15	3	12.67	0.52	0.053	0.005
10931	Ceccano	1998 DA	13.40	0.15	1	11.52	1.03	0.058	0.011
10938	Lorenzalevy	1998 SW60	11.80	0.15	3	26.60	1.11	0.049	0.004
10944		1999 FJ26	13.10	0.15	8	14.77	0.30	0.050	0.002
10946		1999 HR2	13.00	0.15	2	17.94	1.28	0.035	0.005
11004	Stenmark	1980 FJ1	12.20	0.15	6	26.61	0.63	0.033	0.002
11005	Waldtrudering	1980 PP1	13.70	0.15	1	8.58	0.67	0.079	0.013
11020	Orwell	1984 OG	12.40	0.15	3	13.82	0.74	0.102	0.012
11022	Serio	1986 EJ1	13.60	0.15	1	6.92	0.83	0.134	0.033
11029		1988 GZ	12.70	0.15	3	16.15	0.83	0.057	0.006
11055	Honduras	1991 GT2	13.50	0.15	1	10.30	0.64	0.066	0.009
11056	Volland	1991 LE2	13.70	0.15	3	8.98	0.47	0.075	0.008
11096		1994 RU1	12.90	0.15	1	17.34	1.16	0.041	0.006
11099	Sonodamasaki	1995 HL	14.00	0.15	1	9.71	0.57	0.047	0.006
11137	Yarigatake	1996 XE19	13.00	0.15	2	11.95	0.97	0.081	0.014
11147	Delmas	1997 XT5	12.60	0.15	1	15.15	1.15	0.070	0.011
11153		1997 YB10	13.30	0.15	2	10.13	0.75	0.098	0.018
11181		1998 FG118	12.70	0.15	1	15.78	1.29	0.059	0.010
11182		1998 GM6	13.40	0.15	1	15.64	1.07	0.032	0.005
11188		1998 KD50	12.60	0.15	2	15.69	1.58	0.066	0.013
11195	Woomera	1999 AY22	14.00	0.15	4	10.03	0.38	0.045	0.004
11196	Michanikos	1999 BO9	13.00	0.15	2	14.39	0.91	0.060	0.009
11210		1999 GP22	14.00	0.15	2	7.09	0.69	0.091	0.020
11221		1999 JO26	12.20	0.15	4	22.37	0.75	0.048	0.004
11223		1999 JC30	12.90	0.15	1	13.92	1.16	0.063	0.011
11232		1999 JA77	12.60	0.15	2	14.92	1.40	0.076	0.016
11271		1988 KB	13.60	0.15	1	6.70	0.50	0.143	0.022
11338	Schiele	1996 TL9	14.80	0.15	1	6.69	0.55	0.048	0.008
11352	Koldewey	1997 WP22	13.10	0.15	1	11.20	1.12	0.081	0.017
11358		1997 YY5	11.70	0.15	2	14.50	1.11	0.191	0.034
11386		1998 TA18	13.60	0.15	1	8.93	1.14	0.080	0.021
11395		1998 XN77	9.50	0.15	4	67.78	1.84	0.061	0.004
11396		1998 XZ77	10.50	0.15	1	46.54	3.65	0.051	0.008
11397		1998 XX93	10.00	0.15	2	47.49	3.63	0.078	0.012
11405		1999 CV3	15.00	0.15	1	1.48	0.04	0.803	0.057
11410		1999 FU34	11.60	0.15	1	30.21	2.16	0.044	0.007
11416		1999 JK96	13.20	0.15	1	13.67	1.24	0.050	0.009
11424		1999 LZ24	12.10	0.15	3	12.35	0.65	0.173	0.019
11478		1985 CD	13.40	0.15	1	8.12	0.72	0.117	0.021
11509	Thersilochos	1990 VL6	10.10	0.15	2	56.23	4.79	0.051	0.009
11536		1992 FZ	12.00	0.15	1	13.76	1.45	0.148	0.032
11549		1992 YY	12.40	0.15	1	10.30	0.73	0.183	0.027
11552	Boucolion	1993 BD4	10.60	0.15	1	53.91	4.32	0.035	0.006
11569	Virgilsmith	1993 KB2	12.00	0.15	2	28.79	1.91	0.034	0.005
11574	d'Alviella	1994 BP3	13.80	0.15	6	8.07	0.20	0.084	0.005
11587		1994 UH2	13.00	0.15	1	19.24	1.43	0.030	0.005
11596		1995 KA1	14.50	0.15	3	7.63	0.35	0.052	0.005
11605	Ranfagni	1995 UP6	14.10	0.15	4	10.93	0.49	0.040	0.004
11609		1995 XT	12.80	0.15	1	10.21	1.11	0.128	0.028
11618		1996 EX1	12.90	0.15	1	17.49	1.21	0.040	0.006
11633		1996 XG9	13.30	0.15	2	15.09	1.17	0.039	0.006
11658		1997 EQ17	12.70	0.15	2	20.54	1.60	0.035	0.006
11683		1998 FO11	13.50	0.15	3	12.27	0.65	0.050	0.006

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{v}	$\sigma(p_{\mathrm{v}})$
11684		1998 FY11	13.60	0.15	4	10.81	0.44	0.058	0.005
11700		1998 FT115	13.30	0.15	1	13.87	1.11	0.044	0.007
11738		1998 RK72	12.70	0.15	1	18.06	1.57	0.045	0.008
11780		1942 TB	12.90	0.15	1	5.60	0.60	0.390	0.085
11785	Migaic	1973 AW3	12.20	0.15	6	17.69	0.50	0.080	0.005
11787	Baumanka	1977 QF1	12.30	0.15	1	10.88	0.86	0.179	0.029
11796	Nirenberg	1980 DS4	14.20	0.15	3	8.02	0.42	0.057	0.006
11831		1984 SF3	13.60	0.15	2	10.28	0.72	0.061	0.008
11875	Rhone	1989 YG5	12.00	0.15	6	22.36	0.59	0.058	0.003
11911	Angel	1992 LF	12.00	0.15	4	28.01	0.96	0.036	0.003
11929	Uchino	1993 BG3	13.90	0.15	1	8.46	0.80	0.068	0.013
11939		1993 FH36	12.90	0.15	5	13.03	0.40	0.073	0.005
11976	Josephthurn	1995 JG	14.30	0.15	1	5.85	0.65	0.098	0.022
11987	Yonematsu	1995 VU1	12.50	0.15	6	18.64	0.47	0.052	0.003
11989		1995 WN5	12.90	0.15	2	14.74	1.09	0.057	0.009
12003	Hideosugai	1996 FM5	12.20	0.15	6	23.29	0.60	0.045	0.003
12008	Kandrup	1996 TY9	13.10	0.15	3	4.20	0.18	0.592	0.056
12016	Green	1996 XC	13.90	0.15	2	6.57	0.56	0.113	0.020
12029		1997 AQ22	13.60	0.15	4	13.24	0.46	0.037	0.003
12039		1997 CB22	12.70	0.15	4	14.42	0.55	0.074	0.006
12109		1998 KD51	12.70	0.15	3	13.74	0.59	0.079	0.007
12115	Robertgrimm	1998 SD2	12.00	0.15	1	22.84	1.64	0.054	0.008
12127	Mamiya	1999 RD37	13.70	0.15	3	12.54	0.55	0.038	0.004
12132	Wimfroger	2103 P-L	13.90	0.15	1	9.10	0.92	0.059	0.012
12135	Terlingen	3021 P-L	12.70	0.15	1	15.78	1.40	0.059	0.011
12193		1979 EL	11.90	0.15	1	8.69	0.76	0.407	0.074
12234	Shkuratov	1986 RP2	13.50	0.15	3	11.97	0.55	0.054	0.005
12269		1990 QR	13.10	0.15	3	11.05	0.49	0.085	0.008
12273		1990 TS4	13.00	0.15	1	12.08	0.92	0.076	0.012
12281	Chaumont	1990 WA5	13.10	0.15	2	17.62	1.10	0.033	0.005
12306	Pebronstein	1991 TM14	13.90	0.15	1	12.01	0.79	0.034	0.005
12307		1991 UA	12.70	0.15	2	20.33	1.33	0.036	0.005
12315		1992 FA2	12.70	0.15	1	12.75	1.17	0.090	0.017
12336		1992 WO3	13.70	0.15	1	5.78	0.60	0.175	0.037
12342	Kudohmichiko	1993 BL12	14.70	0.15	1	6.75	0.63	0.051	0.010
12365	Yoshitoki	1993 YD	12.70	0.15	1	22.09	1.34	0.030	0.004
12389		1994 WU	12.50	0.15	3	16.35	0.69	0.068	0.006
12396		1995 DL1	12.70	0.15	1	16.88	1.06	0.052	0.007
12397	Peterbrown	1995 FV14	12.90	0.15	1	15.14	1.15	0.053	0.008
12429		1995 WH7	14.30	0.15	3	9.12	0.47	0.041	0.005
12439	Okasaki	1996 CA3	12.30	0.15	1	16.33	1.26	0.080	0.013
12444	Prothoon	1996 GE19	10.10	0.15	3	62.41	2.92	0.043	0.004
12481	Streuvels	1997 EW47	13.40	0.15	6	12.76	0.39	0.049	0.003
12507		1998 FZ109	13.40	0.15	1	14.52	1.09	0.037	0.006
12552		1998 QQ45	12.30	0.15	2	16.00	1.20	0.083	0.013
12559		1998 QB69	11.30	0.15	7	35.31	0.74	0.044	0.002
12562	Briangrazer	1998 SP36	11.80	0.15	5	23.44	0.64	0.063	0.004
12567	Herreweghe	1998 SU71	12.90	0.15	1	13.22	1.22	0.070	0.013
12569		1998 VC29	12.50	0.15	2	21.14	1.67	0.039	0.006
12570		1998 WV5	12.40	0.15	2	15.38	1.12	0.082	0.012
12583	Buckjean	1999 RC35	12.30	0.15	1	19.63	1.43	0.055	0.008
12617	Angelusilesius	5568 P-L	13.50	0.15	2	11.64	0.88	0.052	0.008
12693		1989 EZ	12.60	0.15	1	9.31	0.65	0.186	0.027
12714	Alkimos	1991 GX1	10.30	0.15	2	54.62	4.20	0.045	0.007
12738	Satoshimiki	1992 AL	13.40	0.15	1	17.42	1.26	0.025	0.004
12742	Delisle	1992 OF1	12.30	0.15	1	24.33	1.89	0.036	0.006
12759	Joule	1993 TL18	13.00	0.15	1	13.58	1.27	0.060	0.012
12764		1993 VA2	12.70	0.15	3	21.21	1.12	0.034	0.004
12788	Shigeno	1995 SZ3	14.20	0.15	2	7.76	0.47	0.061	0.008
12832		1997 CE1	13.70	0.15	8	8.40	0.18	0.085	0.004
12849		1997 QD2	11.90	0.15	2	18.20	1.24	0.095	0.013
12894		1998 QN73	12.90	0.15	6	12.32	0.37	0.082	0.005
12896	Geoffroy	1998 QV102	12.40	0.15	3	16.59	0.84	0.081	0.010
12920		1998 VM15	11.10	0.15	6	39.18	0.90	0.043	0.002
12929		1999 TZ1	9.30	0.15	1	55.34	4.04	0.110	0.017
13004	Aldaz	1982 RR	14.00	0.15	3	9.01	0.41	0.055	0.005
13056		1990 VN1	13.40	0.15	1	8.15	0.78	0.116	0.023
13069	Umbertoeco	1991 RX1	14.10	0.15	5	7.67	0.25	0.071	0.005
13084	Virchow	1992 GC8	13.90	0.15	3	11.60	0.66	0.037	0.005
13086	Sauerbruch	1992 HS4	13.30	0.15	6	13.51	0.37	0.049	0.003
13096	Tigris	1993 BE5	12.20	0.15	1	15.49	2.21	0.097	0.028
13124		1994 PS	13.60	0.15	1	9.48	0.66	0.071	0.010
13132		1994 PO32	13.80	0.15	2	10.29	0.74	0.051	0.007
13138		1994 VA	13.40	0.15	5	8.38	0.26	0.112	0.008
13176	Kobedaitenken	1996 HE1	12.30	0.15	6	25.48	0.61	0.035	0.002
13183		1996 TW	10.80	0.15	2	44.65	3.08	0.043	0.007
13224	Takamatsuda	1997 PL5	12.60	0.15	6	18.75	0.70	0.049	0.004
13233		1998 FC66	13.50	0.15	8	8.72	0.20	0.094	0.005
13244	Dannymeyer	1998 MJ14	11.40	0.15	5	34.64	0.85	0.042	0.002
13246		1998 MJ33	13.70	0.15	3	11.63	0.56	0.045	0.005
13249	Marcallen	1998 MD38	12.00	0.15	5	20.15	0.61	0.071	0.005
13295		1998 RE	12.60	0.15	1	18.32	1.36	0.048	0.007
13297		1998 RX	12.40	0.15	1	16.13	1.75	0.074	0.016
13314		1998 RH71	13.20	0.15	1	13.86	1.03	0.048	0.007
13340		1998 SM123	14.00	0.15	1	9.12	0.69	0.053	0.008
13348		1998 SF138	12.50	0.15	1	15.23	1.46	0.076	0.015
13351	Zibeline	1998 SQ145	13.20	0.15	1	7.31	0.57	0.174	0.028
13376	Dunphy	1998 VO32	12.80	0.15	9	15.98	0.31	0.053	0.002
13389	Stacey	1999 AG24	12.50	0.15	1	14.29	1.04	0.086	0.013
13390	Bouska	1999 FQ3	13.10	0.15	1	6.35	0.72	0.252	0.058
13391		1999 JF37	12.50	0.15	1	12.78	1.26	0.108	0.022
13395	Deconihout	1999 RH35	14.60	0.15	4	7.05	0.33	0.052	0.005
13441	Janmerlin	2098 P-L	12.50	0.15	1	7.76	0.54	0.293	0.043
13493	Lockwood	1985 PT	13.50	0.15	2	14.24	0.70	0.035	0.004
13504		1988 RV12	11.60	0.15	3	26.66	1.19	0.057	0.006
13509		1989 GU3	14.10	0.15	1	14.46	1.03	0.019	0.003
13512		1989 TH1	13.00	0.15	7	9.89	0.23	0.121	0.007
13525		1991 PG3	13.60	0.15	1	13.57	0.87	0.035	0.005
13555		1992 JB2	13.00	0.15	6	13.24	0.41	0.067	0.005
13556		1992 OY7	13.00	0.15	4	11.13	0.39	0.094	0.007

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{v}	$\sigma(p_{\mathrm{v}})$
13574		1993 FX79	13.80	0.15	2	11.77	0.80	0.039	0.006
13575		1993 GN	14.50	0.15	1	6.62	0.54	0.064	0.011
13618		1995 BF2	12.70	0.15	3	20.93	0.82	0.034	0.003
13684	Borbona	1997 QQ2	12.50	0.15	3	19.78	0.98	0.050	0.005
13690	Lesleymartin	1997 RG9	12.90	0.15	3	14.38	0.82	0.065	0.008
13695		1998 FO52	13.80	0.15	1	11.77	0.83	0.039	0.006
13808	Davewilliams	1998 XG24	12.10	0.15	1	22.70	1.77	0.050	0.008
13809		1998 XJ40	12.70	0.15	1	10.19	1.39	0.141	0.039
13810		1998 XU51	12.00	0.15	2	15.63	0.98	0.118	0.016
13812		1998 YR	12.10	0.15	1	16.68	0.91	0.092	0.011
13817	Genobechetti	1999 RH39	12.40	0.15	3	18.11	0.93	0.062	0.007
13832		1999 XR13	10.50	0.15	5	42.09	1.15	0.065	0.004
13842		1999 XR33	12.90	0.15	2	12.49	0.91	0.087	0.014
13856		1999 XZ105	12.70	0.15	4	15.50	0.50	0.063	0.005
13859	Fredtreasure	1999 XQ136	12.00	0.15	1	21.71	1.34	0.059	0.008
13874		3013 P-L	13.00	0.15	1	14.22	1.04	0.055	0.008
13913		1979 SO	13.50	0.15	1	11.96	0.67	0.049	0.006
13914	Galegant	1980 LC1	13.00	0.15	2	14.97	1.02	0.051	0.007
13921	Sgarbini	1985 RP	14.40	0.15	1	4.78	0.52	0.134	0.030
13933	Charleville	1988 VE1	12.80	0.15	4	11.97	0.51	0.094	0.009
13936		1989 HC	11.70	0.15	2	21.42	1.45	0.081	0.012
13938		1989 RP1	13.10	0.15	5	13.11	0.32	0.060	0.003
13945		1990 OH2	12.60	0.15	8	20.76	0.45	0.040	0.002
13968		1991 RE7	11.80	0.15	4	21.59	0.75	0.076	0.006
13989	Murikabushi	1993 BG	13.90	0.15	5	7.15	0.21	0.100	0.006
13997		1993 FB32	14.80	0.15	1	8.83	0.59	0.027	0.004
14006	Sakamotofumio	1993 SA4	12.40	0.15	3	16.47	0.58	0.073	0.005
14009		1993 TQ36	13.00	0.15	3	14.25	0.65	0.057	0.006
14033		1994 YR	14.00	0.15	5	8.47	0.30	0.063	0.005
14039		1995 KZ1	12.20	0.15	4	20.70	0.73	0.059	0.005
14076		1996 OO1	12.60	0.15	2	16.36	1.30	0.060	0.010
14195		1998 XD51	11.90	0.15	1	20.46	1.72	0.073	0.013
14211		1999 NT1	13.70	0.15	2	4.07	0.35	0.353	0.063
14220		1999 VE115	12.50	0.15	9	19.65	0.32	0.047	0.002
14227		1999 XW85	12.20	0.15	3	20.22	0.80	0.057	0.005
14241		2000 AO5	12.50	0.15	1	19.21	0.93	0.048	0.005
14274	Landstreet	2000 BL21	12.40	0.15	2	22.49	1.54	0.040	0.006
14315	Ogawamachi	1977 EL5	12.50	0.15	3	20.30	0.89	0.052	0.005
14316	Higashichichibu	1977 ES7	12.40	0.15	1	25.71	1.62	0.029	0.004
14341		1983 RV3	13.40	0.15	6	13.88	0.44	0.041	0.003
14342	Iglika	1984 SL	12.00	0.15	1	19.08	0.93	0.077	0.008
14356		1987 SF6	14.60	0.15	1	6.04	0.53	0.070	0.013
14360	Ipatov	1988 CV4	13.50	0.15	1	16.36	1.14	0.026	0.004
14380		1989 UC6	12.50	0.15	6	13.56	0.32	0.098	0.005
14384		1990 OH4	12.90	0.15	1	14.56	1.01	0.058	0.008
14389		1990 QR5	13.10	0.15	1	10.90	1.00	0.085	0.016
14394		1990 SP15	11.60	0.15	5	23.37	0.71	0.075	0.005
14409		1991 RM1	11.80	0.15	3	21.45	0.88	0.077	0.007
14426		1991 UO2	13.70	0.15	1	10.12	0.86	0.057	0.010
14441		1992 SJ	13.20	0.15	1	9.44	0.90	0.104	0.020
14479	Plekhanov	1994 CQ13	12.60	0.15	1	9.93	1.31	0.163	0.044
14492	Bistar	1994 VM6	13.40	0.15	1	13.59	1.09	0.042	0.007
14551	Itagaki	1997 UN8	13.10	0.15	1	13.63	0.81	0.055	0.007
14564	Heasley	1998 BX13	12.90	0.15	2	8.81	0.77	0.166	0.032
14566	Hokule'a	1998 MY7	13.80	0.15	4	12.81	0.42	0.035	0.003
14569		1998 QB32	12.50	0.15	4	18.93	0.78	0.052	0.005
14612	Irtish	1998 SG164	12.30	0.15	1	20.93	1.20	0.048	0.006
14625		1998 UH31	12.10	0.15	1	13.24	0.75	0.146	0.018
14631		1998 VS32	11.70	0.15	2	21.77	1.19	0.082	0.010
14639		1998 WK3	14.20	0.15	1	6.21	0.81	0.096	0.025
14648		1998 XV49	12.30	0.15	1	11.83	1.38	0.152	0.036
14649		1998 XW62	13.00	0.15	1	19.34	1.43	0.030	0.005
14691		2000 AK119	12.20	0.15	5	12.71	0.39	0.150	0.010
14705		2000 CG2	12.50	0.15	3	16.54	0.66	0.069	0.006
14717		2000 CJ82	12.50	0.15	5	18.23	0.58	0.054	0.004
14726		2000 DD3	12.40	0.15	2	20.61	1.43	0.047	0.007
14790	Beletskij	1970 OF	13.20	0.15	1	6.51	0.75	0.219	0.051
14818	Mindeli	1982 UF7	12.60	0.15	3	16.06	0.66	0.066	0.006
14822		1984 SR5	12.70	0.15	2	17.31	1.40	0.049	0.008
14826	Nicollier	1985 SC1	12.90	0.15	1	13.89	0.81	0.063	0.008
14836	Maxfrisch	1988 CY	12.70	0.15	4	17.15	0.74	0.051	0.005
14846	Lampedusa	1989 BH	13.60	0.15	4	8.62	0.35	0.089	0.008
14868		1990 RA7	14.30	0.15	3	6.89	0.34	0.072	0.008
14886		1991 RL9	14.80	0.15	1	9.52	0.74	0.023	0.004
14889		1991 VX2	12.50	0.15	1	12.48	1.43	0.113	0.026
14935		1995 BP1	13.70	0.15	8	9.06	0.23	0.075	0.004
14962	Masanoriabe	1996 TL15	12.10	0.15	3	24.80	1.11	0.043	0.004
14988	Tryggvason	1997 UA7	13.20	0.15	1	11.54	1.06	0.070	0.013
14991		1997 UV14	13.00	0.15	2	18.35	1.13	0.033	0.004
14995	Archytas	1997 VY1	12.90	0.15	2	16.36	1.12	0.049	0.008
15056	Barbaradixon	1998 YP12	12.80	0.15	2	17.51	1.19	0.044	0.006
15066		1999 AX7	12.40	0.15	3	25.51	1.14	0.031	0.003
15082		1999 CT30	12.20	0.15	1	21.45	1.38	0.051	0.007
15085		1999 CB43	12.90	0.15	1	14.62	1.04	0.057	0.009
15101		2000 AY150	12.50	0.15	1	14.22	1.15	0.087	0.015
15102		2000 AA202	11.80	0.15	2	25.23	1.61	0.054	0.007
15104		2000 BV3	12.60	0.15	2	17.14	1.14	0.056	0.008
15112	Arlenewolfe	2000 CY94	14.10	0.15	2	7.18	0.61	0.079	0.014
15127		2000 EN45	11.90	0.15	5	22.06	0.57	0.064	0.003
15136		2000 EE93	12.20	0.15	4	20.43	0.80	0.057	0.005
15147	Siegfried	2000 EJ134	12.30	0.15	1	21.58	1.56	0.046	0.007
15153		2000 FD17	12.40	0.15	1	26.55	1.79	0.027	0.004
15161		2000 FQ48	11.10	0.15	8	34.44	0.50	0.056	0.002
15185		4104 T-1	13.10	0.15	1	12.45	0.99	0.066	0.011
15200		1975 SU	12.00	0.15	3	20.51	0.96	0.082	0.011
15246	Kumeta	1989 VS1	13.70	0.15	1	7.47	0.62	0.105	0.018
15249		1989 YB5	11.80	0.15	1	22.84	1.54	0.065	0.009
15256		1990 RD1	12.50	0.15	1	16.87	1.32	0.062	0.010
15269		1990 XF	12.40	0.15	1	9.48	0.74	0.216	0.035
15278	Paquet	1991 PG7	11.70	0.15	2	28.25	2.15	0.049	0.008

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
15293		1991 VO3	14.30	0.15	1	8.42	0.58	0.048	0.007
15305		1992 WT1	12.90	0.15	3	13.35	0.50	0.084	0.008
15330		1993 TO	13.90	0.15	5	9.27	0.32	0.070	0.007
15410		1997 YZ	12.20	0.15	2	21.14	1.41	0.052	0.007
15436		1998 VU30	9.50	0.15	4	78.63	2.20	0.046	0.003
15440		1998 WX4	9.10	0.15	2	71.88	3.87	0.079	0.009
15445		1998 XE	12.90	0.15	4	12.43	0.46	0.080	0.006
15450		1998 XV40	13.20	0.15	1	8.10	0.64	0.141	0.023
15454		1998 YB3	13.30	0.15	2	16.44	1.43	0.032	0.006
15488		1999 CB75	12.10	0.15	2	20.40	1.51	0.063	0.010
15494		1999 CX123	13.10	0.15	2	13.83	0.95	0.053	0.008
15502		1999 NV27	10.10	0.15	3	50.86	2.51	0.067	0.007
15514		1999 VW24	11.60	0.15	7	26.95	0.57	0.059	0.003
15527		1999 YY2	10.80	0.15	1	40.99	2.94	0.050	0.008
15532		2000 AP126	12.40	0.15	2	20.52	1.44	0.047	0.007
15534		2000 AQ164	12.70	0.15	2	18.86	1.24	0.043	0.006
15562		2000 GF48	11.90	0.15	5	27.81	0.56	0.040	0.002
15580		2000 GE71	12.90	0.15	1	13.54	1.14	0.067	0.012
15602		2000 GA108	13.30	0.15	2	14.32	1.16	0.042	0.007
15633		2000 JZ1	12.70	0.15	1	7.17	0.47	0.286	0.040
15637		2000 JY53	12.30	0.15	3	19.02	0.91	0.059	0.006
15675	Goloseevo	1978 SP5	13.20	0.15	2	12.66	0.94	0.062	0.010
15701		1987 RG1	13.70	0.15	7	10.35	0.26	0.059	0.003
15712		1989 RN2	13.00	0.15	3	15.74	0.73	0.048	0.005
15732	Vitusbering	1990 VZ5	12.60	0.15	5	20.46	0.68	0.040	0.003
15735	Andakerkhoven	1990 WF2	13.40	0.15	1	18.71	1.42	0.022	0.003
15736		1990 XN	13.80	0.15	5	11.73	0.38	0.040	0.003
15751		1991 VN4	12.10	0.15	1	15.96	1.08	0.100	0.014
15752	Eluard	1992 BD2	13.30	0.15	4	16.30	0.63	0.033	0.003
15754		1992 EP	13.80	0.15	2	9.58	0.62	0.059	0.009
15758		1992 FT1	14.00	0.15	4	10.94	0.38	0.038	0.003
15795		1993 TY38	14.50	0.15	1	7.92	0.70	0.045	0.008
15811	Nusslein-Volhard	1994 ND1	12.60	0.15	5	18.64	0.57	0.048	0.003
15842		1995 SX2	14.50	0.15	2	7.31	0.55	0.053	0.008
15848		1995 YJ4	12.20	0.15	9	19.86	0.33	0.062	0.002
15878		1996 XC3	12.70	0.15	2	14.23	1.01	0.072	0.010
15941	Stevegauthier	1997 YX15	13.10	0.15	2	18.18	1.18	0.031	0.004
15951		1998 BB2	12.30	0.15	1	18.20	1.16	0.064	0.009
15974		1998 FL103	12.80	0.15	1	18.46	1.28	0.039	0.006
15975		1998 FW108	13.60	0.15	1	15.54	1.29	0.027	0.005
15977		1998 MA11	10.40	0.15	2	51.53	3.86	0.046	0.007
15979		1998 QW34	12.30	0.15	3	11.88	0.54	0.155	0.015
15981		1998 UP6	13.20	0.15	3	8.81	0.41	0.124	0.013
16018		1999 CJ67	12.30	0.15	7	19.30	0.45	0.059	0.003
16029		1999 DQ6	12.20	0.15	1	22.48	1.73	0.046	0.007
16031		1999 FJ10	13.40	0.15	1	13.42	1.10	0.043	0.007
16035	Sasandford	1999 FX32	12.50	0.15	2	19.36	1.28	0.047	0.007
16037	Sheehan	1999 GX8	13.30	0.15	4	19.72	0.79	0.024	0.002
16041		1999 GM19	12.00	0.15	4	14.72	0.61	0.134	0.012
16054		1999 JP55	13.00	0.15	4	18.08	0.64	0.036	0.003
16057		1999 JO75	12.70	0.15	3	13.69	0.64	0.080	0.008
16070		1999 RB101	9.80	0.15	2	68.98	3.69	0.045	0.005
16106	Carmagnola	1999 VW212	14.00	0.15	1	9.90	0.78	0.045	0.007
16133		1999 XC100	12.60	0.15	4	23.40	0.82	0.030	0.002
16151		1999 XF230	13.60	0.15	1	9.99	0.76	0.064	0.010
16153		2000 AB	12.50	0.15	1	15.25	1.16	0.076	0.012
16156		2000 AP39	12.50	0.15	4	15.77	0.68	0.075	0.007
16159		2000 AK62	12.80	0.15	3	15.74	0.89	0.055	0.007
16171		2000 AD97	13.90	0.15	1	15.30	0.98	0.021	0.003
16194	Roderick	2000 AJ231	12.80	0.15	5	20.59	0.65	0.032	0.002
16216		2000 DR4	13.00	0.15	2	13.59	1.04	0.061	0.009
16235		2000 FF46	13.60	0.15	2	14.28	0.68	0.032	0.003
16242		2000 GT126	13.90	0.15	1	10.38	0.73	0.045	0.007
16257		2000 JY6	12.60	0.15	6	25.35	0.61	0.026	0.001
16259	Housinger	2000 JR13	14.50	0.15	2	9.38	0.73	0.032	0.005
16272		2000 JS55	12.40	0.15	1	19.50	1.52	0.051	0.008
16277		2000 JW74	13.70	0.15	4	16.34	0.65	0.023	0.002
16285		3047 P-L	12.60	0.15	3	15.37	0.69	0.071	0.007
16332		4117 T-2	13.10	0.15	3	16.93	0.81	0.036	0.004
16359		1978 VO4	14.90	0.15	3	10.23	0.49	0.019	0.002
16390		1981 EG39	14.40	0.15	1	9.55	1.16	0.034	0.008
16408		1986 AB	12.70	0.15	4	14.48	0.48	0.079	0.007
16447	Vauban	1989 RX	13.10	0.15	2	10.17	0.70	0.098	0.014
16449	Kigoyama	1989 SO	12.20	0.15	4	15.53	0.61	0.099	0.009
16458		1989 WZ2	12.70	0.15	1	17.01	1.10	0.051	0.007
16461		1990 BO	11.60	0.15	6	26.84	0.68	0.057	0.003
16467		1990 FD3	12.20	0.15	1	17.16	1.35	0.079	0.013
16481		1990 QU7	13.50	0.15	5	13.36	0.46	0.040	0.003
16485		1990 RG2	12.90	0.15	1	12.40	0.91	0.079	0.012
16546		1991 RP5	12.60	0.15	3	17.86	0.93	0.051	0.005
16549		1991 RE10	13.10	0.15	3	15.00	0.74	0.049	0.005
16560	Daitor	1991 VZ5	10.90	0.15	1	43.38	3.29	0.041	0.006
16593		1992 UB3	13.20	0.15	1	11.86	1.22	0.066	0.014
16643		1993 RV15	14.60	0.15	1	8.45	0.65	0.036	0.006
16698		1995 CX	13.20	0.15	2	11.89	0.75	0.066	0.009
16708		1995 SP1	13.30	0.15	4	17.26	0.71	0.029	0.003
16712		1995 SW29	12.80	0.15	3	14.72	0.70	0.063	0.007
16713		1995 SV52	13.00	0.15	2	14.31	1.26	0.054	0.010
16722		1995 WG7	12.60	0.15	3	11.00	0.60	0.140	0.017
16785		1997 AL1	11.70	0.15	8	28.93	0.57	0.045	0.002
16786		1997 AT1	11.80	0.15	1	18.74	1.39	0.096	0.015
16796	Shinji	1997 CY16	13.60	0.15	1	13.21	0.99	0.037	0.006
16804	Bonini	1997 SX15	13.10	0.15	1	12.76	0.67	0.062	0.007
16844		1997 XY3	13.80	0.15	2	12.46	1.02	0.035	0.006
16885		1998 BX25	13.30	0.15	2	15.77	1.12	0.034	0.005
16897		1998 DH10	13.40	0.15	1	15.59	1.07	0.032	0.005
16927		1998 FX68	12.40	0.15	1	25.77	1.99	0.029	0.005
16928		1998 FF70	13.50	0.15	2	19.33	1.53	0.019	0.003
16936		1998 FJ112	11.90	0.15	1	12.80	1.00	0.187	0.030
16941		1998 GR7	12.50	0.15	4	20.36	0.88	0.044	0.004
16948		1998 HA133	13.60	0.15	1	14.20	1.17	0.032	0.005
16955		1998 KU48	12.20	0.15	1	10.73	0.95	0.202	0.037
16968		1998 TT5	12.60	0.15	1	14.92	1.11	0.072	0.011
16974		1998 WR21	9.80	0.15	2	57.15	3.85	0.066	0.009
16975	Delamere	1998 YX29	13.30	0.15	3	6.45	0.35	0.204	0.023
17013		1999 CA82	13.50	0.15	2	8.23	0.51	0.105	0.014
17100	Kamiokanatsu	1999 JT37	14.20	0.15	1	10.74	1.01	0.032	0.006
17117		1999 JL58	12.80	0.15	1	12.16	1.25	0.091	0.019
17129		1999 JM78	11.70	0.15	1	9.24	1.02	0.432	0.097
17161		1999 LQ13	12.80	0.15	6	18.88	0.57	0.047	0.004
17164		1999 LP24	12.70	0.15	2	21.48	1.24	0.032	0.004
17167		1999 NB	13.90	0.15	5	11.35	0.38	0.039	0.003
17175		1999 SS3	12.00	0.15	2	24.75	1.58	0.046	0.006
17213		2000 AF186	13.30	0.15	1	13.59	1.27	0.046	0.009
17230		2000 CX116	12.60	0.15	4	24.89	0.80	0.028	0.002
17232		2000 DE3	14.80	0.15	1	7.23	0.59	0.041	0.007
17252		2000 GJ127	12.70	0.15	9	23.24	0.41	0.028	0.001
17254		2000 GG137	12.30	0.15	1	14.20	1.08	0.105	0.017
17264		2000 JM66	12.50	0.15	4	16.96	0.58	0.068	0.005
17266		2000 KT6	14.00	0.15	6	13.58	0.43	0.028	0.002
17276		2000 LU22	12.90	0.15	4	15.73	0.52	0.050	0.004
17283	Ustinov	2000 MB1	13.10	0.15	2	19.96	1.74	0.025	0.005
17297		3560 P-L	11.80	0.15	7	27.66	0.61	0.044	0.002
17398		1982 UR2	14.10	0.15	2	11.18	0.90	0.032	0.005
17428	Charleroi	1989 DL	11.20	0.15	5	34.21	0.89	0.050	0.003
17440		1989 TP14	13.40	0.15	4	11.93	0.45	0.056	0.005
17443		1989 UU5	13.60	0.15	1	16.55	1.56	0.023	0.004
17445	Avatcha	1989 YC5	12.60	0.15	2	22.02	1.13	0.033	0.004
17508	Takumadan	1992 JH	14.70	0.15	1	6.32	0.53	0.058	0.010
17520		1993 BX2	12.90	0.15	3	12.38	0.60	0.083	0.009
17567		1994 GP	12.80	0.15	1	10.61	1.16	0.119	0.027
17615		1995 UZ8	13.30	0.15	2	12.37	1.01	0.058	0.011
17626		1996 AG2	12.00	0.15	3	18.49	0.82	0.085	0.009
17627	Humptydumpty	1996 BM3	12.80	0.15	1	15.18	1.06	0.058	0.009
17683	Kanagawa	1997 AR16	12.70	0.15	10	18.84	0.36	0.043	0.002
17730		1998 AS4	13.20	0.15	1	8.11	0.68	0.141	0.025
17754		1998 DN8	12.70	0.15	2	15.21	1.07	0.069	0.011
17790		1998 FN49	13.80	0.15	1	13.64	1.04	0.029	0.005
17802		1998 FA71	12.70	0.15	2	19.72	1.29	0.038	0.005
17809		1998 FR78	12.30	0.15	2	21.68	1.20	0.047	0.006
17811		1998 FH105	13.40	0.15	6	11.26	0.37	0.067	0.005
17816		1998 FY113	12.60	0.15	3	18.25	0.82	0.050	0.005
17839		1998 HN95	12.00	0.15	2	22.55	1.22	0.055	0.006
17840		1998 HG96	12.40	0.15	2	20.39	1.47	0.048	0.007
17855	Geffert	1998 KK	12.50	0.15	1	15.09	1.27	0.078	0.014
17861		1998 KN24	12.00	0.15	3	18.76	1.01	0.079	0.009
17973		1999 JP51	12.70	0.15	5	24.64	0.81	0.025	0.002
17989		1999 JE64	13.00	0.15	2	14.30	1.65	0.055	0.013
17997		1999 JN78	14.10	0.15	2	7.48	0.60	0.079	0.015
18042		1999 RF27	13.80	0.15	4	10.87	0.33	0.047	0.003
18052		1999 RV199	12.30	0.15	2	22.69	1.37	0.042	0.005
18053		1999 RU208	13.20	0.15	3	17.24	0.69	0.032	0.003
18054		1999 SW7	10.80	0.15	1	46.79	3.31	0.039	0.006
18057		1999 VK10	13.50	0.15	3	10.80	0.48	0.068	0.007
18105		2000 NT3	12.80	0.15	2	12.49	0.65	0.086	0.010
18129		2000 OH5	13.30	0.15	1	8.84	0.72	0.108	0.018
18135		2000 OQ20	13.30	0.15	1	13.31	0.98	0.048	0.007
18148	Bellier	2000 OZ57	12.80	0.15	1	18.83	1.37	0.038	0.006
18150	Lopez-Moreno	2000 OC60	12.30	0.15	1	21.99	1.95	0.044	0.008
18151	Licchelli	2000 OT60	13.30	0.15	2	8.45	0.68	0.136	0.027
18153		2000 OC61	11.90	0.15	3	16.86	0.80	0.113	0.012
18169	Amaldi	2000 QF	12.30	0.15	4	19.66	0.68	0.058	0.004
18181		2000 QD34	13.20	0.15	5	5.96	0.20	0.262	0.019
18219		6260 P-L	11.60	0.15	2	25.81	1.40	0.062	0.007
18227		1222 T-1	14.30	0.15	1	9.13	0.62	0.040	0.006
18239	Ekers	1251 T-2	13.60	0.15	1	10.95	1.11	0.054	0.011
18285	Vladplatonov	1972 GJ	12.30	0.15	6	15.73	0.41	0.086	0.005
18300		1979 PA	14.60	0.15	1	10.19	0.72	0.025	0.004
18331		1987 DQ6	12.20	0.15	8	27.32	0.54	0.032	0.001
18336		1988 LG	13.30	0.15	1	9.36	0.76	0.097	0.016
18345		1989 UP4	12.90	0.15	2	12.72	0.95	0.078	0.013
18377		1991 SH1	13.50	0.15	6	11.56	0.31	0.054	0.003
18399		1992 WK1	12.10	0.15	1	28.27	1.98	0.032	0.005
18429		1994 AO1	13.20	0.15	1	10.01	0.90	0.092	0.017
18439		1994 LJ1	12.80	0.15	4	9.82	0.40	0.142	0.012
18471		1995 UZ45	14.00	0.15	1	11.33	0.90	0.035	0.006
18474		1995 WV3	12.70	0.15	4	14.85	0.54	0.074	0.006
18488		1996 AY3	11.90	0.15	6	26.60	0.49	0.043	0.002
18571		1997 WQ21	13.30	0.15	5	11.37	0.34	0.068	0.005
18616		1998 DR5	13.30	0.15	5	13.08	0.37	0.052	0.003
18640		1998 EF9	13.40	0.15	2	6.87	0.47	0.164	0.024
18807		1999 JL85	14.10	0.15	1	9.29	0.70	0.047	0.007
18833		1999 NT53	13.60	0.15	2	13.22	0.90	0.037	0.005
18835		1999 NK56	11.90	0.15	1	8.83	0.83	0.394	0.076
18859		1999 RM130	13.90	0.15	1	9.88	0.90	0.050	0.009
18889		2000 CC28	13.10	0.15	2	14.59	1.16	0.049	0.008
18909		2000 OE21	13.90	0.15	2	10.00	0.98	0.049	0.010
18963		2000 QB141	13.30	0.15	1	14.53	0.98	0.040	0.006
18980	Johannatang	2000 RY2	14.80	0.15	2	8.30	0.66	0.030	0.005
18984	Olathe	2000 RA8	13.30	0.15	1	27.60	1.35	0.011	0.001
18986		2000 RF22	14.40	0.15	1	10.78	0.75	0.026	0.004
18996	Torasan	2000 RR53	11.90	0.15	2	24.37	1.39	0.053	0.007
19010		2000 RT72	13.00	0.15	1	13.48	1.41	0.061	0.013
19028		2000 SC165	12.30	0.15	2	19.64	1.35	0.055	0.008
19030		2000 SJ276	12.90	0.15	3	13.74	0.72	0.068	0.008
19059		1352 T-2	14.70	0.15	1	7.84	0.71	0.038	0.007
19078		5187 T-3	13.00	0.15	2	12.53	1.12	0.080	0.017
19121		1985 CY1	13.90	0.15	2	12.83	0.93	0.030	0.005
19173	Virginiaterese	1991 GE2	14.00	0.15	2	8.37	0.60	0.064	0.009
19222		1993 QK1	14.50	0.15	1	8.24	0.63	0.041	0.007

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{v}	$\sigma(p_{\mathrm{v}})$
19261		1995 MB	12.90	0.15	1	8.56	0.51	0.167	0.021
19327		1996 XH19	13.30	0.15	6	12.95	0.37	0.052	0.003
19337		1997 AT	13.50	0.15	5	11.55	0.25	0.054	0.003
19340		1997 AV4	13.20	0.15	1	19.10	1.06	0.025	0.003
19427		1998 FJ66	13.90	0.15	4	10.75	0.50	0.046	0.005
19590		1999 NG18	12.30	0.15	1	18.86	1.40	0.060	0.009
19615		1999 OB3	12.00	0.15	4	26.65	0.89	0.040	0.003
19646		1999 RF102	12.80	0.15	5	19.29	0.59	0.036	0.002
19661		1999 RR130	13.50	0.15	7	14.96	0.40	0.033	0.002
19668		1999 RB145	12.90	0.15	1	11.83	1.11	0.087	0.017
19683		1999 RK196	13.70	0.15	2	9.39	0.69	0.076	0.013
19696		1999 SW1	12.80	0.15	1	18.23	1.42	0.040	0.006
19720		1999 VP10	12.60	0.15	3	15.60	0.71	0.066	0.006
19728		1999 XQ14	13.50	0.15	5	10.77	0.33	0.072	0.005
19730	Machiavelli	1999 XO36	13.90	0.15	3	9.42	0.53	0.062	0.008
19744		2000 AC176	13.40	0.15	2	12.80	0.79	0.049	0.006
19748		2000 BD5	11.50	0.15	2	35.54	1.77	0.036	0.004
19752		2000 CH67	11.40	0.15	2	25.04	1.66	0.078	0.011
19783	Antoniromanya	2000 QF71	13.30	0.15	1	12.37	0.99	0.055	0.009
19858		2000 UT18	13.30	0.15	4	12.55	0.51	0.054	0.005
19910		5078 T-3	12.50	0.15	1	13.16	1.64	0.102	0.026
19911		1933 FK	12.50	0.15	9	21.02	0.35	0.041	0.001
19918		1977 PB	13.00	0.15	1	7.76	0.82	0.185	0.040
19926		1979 YQ	13.60	0.15	1	12.03	1.56	0.044	0.012
19968		1988 FE3	13.70	0.15	1	10.25	0.88	0.056	0.010
19981	Bialystock	1989 YB6	13.20	0.15	2	16.65	1.19	0.035	0.005
19986		1990 KD	14.60	0.15	1	6.72	0.60	0.057	0.011
20001		1991 CM	12.10	0.15	3	26.03	1.32	0.038	0.004
20007	Marybrown	1991 LR	14.40	0.15	4	6.88	0.28	0.067	0.006
20036		1992 UW1	14.30	0.15	3	9.58	0.48	0.039	0.005
20038		1992 UN5	11.90	0.15	1	25.74	2.21	0.046	0.008
20098		1994 WC2	11.90	0.15	5	20.61	0.62	0.074	0.005
20101		1994 XM2	12.70	0.15	1	19.01	1.43	0.041	0.006
20175		1996 XJ27	14.10	0.15	3	11.45	0.66	0.033	0.004
20210		1997 GQ7	12.50	0.15	2	23.85	1.41	0.031	0.004
20243		1998 DB36	14.00	0.15	1	5.96	0.48	0.125	0.021
20346		1998 HZ114	13.60	0.15	3	10.22	0.45	0.062	0.006
20363	Komitov	1998 KU1	15.00	0.15	1	8.89	0.72	0.022	0.004
20391		1998 KT55	12.80	0.15	3	12.46	0.44	0.087	0.007
20395		1998 MY29	12.70	0.15	7	17.28	0.43	0.050	0.003
20402		1998 OH6	12.60	0.15	1	13.40	1.11	0.090	0.015
20409		1998 QP43	12.60	0.15	2	16.06	1.29	0.063	0.010
20412		1998 QG73	12.30	0.15	1	12.19	1.26	0.143	0.030
20470		1999 NZ5	13.80	0.15	1	10.20	0.80	0.051	0.008
20502		1999 RG11	12.90	0.15	1	13.35	1.17	0.069	0.013
20520		1999 RC38	12.50	0.15	1	13.05	1.10	0.104	0.018
20525		1999 RU43	13.10	0.15	6	14.61	0.36	0.050	0.003
20562		1999 RV120	13.50	0.15	2	8.95	0.66	0.092	0.014
20602		1999 RC198	12.20	0.15	2	19.07	1.41	0.065	0.010
20607	Vernazza	1999 RR219	13.00	0.15	2	16.65	0.94	0.041	0.005
20617		1999 SA7	12.20	0.15	3	18.99	0.89	0.068	0.007
20635		1999 TV96	12.00	0.15	4	22.17	0.80	0.065	0.006
20676		1999 VA7	13.00	0.15	2	17.15	1.25	0.043	0.007
20679		1999 VU9	12.40	0.15	3	17.02	0.88	0.068	0.007
20691		1999 VY72	13.20	0.15	1	6.07	0.39	0.251	0.034
20713		1999 XA32	11.70	0.15	2	19.64	1.28	0.101	0.013
20718		1999 XZ97	11.90	0.15	1	24.40	1.54	0.052	0.007
20734		1999 XA169	12.50	0.15	3	21.80	1.09	0.038	0.004
20755		2000 BX6	12.60	0.15	2	16.51	1.17	0.059	0.008
20762		2000 EE36	11.50	0.15	2	21.97	1.79	0.102	0.019
20825		2000 UN11	12.50	0.15	5	15.94	0.46	0.074	0.005
20840	Borishanin	2000 UF58	14.30	0.15	5	12.61	0.40	0.022	0.002
20869		2000 VK45	13.80	0.15	4	8.06	0.33	0.083	0.007
20985		1981 EA35	12.60	0.15	1	11.13	0.87	0.130	0.021
21018		1988 VV1	12.60	0.15	1	16.02	0.97	0.063	0.008
21022	Ike	1989 CR	13.00	0.15	3	9.26	0.41	0.131	0.012
21062	Iasky	1991 JW1	11.70	0.15	3	18.29	0.94	0.111	0.012
21065		1991 NM	12.10	0.15	2	14.75	1.35	0.128	0.027
21066		1991 NG5	15.00	0.15	1	6.65	0.51	0.040	0.006
21088		1992 BL2	14.40	0.15	2	3.46	0.25	0.257	0.038
21108		1992 QT	14.30	0.15	7	10.90	0.25	0.029	0.001
21182		1994 EC2	13.60	0.15	1	5.95	0.41	0.181	0.026
21258	Huckins	1996 EH1	12.90	0.15	1	12.76	1.05	0.075	0.013
21262	Kanba	1996 HA2	13.80	0.15	7	14.11	0.40	0.028	0.002
21534		1998 OV12	13.60	0.15	3	13.48	0.76	0.035	0.004
21555	Levary	1998 QF70	12.50	0.15	1	16.68	1.40	0.063	0.011
21559	Jingyuanluo	1998 QE78	13.70	0.15	1	8.85	0.58	0.075	0.010
21563	Chetgervais	1998 QW95	14.30	0.15	1	6.34	0.94	0.084	0.025
21565		1998 QZ102	13.50	0.15	2	13.17	0.91	0.041	0.006
21578		1998 SN27	13.00	0.15	2	15.00	0.95	0.050	0.007
21586	Pourkaviani	1998 SU129	12.50	0.15	2	19.31	1.20	0.049	0.007
21587	Christopynn	1998 SE132	12.50	0.15	8	19.92	0.43	0.048	0.002
21592		1998 VJ5	13.10	0.15	1	8.09	0.73	0.155	0.029
21601		1998 XO89	9.40	0.15	5	56.08	1.94	0.100	0.007
21621	Sherman	1999 KR4	14.50	0.15	1	8.07	0.59	0.043	0.007
21627	Sillis	1999 NZ3	14.20	0.15	3	8.24	0.45	0.057	0.007
21632	Suwanasri	1999 NR11	14.00	0.15	5	9.82	0.29	0.048	0.003
21688		1999 RK37	14.30	0.15	6	9.32	0.26	0.040	0.002
21689		1999 RL38	15.10	0.15	1	6.00	0.53	0.045	0.008
21696	Ermalmquist	1999 RC52	15.10	0.15	1	5.35	0.60	0.056	0.013
21736	Samaschneid	1999 RW149	14.20	0.15	1	5.22	0.61	0.135	0.032
21760		1999 RM199	14.30	0.15	3	9.36	0.37	0.040	0.004
21766		1999 RW208	12.80	0.15	1	20.06	1.61	0.033	0.006
21768		1999 RL210	13.50	0.15	1	16.37	1.14	0.026	0.004
21792		1999 ST7	13.00	0.15	1	13.39	0.97	0.062	0.009
21900		1999 VQ10	9.80	0.15	2	53.87	4.08	0.083	0.015
21930		1999 VP61	13.00	0.15	2	19.28	1.45	0.030	0.005
21943		1999 VG114	14.40	0.15	1	8.98	0.64	0.038	0.006
21954		1999 VU178	14.10	0.15	1	10.14	1.10	0.039	0.009
21967		1999 WS9	12.00	0.15	7	18.85	0.37	0.080	0.003
21971		1999 XG	14.30	0.15	1	6.86	0.99	0.071	0.021
22043		1999 XW204	12.90	0.15	4	17.31	0.64	0.043	0.004
22044		1999 XS206	12.30	0.15	1	16.70	1.36	0.076	0.013
22046		1999 XU211	12.90	0.15	2	15.73	1.26	0.050	0.008
22050		1999 YV13	12.90	0.15	2	17.09	1.35	0.045	0.008
22053		2000 AO17	13.40	0.15	5	17.26	0.52	0.027	0.002
22070		2000 AN106	12.70	0.15	3	21.29	0.92	0.033	0.003
22071		2000 AB107	13.60	0.15	1	16.69	1.29	0.023	0.004
22097		2000 BH4	12.40	0.15	4	20.58	0.66	0.046	0.003
22106		2000 NC12	12.80	0.15	1	12.07	0.77	0.092	0.012
22115		2000 RB62	13.20	0.15	2	10.77	0.77	0.080	0.012
22118		2000 SL86	13.00	0.15	3	15.20	0.74	0.057	0.006
22129		2000 SD311	13.10	0.15	2	13.66	1.07	0.057	0.010
22149		2000 WD49	9.90	0.15	1	50.37	4.09	0.076	0.013
22177	Saotome	2000 XS38	12.60	0.15	1	19.66	1.64	0.042	0.007
22185	Stiavnica	2000 YV28	13.10	0.15	2	20.10	1.48	0.026	0.004
22249	Dvorets Pionerov	1972 RF2	15.30	0.15	1	6.34	0.51	0.033	0.006
22270		1981 EQ30	14.30	0.15	1	6.64	0.61	0.076	0.014
22279		1984 DM	12.60	0.15	6	18.28	0.42	0.049	0.003
22295		1989 SZ9	13.10	0.15	2	8.94	0.67	0.127	0.020
22393		1994 QV	13.60	0.15	3	10.99	0.44	0.056	0.005
22394		1994 TO	13.10	0.15	1	10.69	0.80	0.089	0.014
22401	Egisto	1995 DP3	13.10	0.15	1	14.44	1.16	0.049	0.008
22412		1995 UQ4	12.80	0.15	8	13.43	0.27	0.076	0.003
22440	Bangsgaard	1996 KA	13.20	0.15	3	14.21	0.80	0.047	0.006
22473		1997 EN4	14.70	0.15	1	7.94	0.66	0.037	0.006
22481	Zachlynn	1997 GM13	14.00	0.15	1	10.71	0.95	0.039	0.007
22647	Levi-Strauss	1998 OR8	13.70	0.15	1	17.75	1.57	0.019	0.003
22714		1998 SR2	12.60	0.15	3	17.38	0.83	0.058	0.006
22754		1998 WJ8	12.70	0.15	4	20.83	0.92	0.034	0.003
22805		1999 RR2	12.30	0.15	1	17.98	1.11	0.066	0.009
22940	Chyan	1999 TF178	15.10	0.15	1	5.37	0.76	0.056	0.016
22955		1999 TH251	13.10	0.15	3	13.56	0.86	0.060	0.008
23025		1999 WR9	12.60	0.15	4	21.08	0.95	0.038	0.004
23030	Jimkennedy	1999 XR7	11.90	0.15	1	12.27	1.66	0.204	0.056
23099		1999 XA160	11.40	0.15	8	31.96	0.63	0.049	0.002
23101		1999 XP164	12.50	0.15	7	20.63	0.44	0.042	0.002
23104		1999 XK182	13.80	0.15	2	11.12	0.81	0.046	0.007
23129		2000 AO100	12.10	0.15	2	26.89	1.53	0.037	0.005
23135		2000 AN146	9.90	0.15	6	68.50	1.93	0.042	0.003
23138		2000 AV150	12.90	0.15	1	11.87	0.96	0.087	0.015
23143		2000 AZ177	12.90	0.15	2	10.24	0.52	0.124	0.015
23145		2000 AB187	15.10	0.15	1	6.80	0.54	0.035	0.006
23184		2000 OD36	13.90	0.15	2	10.23	0.63	0.047	0.006
23232	Buschur	2000 WU59	14.30	0.15	3	9.79	0.42	0.039	0.004
23268		2000 YD55	13.70	0.15	2	6.21	0.48	0.154	0.025
23301		2001 AO16	10.90	0.15	1	34.21	2.33	0.066	0.009
23351		6818 P-L	14.50	0.15	1	8.91	0.68	0.035	0.006
23479		1991 CG	12.10	0.15	6	16.98	0.45	0.104	0.006
23544		1993 XW	13.00	0.15	1	18.38	1.57	0.033	0.006
23562		1994 TR1	14.10	0.15	7	8.33	0.21	0.060	0.003
23691		1997 JN16	14.20	0.15	1	10.73	0.61	0.032	0.004
23711		1997 UT2	13.00	0.15	1	12.02	0.96	0.077	0.013
23737		1998 HW150	14.80	0.15	1	6.07	0.47	0.058	0.009
23782		1998 QE12	12.50	0.15	2	16.42	1.43	0.069	0.013
23807		1998 QM40	13.90	0.15	1	9.55	0.72	0.053	0.008
23830		1998 QZ85	13.50	0.15	8	9.18	0.21	0.086	0.004
23900	Urakawa	1998 SO61	13.50	0.15	1	12.31	1.06	0.046	0.008
23918		1998 SH133	13.10	0.15	1	16.40	1.20	0.038	0.006
23923		1998 SA137	13.80	0.15	2	10.78	0.74	0.046	0.007
23936		1998 TV6	12.80	0.15	1	23.48	1.35	0.024	0.003
23951		1998 UX25	13.60	0.15	1	15.55	0.94	0.027	0.003
23953		1998 UV30	14.10	0.15	1	9.46	0.75	0.045	0.007
23958		1998 VD30	9.90	0.15	1	47.91	4.66	0.084	0.017
23977		1999 GW6	13.00	0.15	2	14.73	1.21	0.057	0.011
24038		1999 SL8	14.60	0.15	1	5.71	0.45	0.078	0.013
24127		1999 VZ52	11.40	0.15	2	26.10	1.64	0.072	0.010
24192		1999 XM30	12.60	0.15	1	14.01	1.75	0.082	0.021
24193		1999 XF32	13.50	0.15	2	8.04	0.55	0.109	0.015
24229		1999 XC90	12.60	0.15	1	13.59	1.45	0.087	0.019
24230		1999 XE90	13.90	0.15	1	9.30	0.80	0.056	0.010
24256		1999 XZ125	14.60	0.15	1	6.35	0.53	0.063	0.011
24276		1999 XO169	13.40	0.15	2	12.11	0.67	0.054	0.007
24282		1999 XB179	12.60	0.15	1	18.11	1.32	0.049	0.007
24362		2000 AR120	12.20	0.15	1	17.21	1.26	0.079	0.012
24388		2000 AB175	12.60	0.15	8	22.15	0.44	0.034	0.002
24402		2000 AT192	13.70	0.15	1	7.48	0.73	0.105	0.021
24412		2000 AM243	13.00	0.15	1	16.11	1.60	0.043	0.009
24427		2000 CN21	13.80	0.15	1	8.24	0.58	0.079	0.012
24478		2000 WC145	12.60	0.15	3	18.87	0.88	0.048	0.005
24500		2001 AX33	14.50	0.15	1	7.66	0.57	0.048	0.007
24513		2001 BL35	12.40	0.15	1	16.34	1.11	0.073	0.010
24520	Abramson	2001 CW1	15.00	0.15	1	7.77	0.60	0.029	0.005
24551		2048 P-L	14.80	0.15	1	8.07	0.85	0.033	0.007
24561		4646 P-L	12.80	0.15	2	17.48	1.50	0.053	0.010
24649	Balaklava	1985 SG3	13.30	0.15	3	18.28	0.78	0.026	0.002
24685		1990 FQ	14.10	0.15	2	9.20	0.59	0.048	0.007
24689		1990 OH1	12.80	0.15	9	16.11	0.29	0.054	0.002
24762		1993 DE1	13.10	0.15	2	11.80	0.82	0.075	0.012
24765		1993 FE8	14.50	0.15	2	8.50	0.64	0.038	0.006
24813		1994 VL1	14.00	0.15	1	10.19	0.65	0.043	0.006
24827	Maryphil	1995 RA	13.10	0.15	7	6.72	0.19	0.236	0.014
24870		1996 FJ1	13.70	0.15	3	10.52	0.53	0.061	0.007
24980		1998 KF2	13.10	0.15	11	9.93	0.18	0.105	0.004
25000	Astrometria	1998 OW5	12.60	0.15	3	15.89	0.81	0.070	0.008
25270		1998 VR27	12.70	0.15	3	15.87	0.89	0.061	0.007
25281		1998 WP	13.30	0.15	5	12.00	0.28	0.060	0.003
25286		1998 WC8	13.30	0.15	2	9.16	0.61	0.102	0.014
25295		1998 WK17	12.80	0.15	2	17.12	1.22	0.046	0.007
25306		1998 XQ73	12.20	0.15	2	20.29	1.44	0.057	0.008

Table E.2 (Continued.)

Asteroid			H	G	$N_{\rm ID}$	d	$\sigma(d)$	$p_{\rm V}$	$\sigma(p_{\rm V})$
25310		1998 XY92	12.70	0.15	4	16.64	0.47	0.056	0.004
25312	Asiapossenti	1998 YU6	12.20	0.15	2	19.55	1.50	0.061	0.010
25316		1999 AH23	12.50	0.15	1	11.36	0.91	0.137	0.023
25467		1999 XV32	13.60	0.15	3	12.20	0.50	0.044	0.004
25490	Kevinkelly	1999 XN84	14.50	0.15	1	8.09	0.66	0.043	0.007
25700		2000 AA128	13.20	0.15	1	16.48	1.09	0.034	0.005
25705		2000 AU128	13.00	0.15	1	10.31	1.15	0.105	0.024
25707		2000 AQ141	14.30	0.15	1	7.61	0.68	0.058	0.011
25726		2000 AD181	14.00	0.15	2	10.00	0.70	0.045	0.006
25743		2000 AA229	12.30	0.15	4	16.97	0.67	0.076	0.006
25789		2000 CK53	12.40	0.15	1	13.47	1.06	0.107	0.018
25791		2000 CM61	12.40	0.15	1	15.59	1.28	0.080	0.014
25794		2000 CF71	13.40	0.15	4	14.66	0.59	0.037	0.003
25845		2000 EO86	13.60	0.15	2	12.82	0.75	0.039	0.005
25869		2000 JP70	11.50	0.15	2	27.42	1.98	0.060	0.009
25881		2000 RH41	12.60	0.15	3	15.06	0.79	0.077	0.009
25906		2000 YV139	13.20	0.15	1	14.92	0.97	0.042	0.006
25915		2001 CF30	13.40	0.15	3	11.59	0.57	0.059	0.006
25917		2001 DT6	12.30	0.15	2	17.27	1.13	0.072	0.010
25977		2001 FG46	12.00	0.15	4	26.75	0.77	0.040	0.003
25982		2001 FQ57	12.70	0.15	1	16.94	1.32	0.051	0.008
25984		2001 FG60	13.90	0.15	1	8.40	0.74	0.069	0.013
26114		1991 QG	15.10	0.15	2	7.65	0.50	0.028	0.004
26121		1992 BX	13.70	0.15	2	11.26	0.61	0.046	0.005
26123		1992 OK	14.50	0.15	3	6.31	0.32	0.073	0.008
26124		1992 PG2	14.00	0.15	1	8.32	0.69	0.064	0.011
26125		1992 RG	13.00	0.15	6	11.21	0.28	0.089	0.005
26160		1994 XR4	12.90	0.15	7	11.65	0.29	0.093	0.005
26171		1996 BY2	14.00	0.15	5	13.70	0.41	0.025	0.002
26211		1997 RR9	14.30	0.15	2	9.09	0.61	0.041	0.006
26369		1999 CG62	11.90	0.15	6	20.15	0.55	0.084	0.005
26382		1999 LT32	11.50	0.15	4	28.37	1.03	0.057	0.004
26445		2000 AY61	13.50	0.15	2	9.80	0.66	0.074	0.011
26471		2000 AS152	13.00	0.15	1	6.05	0.44	0.304	0.046
26482		2000 AM203	12.10	0.15	4	24.95	0.74	0.046	0.003
26483		2000 AX204	14.00	0.15	3	9.13	0.52	0.058	0.007
26499		2000 CX1	13.40	0.15	2	13.20	0.94	0.046	0.007
26521		2000 CS76	13.40	0.15	1	11.24	0.89	0.061	0.010
26540		2000 DF13	14.30	0.15	1	8.71	0.78	0.044	0.008
26572		2000 EP84	13.60	0.15	1	16.47	1.21	0.024	0.004
26598		2000 EV171	13.60	0.15	1	10.64	1.07	0.057	0.012
26599		2000 EZ171	12.80	0.15	1	10.76	0.79	0.116	0.018
26607		2000 FA33	13.10	0.15	2	20.11	1.57	0.028	0.005
26610		2000 FK39	12.60	0.15	2	19.11	1.40	0.045	0.007
26616		2000 GG6	13.80	0.15	4	10.96	0.45	0.045	0.004
26621		2000 GY57	13.80	0.15	4	11.35	0.44	0.043	0.004
26623		2000 GK82	13.10	0.15	1	10.64	0.93	0.090	0.016
26635		2000 HC53	13.50	0.15	1	15.19	1.08	0.031	0.005
26718		2001 HP5	12.20	0.15	4	24.43	0.96	0.041	0.004
26719		2001 HQ5	13.20	0.15	2	13.34	1.10	0.053	0.009
26722		2001 HK7	13.20	0.15	6	18.12	0.40	0.029	0.001
26760		2001 KP41	15.50	0.15	7	4.98	0.12	0.046	0.002
26833		1990 RE	14.10	0.15	1	12.51	1.09	0.026	0.005
26847		1992 DG	13.50	0.15	3	13.93	0.58	0.037	0.003
26858	Misterrogers	1993 FR	12.80	0.15	6	8.07	0.17	0.208	0.010
26917	Pianoro	1996 RF4	13.20	0.15	1	14.15	1.09	0.046	0.007
26919	Shoichimiyata	1996 RC24	12.30	0.15	1	15.30	1.12	0.091	0.014
26925		1997 AK2	14.50	0.15	1	12.17	0.86	0.019	0.003
26968		1997 RB9	13.90	0.15	1	11.58	0.86	0.036	0.006
27005		1998 DR35	14.60	0.15	1	8.80	0.60	0.033	0.005
27109		1998 VV32	12.10	0.15	2	22.07	1.32	0.053	0.007
27142		1998 XG61	12.50	0.15	3	12.30	0.62	0.119	0.013
27226		1999 GC17	11.50	0.15	4	21.45	0.85	0.099	0.008
27294		2000 AT142	13.90	0.15	1	8.36	0.77	0.070	0.013
27321		2000 CR2	12.90	0.15	2	13.25	0.94	0.070	0.010
27340		2000 CH97	13.90	0.15	2	10.74	0.85	0.043	0.007
27360		2000 DH107	12.60	0.15	3	13.99	0.60	0.084	0.008
27370		2000 EM40	13.10	0.15	1	11.72	1.03	0.074	0.013
27396	Shuji	2000 EE101	11.40	0.15	3	25.34	1.19	0.080	0.008
27421	Nathanhan	2000 EK164	14.20	0.15	1	9.85	0.80	0.038	0.006
27427		2000 FE1	13.00	0.15	2	12.10	1.05	0.091	0.020
27476		2000 GS85	12.40	0.15	2	16.98	1.30	0.068	0.010
27477		2000 GT85	12.30	0.15	3	17.34	0.75	0.073	0.007
27491	Broksas	2000 GC104	14.30	0.15	1	13.07	1.10	0.020	0.003
27496		2000 GC125	11.80	0.15	8	13.12	0.26	0.212	0.010
27550		2000 JC24	13.70	0.15	4	10.02	0.43	0.058	0.005
27562		2000 KJ54	12.80	0.15	2	13.96	1.11	0.069	0.011
27575		2000 RX29	13.70	0.15	1	12.51	0.91	0.037	0.006
27590		2000 YO132	13.20	0.15	1	10.48	1.33	0.084	0.022
27660	Waterwayuni	1978 TR7	12.90	0.15	5	11.94	0.39	0.093	0.007
27691		1981 EA29	14.30	0.15	2	8.73	0.68	0.044	0.007
27702		1984 SE1	13.70	0.15	2	10.70	0.71	0.051	0.007
27708		1987 WP	13.00	0.15	4	6.58	0.25	0.270	0.022
27722		1990 OB2	13.20	0.15	1	8.28	0.67	0.135	0.023
27723		1990 QA	12.60	0.15	3	19.35	0.82	0.043	0.004
27726		1990 QM5	13.60	0.15	1	8.77	0.82	0.083	0.016
27730		1990 QU9	12.40	0.15	1	14.68	1.09	0.090	0.014
27736	Ekaterinburg	1990 SA6	12.50	0.15	1	15.30	1.18	0.075	0.012
27738		1990 TT4	13.10	0.15	1	14.11	1.10	0.051	0.008
27743		1990 VM	12.80	0.15	1	14.51	1.00	0.064	0.009
27754		1991 PP9	13.40	0.15	7	11.72	0.33	0.058	0.004
27787		1992 UO6	13.40	0.15	5	10.93	0.34	0.066	0.004
27807		1993 FF49	13.50	0.15	2	12.30	0.82	0.047	0.006
27851		1994 VG2	13.30	0.15	2	10.89	0.76	0.081	0.013
27920		1996 VV8	12.20	0.15	1	21.93	1.26	0.048	0.006
28016		1997 YV11	12.10	0.15	1	17.19	1.33	0.086	0.014
28024		1998 BT14	12.30	0.15	1	13.66	1.38	0.114	0.024
28032		1998 DZ23	13.70	0.15	7	13.99	0.35	0.031	0.002
28079		1998 QY63	12.20	0.15	1	20.94	1.42	0.053	0.008
28362		1999 GP5	12.50	0.15	5	15.06	0.55	0.082	0.006
28369		1999 GA21	13.30	0.15	2	17.53	1.39	0.028	0.004
28373		1999 HL3	12.10	0.15	3	19.45	0.96	0.068	0.007
28391		1999 LV11	12.90	0.15	2	16.52	1.23	0.045	0.007
28502		2000 CV79	13.50	0.15	2	9.58	0.74	0.077	0.012
28546		2000 EE20	12.50	0.15	3	15.41	0.86	0.076	0.009
28588		2000 EL114	13.30	0.15	1	11.37	0.93	0.065	0.011
28610		2000 EM158	12.40	0.15	1	13.89	1.37	0.100	0.020
28670		2000 GO55	13.60	0.15	1	11.71	0.98	0.047	0.008
28696		2000 GU87	13.30	0.15	2	10.45	0.89	0.080	0.014
28814		2000 JA17	14.00	0.15	2	10.31	0.77	0.044	0.008
28861		2000 JF62	12.20	0.15	4	21.87	0.77	0.053	0.004
28876		2000 KL31	13.10	0.15	1	16.66	1.25	0.037	0.006
28922		2000 QK132	12.40	0.15	1	18.36	1.68	0.057	0.011
28932		2000 RY102	12.60	0.15	1	16.34	1.32	0.060	0.010
28938		2000 SR311	12.00	0.15	4	19.37	0.74	0.077	0.007
28959		2001 DL74	12.50	0.15	4	21.05	0.66	0.041	0.003
28962		2001 FL117	12.90	0.15	1	15.62	1.59	0.050	0.010
29080	Astrocourier	1978 RK	12.30	0.15	3	18.58	0.78	0.062	0.006
29091		1981 EF8	13.20	0.15	1	9.67	1.17	0.099	0.024
29155		1988 XE	13.10	0.15	1	13.84	1.04	0.053	0.008
29177		1990 RF7	13.70	0.15	1	17.49	1.60	0.019	0.004
29192		1990 VK2	13.00	0.15	3	12.03	0.54	0.078	0.007
29199	Himeji	1991 FZ	12.70	0.15	2	14.79	1.06	0.069	0.011
29210		1991 RB12	13.40	0.15	2	10.80	0.83	0.067	0.011
29246	Clausius	1992 RV	13.50	0.15	4	12.65	0.43	0.044	0.003
29254		1993 FR1	12.10	0.15	1	17.67	1.25	0.082	0.012
29309		1993 VF1	13.10	0.15	7	12.03	0.25	0.072	0.003
29408		1996 VJ5	12.00	0.15	6	16.28	0.42	0.110	0.006
29423		1997 AF22	12.60	0.15	3	17.41	0.76	0.054	0.005
29455		1997 SX1	14.00	0.15	4	10.11	0.45	0.046	0.004
29482		1997 VM3	13.00	0.15	1	12.28	1.14	0.074	0.014
29492		1997 WP2	13.00	0.15	3	19.09	0.75	0.031	0.003
29515		1997 YL7	12.70	0.15	1	9.27	0.66	0.171	0.026
29517		1997 YQ10	12.90	0.15	3	19.64	0.84	0.038	0.004
29538		1998 BN16	11.50	0.15	2	25.41	1.74	0.076	0.012
29540		1998 BV24	13.00	0.15	1	9.62	1.13	0.120	0.029
29545		1998 BM31	13.50	0.15	1	8.30	1.14	0.102	0.028
29546		1998 BV33	12.80	0.15	1	14.62	1.22	0.063	0.011
29555	MACEK	1998 DP	11.80	0.15	6	25.08	0.60	0.055	0.003
29559		1998 DS4	13.60	0.15	1	14.45	1.04	0.031	0.005
29564		1998 ED6	11.70	0.15	6	27.53	0.50	0.049	0.002
29571		1998 FC29	12.90	0.15	2	17.64	1.09	0.043	0.006
29585		1998 FD64	14.10	0.15	1	11.90	1.49	0.029	0.007
29595		1998 HL14	12.00	0.15	2	22.15	1.53	0.057	0.008
29665		1998 WD24	12.40	0.15	4	21.98	0.91	0.042	0.004
29719		1999 AF19	12.60	0.15	1	16.98	1.34	0.056	0.009
29735		1999 BR6	13.30	0.15	1	13.87	1.11	0.044	0.007
29757		1999 CH8	13.00	0.15	1	13.12	1.01	0.065	0.010
29769		1999 CE28	11.80	0.15	4	21.78	0.68	0.072	0.005
29829	Engels	1999 EK3	13.50	0.15	1	9.71	0.74	0.075	0.012
29890		1999 GH37	13.10	0.15	1	12.12	1.07	0.069	0.013
29891		1999 GQ37	12.70	0.15	1	22.25	1.64	0.030	0.005
29895		1999 GP53	12.30	0.15	5	19.51	0.64	0.057	0.004
29902		1999 HM8	13.40	0.15	1	9.88	0.82	0.079	0.014
29931		1999 JL44	11.70	0.15	1	20.93	1.56	0.084	0.013
29936		1999 JD49	12.50	0.15	1	16.33	1.59	0.066	0.013
29943		1999 JZ78	10.40	0.15	5	39.24	0.92	0.083	0.004
29956		1999 JF91	12.80	0.15	1	18.75	1.33	0.038	0.006
30219		2000 GM126	13.60	0.15	3	11.94	0.57	0.046	0.005
30331		2000 JT26	13.20	0.15	1	11.45	0.98	0.071	0.013
30379		2000 JY69	13.00	0.15	1	10.44	0.61	0.102	0.013
30398		2000 KM41	13.60	0.15	1	12.41	0.99	0.042	0.007
30433		2000 LJ21	12.40	0.15	3	19.30	0.99	0.053	0.006
30434		2000 LQ21	12.80	0.15	4	17.51	0.71	0.044	0.004
30472		2000 OM23	12.40	0.15	2	14.20	1.04	0.108	0.019
30482		2000 OG45	11.70	0.15	3	20.61	1.10	0.088	0.010
30486		2000 PE23	13.90	0.15	5	9.64	0.30	0.053	0.004
30497		2000 QH97	12.30	0.15	5	21.61	0.78	0.046	0.003
30534		2001 OA5	12.20	0.15	1	10.77	1.26	0.201	0.048
30545		2001 OT35	11.80	0.15	2	25.77	1.92	0.054	0.009
30581		2001 PY2	13.10	0.15	1	10.98	0.82	0.084	0.013
30594		2001 QD30	12.40	0.15	1	18.39	1.04	0.057	0.007
30656		3098 T-1	12.50	0.15	1	23.20	1.58	0.033	0.005
30693		5069 T-2	13.90	0.15	2	10.43	0.78	0.045	0.007
30724	Peterburgtrista	1978 SX2	11.50	0.15	6	20.32	0.60	0.108	0.007
30768		1983 YK	12.60	0.15	1	23.45	1.47	0.029	0.004
30773		1986 RJ4	13.70	0.15	1	10.65	0.97	0.052	0.010
30788	Angekauffmann	1988 RE3	13.20	0.15	2	12.45	0.88	0.060	0.008
30888	Okitsumisaki	1993 BG2	13.50	0.15	2	11.41	0.72	0.054	0.007
30980		1995 QU3	13.20	0.15	1	11.83	0.81	0.066	0.010
30981		1995 SJ4	13.00	0.15	4	11.82	0.60	0.081	0.009
31062		1996 TP10	11.70	0.15	1	14.14	1.20	0.185	0.033
31090		1997 BJ5	13.00	0.15	1	12.61	0.96	0.070	0.011
31178		1997 XK13	12.90	0.15	2	16.55	1.23	0.045	0.007
31180		1997 YX3	14.10	0.15	11	6.28	0.13	0.108	0.005
31187		1997 YK7	13.90	0.15	1	11.01	0.85	0.040	0.006
31205		1998 BW	12.50	0.15	1	17.23	1.27	0.060	0.009
31300		1998 FZ82	12.30	0.15	3	15.59	0.85	0.092	0.011
31340		1998 KW53	12.10	0.15	2	15.95	1.38	0.101	0.018
31342		1998 MU31	10.20	0.15	1	53.99	4.31	0.050	0.008
31432		1999 BY12	12.90	0.15	5	17.01	0.41	0.043	0.002
31450		1999 CU9	13.70	0.15	5	13.17	0.40	0.034	0.002
31485		1999 CM51	12.80	0.15	1	10.06	0.66	0.132	0.018
31539		1999 DQ1	12.10	0.15	4	25.54	0.72	0.042	0.003
31547		1999 DT6	13.30	0.15	3	15.55	0.59	0.037	0.003
31570		1999 FG19	14.00	0.15	3	10.03	0.50	0.045	0.005
31675		1999 JO10	14.10	0.15	1	12.21	1.17	0.027	0.005
31723		1999 JT61	12.90	0.15	1	13.85	0.88	0.064	0.009
31733		1999 JP71	12.50	0.15	1	15.51	1.14	0.073	0.011
31751		1999 JF85	12.50	0.15	1	19.23	1.08	0.048	0.006

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
31756		1999 JL98	12.50	0.15	2	16.72	1.09	0.072	0.010
31761		1999 JO103	13.70	0.15	1	10.37	0.92	0.054	0.010
31762		1999 JB104	12.10	0.15	2	17.27	1.29	0.086	0.014
31801		1999 LY26	12.50	0.15	1	16.78	1.60	0.063	0.012
31808		1999 NR34	13.70	0.15	1	11.67	0.85	0.043	0.007
31810		1999 NR38	12.90	0.15	3	13.61	0.73	0.071	0.009
31822		1999 SY4	11.90	0.15	5	23.93	0.78	0.055	0.004
31826		1999 VM2	12.90	0.15	2	15.60	0.98	0.052	0.007
31828		1999 VU199	12.30	0.15	3	17.70	0.80	0.075	0.008
31848		2000 EM21	14.10	0.15	1	7.35	0.60	0.075	0.013
31932		2000 GK85	13.00	0.15	2	15.05	1.28	0.050	0.009
31967		2000 HW4	12.50	0.15	6	16.85	0.44	0.064	0.004
32123		2000 LO10	13.00	0.15	1	15.74	1.37	0.045	0.008
32162		2000 MV5	12.90	0.15	3	21.03	0.97	0.033	0.004
32200	Seiicyoshida	2000 OT2	13.30	0.15	1	11.47	0.95	0.064	0.011
32205		2000 OS5	12.90	0.15	6	13.32	0.39	0.070	0.005
32253		2000 OP51	11.50	0.15	5	23.27	0.60	0.083	0.005
32254		2000 OR51	12.90	0.15	1	18.82	1.21	0.035	0.005
32290		2000 QH5	14.10	0.15	1	9.05	0.81	0.049	0.009
32331		2000 QK65	13.10	0.15	1	13.01	1.05	0.060	0.010
32441		2000 RO100	12.70	0.15	4	15.53	0.51	0.061	0.004
32452		2000 SC39	13.90	0.15	1	10.42	0.82	0.045	0.007
32459		2000 SK87	13.90	0.15	3	10.79	0.47	0.042	0.004
32484		2000 TV29	12.70	0.15	8	16.59	0.28	0.054	0.002
32496		2000 WX182	9.80	0.15	1	51.63	3.99	0.080	0.013
32507		2001 LR15	13.80	0.15	1	8.82	0.68	0.069	0.011
32534		2001 PL37	12.40	0.15	1	17.72	1.16	0.062	0.009
32536		2001 PD41	11.80	0.15	1	16.47	1.34	0.124	0.021
32570	Peruindiana	2001 QZ71	13.10	0.15	5	13.03	0.35	0.064	0.004
32578		2001 QY88	12.90	0.15	4	17.96	0.63	0.039	0.003
32637		2021 P-L	14.40	0.15	1	10.68	0.71	0.027	0.004
32772		1986 JL	13.70	0.15	2	7.99	0.54	0.096	0.014
32791		1989 TQ2	12.60	0.15	4	16.14	0.58	0.063	0.005
32999		1997 CY27	13.40	0.15	2	17.86	1.17	0.024	0.003
33008		1997 EU17	12.60	0.15	1	12.75	1.54	0.099	0.024
33289		1998 KP5	13.20	0.15	3	13.94	0.69	0.050	0.005
33305		1998 KQ50	12.80	0.15	1	14.11	1.36	0.067	0.013
33323		1998 QN53	12.20	0.15	1	15.95	1.05	0.092	0.013
33540		1999 JH3	13.90	0.15	1	6.60	0.70	0.112	0.024
33699		1999 KT12	14.40	0.15	1	12.33	1.08	0.020	0.004
33729		1999 NJ21	12.90	0.15	7	13.06	0.33	0.077	0.004
33743		1999 NC55	12.80	0.15	1	20.95	1.49	0.031	0.005
33773		1999 RL145	14.20	0.15	2	8.54	0.57	0.051	0.008
33800	Gross	1999 VB7	12.00	0.15	2	24.32	1.54	0.050	0.007
33812		1999 XS173	13.20	0.15	6	11.42	0.23	0.073	0.003
33815		2000 AG31	13.80	0.15	2	9.37	0.78	0.065	0.012
33818		2000 AK97	12.40	0.15	2	17.00	1.28	0.069	0.011
33909		2000 LU7	13.20	0.15	1	10.57	0.79	0.083	0.013
34098		2000 PM12	13.70	0.15	2	11.94	1.18	0.042	0.008
34119		2000 PY27	12.50	0.15	6	23.22	0.63	0.035	0.002
34210		2000 QV67	12.90	0.15	3	13.82	0.72	0.065	0.007
34281		2000 QR141	14.30	0.15	1	7.61	0.96	0.058	0.015
34309		2000 QY186	13.10	0.15	3	11.41	0.64	0.080	0.009
34314		2000 QN189	15.40	0.15	2	7.80	0.67	0.020	0.004
34371		2000 RC43	12.50	0.15	3	17.91	0.77	0.058	0.006
34440		2000 SV46	12.50	0.15	1	25.36	1.71	0.027	0.004
34460		2000 SV91	13.40	0.15	1	14.92	1.46	0.035	0.007
34480		2000 SW121	13.30	0.15	1	13.58	1.59	0.046	0.011
34532		2000 SO213	12.30	0.15	6	17.52	0.43	0.073	0.004
34562		2000 SW287	13.00	0.15	1	20.05	1.60	0.028	0.005
34603		2000 TS60	13.50	0.15	1	10.54	0.95	0.063	0.012
34631		2000 UY107	12.80	0.15	6	18.06	0.50	0.045	0.003
34668		2000 XW39	12.50	0.15	5	19.57	0.64	0.050	0.004
34669		2000 YO5	12.40	0.15	3	16.99	0.85	0.074	0.009
34709		2001 OW96	14.50	0.15	1	6.44	0.87	0.068	0.019
34746		2001 QE91	9.20	0.15	1	63.63	4.11	0.091	0.012
34757		2001 QX139	13.60	0.15	2	10.72	0.85	0.056	0.009
34777		2001 RH	12.70	0.15	13	16.45	0.16	0.058	0.001
34781		2001 RK63	13.10	0.15	1	16.13	1.28	0.039	0.006
34803		2001 SW63	13.10	0.15	1	12.35	0.92	0.067	0.010
35076	Yataro	1990 BA1	13.70	0.15	2	13.62	1.10	0.033	0.006
35104		1991 RP17	14.60	0.15	2	9.21	0.68	0.031	0.005
35135		1992 RO1	14.50	0.15	3	6.87	0.35	0.060	0.007
35344		1997 HX6	14.00	0.15	1	14.57	0.94	0.021	0.003
35404		1997 YV5	13.40	0.15	2	7.90	0.54	0.139	0.022
35499		1998 FO35	13.90	0.15	2	12.78	1.05	0.032	0.006
35552		1998 FE115	13.30	0.15	1	12.41	0.74	0.055	0.007
35624		1998 KR7	13.90	0.15	1	9.78	0.84	0.051	0.009
35678		1998 XW96	14.90	0.15	4	6.43	0.28	0.048	0.004
35709		1999 FR28	13.70	0.15	6	7.32	0.17	0.121	0.007
35761		1999 HC2	15.10	0.15	1	8.79	0.45	0.021	0.002
36026		1999 NZ52	12.50	0.15	1	20.78	1.16	0.041	0.005
36030		1999 NR59	13.10	0.15	1	13.28	1.27	0.058	0.011
36153		1999 RF201	14.50	0.15	1	7.10	0.57	0.056	0.009
36156		1999 RQ206	12.20	0.15	1	13.34	1.70	0.131	0.034
36185		1999 TG25	13.40	0.15	2	12.38	0.86	0.050	0.007
36190		1999 TG40	14.50	0.15	1	11.35	0.86	0.022	0.003
36197		1999 TZ91	13.90	0.15	1	9.44	0.69	0.055	0.008
36237		1999 VX11	12.80	0.15	4	18.71	0.80	0.042	0.004
36240		1999 VN44	14.00	0.15	1	6.63	0.94	0.101	0.029
36260		1999 XQ111	13.70	0.15	2	11.02	0.68	0.048	0.006
36273		2000 AM68	12.80	0.15	2	10.50	0.78	0.123	0.019
36289		2000 FP11	12.00	0.15	1	23.17	1.60	0.052	0.008
36314		2000 LH4	13.00	0.15	1	13.37	0.97	0.062	0.009
36338		2000 NN9	13.50	0.15	1	11.21	0.96	0.056	0.010
36587		2000 QM128	12.60	0.15	3	15.10	0.79	0.073	0.008
36663		2000 QY210	14.80	0.15	1	6.55	0.87	0.049	0.013
36718		2000 RK41	12.80	0.15	3	10.97	0.65	0.122	0.017
36735		2000 RF55	12.70	0.15	6	20.28	0.50	0.037	0.002
36741		2000 RL62	12.20	0.15	1	14.06	1.15	0.118	0.020
36983		2000 SB346	14.80	0.15	4	6.15	0.26	0.059	0.005
37187		2000 WP60	13.00	0.15	5	14.11	0.47	0.059	0.004
37286		2000 YL101	12.10	0.15	3	19.83	0.87	0.072	0.007
37403		2001 XV98	13.20	0.15	5	13.78	0.43	0.051	0.003
37530	Dancingangel	1977 RP7	15.10	0.15	3	6.42	0.32	0.041	0.004
37569		1989 UG	14.00	0.15	2	6.39	0.45	0.113	0.017
37590		1991 RA14	13.30	0.15	1	12.99	1.13	0.050	0.009
37717		1996 RQ33	15.50	0.15	2	7.44	0.61	0.021	0.004
37750		1997 BZ	14.00	0.15	2	9.47	0.80	0.049	0.008
37820		1998 BL8	13.70	0.15	1	8.48	0.61	0.081	0.012
37897		1998 FP64	14.40	0.15	4	7.63	0.34	0.054	0.005
37977		1998 HC123	12.60	0.15	1	14.42	1.01	0.077	0.011
38019	Jeanmariepelt	1998 LV2	12.80	0.15	1	14.38	1.17	0.065	0.011
38042		1998 SA10	12.80	0.15	2	12.56	0.92	0.085	0.013
38050		1998 VR38	9.40	0.15	2	50.44	4.24	0.133	0.026
38166		1999 JV84	14.90	0.15	2	6.13	0.45	0.054	0.009
38264		1999 RC22	13.80	0.15	1	16.11	1.28	0.021	0.003
38548		1999 VK47	12.20	0.15	1	21.94	1.63	0.048	0.007
38577		1999 XZ10	12.80	0.15	3	17.32	1.08	0.045	0.006
38717		2000 QM121	13.60	0.15	2	12.30	1.05	0.043	0.007
38909		2000 SQ172	12.50	0.15	1	18.76	1.34	0.050	0.008
38991		2000 UE19	13.60	0.15	2	15.35	1.00	0.031	0.005
39160		2000 WC116	12.80	0.15	1	12.39	0.89	0.087	0.013
39198		2000 XY4	13.90	0.15	1	7.27	0.71	0.092	0.018
39263		2000 YK139	13.40	0.15	3	14.34	0.67	0.038	0.004
39510		1982 DU	12.80	0.15	7	16.73	0.41	0.050	0.003
39902		1998 FG30	15.20	0.15	4	7.67	0.32	0.026	0.002
40029		1998 KG2	14.90	0.15	1	8.65	0.75	0.026	0.005
40064		1998 KW50	14.50	0.15	2	8.72	0.76	0.038	0.007
40086		1998 MK33	14.80	0.15	1	8.83	0.72	0.027	0.005
40137		1998 QO60	13.60	0.15	5	10.97	0.37	0.054	0.004
40223		1998 SX142	13.00	0.15	1	15.24	0.87	0.048	0.006
40248		1998 XF5	14.00	0.15	3	12.60	0.47	0.029	0.002
40333		1999 NO1	12.70	0.15	3	11.25	0.61	0.136	0.019
40398		1999 NL57	14.60	0.15	1	5.86	0.55	0.074	0.014
40429		1999 RL27	12.30	0.15	1	7.75	0.70	0.354	0.066
40803		1999 TX39	14.20	0.15	3	9.43	0.59	0.042	0.005
40909		1999 TR152	15.10	0.15	1	7.71	0.74	0.027	0.005
41015		1999 UB24	12.90	0.15	1	12.63	1.13	0.077	0.014
41042		1999 VB2	12.20	0.15	12	20.13	0.27	0.058	0.002
41223		1999 XD16	13.20	0.15	8	11.00	0.19	0.077	0.003
41283		1999 XM99	11.80	0.15	3	20.16	0.99	0.084	0.008
41365		2000 AO98	13.10	0.15	1	19.48	1.30	0.027	0.004
41383		2000 AH138	12.80	0.15	1	14.71	1.06	0.062	0.009
41576		2000 SF2	14.00	0.15	1	10.95	0.91	0.037	0.006
41707		2000 UU55	14.70	0.15	1	7.28	0.52	0.044	0.007
41799		2000 WL19	13.40	0.15	2	10.09	0.76	0.076	0.012
41858		2000 WU93	14.70	0.15	1	10.70	0.94	0.020	0.004
42073	Noreen	2001 AS1	14.30	0.15	1	11.52	1.18	0.025	0.005
42245		2001 FB88	13.90	0.15	2	7.80	0.62	0.081	0.014
42318		2001 XV1	13.60	0.15	2	15.39	1.07	0.028	0.004
42347		2002 AV155	14.70	0.15	1	7.78	0.55	0.038	0.006
42479	Tolik	1981 SE7	12.80	0.15	5	12.78	0.42	0.086	0.006
42708		1998 QD11	13.60	0.15	4	11.64	0.39	0.048	0.004
42720		1998 QH69	14.30	0.15	1	6.59	0.49	0.078	0.012
42776	Casablanca	1998 UV26	12.90	0.15	1	15.79	1.28	0.049	0.008
42781		1998 VL28	14.70	0.15	2	7.75	0.59	0.039	0.006
42801		1999 FK41	14.20	0.15	3	7.62	0.38	0.067	0.008
42931		1999 TG17	14.20	0.15	3	10.62	0.50	0.033	0.004
42993		1999 TP270	13.60	0.15	1	11.62	0.80	0.048	0.007
43110		1999 XH29	12.80	0.15	4	17.45	0.65	0.046	0.004
43152		1999 XM115	13.00	0.15	2	19.88	1.19	0.032	0.004
43173		1999 XK177	12.20	0.15	2	17.45	1.32	0.076	0.012
43202		2000 AQ70	11.80	0.15	1	13.98	1.18	0.172	0.030
43231		2000 AU177	12.10	0.15	10	21.73	0.39	0.056	0.002
43346		2000 RT103	14.10	0.15	2	9.80	0.57	0.042	0.005
43560		2001 FX64	14.20	0.15	4	8.32	0.31	0.055	0.005
43592		2001 QC72	13.00	0.15	1	16.40	1.09	0.041	0.006
43725		1978 RK9	14.80	0.15	1	6.70	0.56	0.047	0.008
43735		1981 DQ1	14.30	0.15	1	13.44	0.76	0.019	0.002
43756		1984 CE	14.00	0.15	3	10.93	0.52	0.038	0.004
43757		1984 DB1	12.60	0.15	1	10.62	1.13	0.143	0.031
43780		1989 SL8	15.40	0.15	1	6.21	0.43	0.032	0.005
43792		1990 VY1	13.90	0.15	1	7.75	0.98	0.081	0.021
43857		1993 VP2	13.40	0.15	2	13.79	0.86	0.041	0.006
43993	Mariola	1997 OK	13.90	0.15	1	9.85	0.63	0.050	0.007
43998		1997 QB3	13.60	0.15	1	13.18	0.99	0.037	0.006
44016	Jimmypage	1997 WQ28	13.20	0.15	2	11.22	0.76	0.075	0.010
44220		1998 QT7	15.40	0.15	1	6.95	0.61	0.025	0.005
44346		1998 RC74	13.80	0.15	1	8.88	0.89	0.068	0.014
44443		1998 UY19	11.60	0.15	1	14.23	1.10	0.200	0.032
44511		1998 XC51	13.30	0.15	2	17.10	1.33	0.030	0.005
44530	Horakova	1998 YC8	12.80	0.15	1	6.73	0.62	0.296	0.056
44566		1999 CK103	11.60	0.15	4	29.66	1.26	0.046	0.004
44700		1999 SG3	13.80	0.15	11	10.19	0.17	0.054	0.002
44907		1999 VM24	13.70	0.15	1	8.45	0.72	0.082	0.014
45106		1999 XX74	13.20	0.15	1	14.97	0.99	0.041	0.006
45179		1999 XQ144	14.00	0.15	1	9.59	0.79	0.048	0.008
45206		1999 XK174	14.20	0.15	2	6.65	0.54	0.086	0.015
45248		1999 XO258	13.80	0.15	1	7.22	0.87	0.102	0.025
45350		2000 AD95	13.20	0.15	1	18.75	1.30	0.026	0.004
45352		2000 AC97	13.10	0.15	2	11.60	0.72	0.077	0.010
45390		2000 AW128	13.00	0.15	2	14.92	1.23	0.050	0.008
45425		2000 AY166	13.50	0.15	1	11.54	1.27	0.053	0.012
45443		2000 AR179	13.70	0.15	1	8.67	1.27	0.078	0.023
45449		2000 AQ188	14.40	0.15	2	7.21	0.53	0.060	0.009
45481		2000 AK233	13.60	0.15	3	16.78	0.69	0.024	0.002
45502		2000 BZ8	12.00	0.15	4	17.15	0.74	0.098	0.009
45533		2000 CH23	14.20	0.15	7	8.93	0.21	0.046	0.002
45574		2000 CE73	13.80	0.15	2	10.77	0.81	0.048	0.008

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
45583		2000 CK87	13.20	0.15	1	10.53	0.88	0.084	0.015
45646		2000 EE45	13.50	0.15	1	13.34	0.72	0.040	0.005
45657		2000 EK76	13.80	0.15	1	8.53	0.67	0.073	0.012
45728		2000 GC86	13.40	0.15	1	9.09	0.77	0.093	0.016
45745		2000 HU84	13.70	0.15	1	12.14	1.02	0.040	0.007
45791		2000 OD45	14.60	0.15	1	6.57	0.45	0.059	0.009
45906		2000 YW34	13.00	0.15	2	12.65	0.83	0.075	0.011
45920		2000 YP104	13.20	0.15	1	14.66	0.79	0.043	0.005
46027		2001 DG21	13.90	0.15	1	9.21	0.65	0.057	0.008
46138		2001 FR56	14.50	0.15	1	8.72	0.66	0.037	0.006
46196		2001 FH145	14.50	0.15	1	9.44	0.68	0.031	0.005
46209		2001 FK160	13.60	0.15	1	16.21	1.48	0.024	0.005
46231		2001 HM5	12.20	0.15	6	17.59	0.61	0.083	0.006
46235		2001 HX9	14.20	0.15	1	10.65	0.91	0.033	0.006
46299		2001 MR24	13.00	0.15	1	15.66	1.50	0.045	0.009
46317		2001 QN53	14.60	0.15	1	5.88	0.77	0.074	0.020
46355		2001 TQ65	13.70	0.15	1	13.27	1.37	0.033	0.007
46409		2002 FT35	13.40	0.15	2	16.73	1.46	0.032	0.006
46436		2002 LH5	12.90	0.15	7	15.58	0.25	0.052	0.002
46452		3097 P-L	13.90	0.15	2	10.59	0.78	0.061	0.014
46525		1980 UG1	14.10	0.15	1	7.26	0.54	0.077	0.012
46564		1991 RA11	11.60	0.15	2	24.91	1.70	0.065	0.009
46598		1993 FT2	13.60	0.15	1	5.01	0.38	0.256	0.041
46631		1994 TQ3	13.00	0.15	6	13.85	0.37	0.058	0.003
46670		1996 NU	12.40	0.15	4	18.92	0.81	0.055	0.005
46867		1998 QN91	14.50	0.15	4	10.01	0.38	0.029	0.002
46918		1998 SC	13.40	0.15	1	11.98	0.80	0.054	0.008
46925		1998 SS27	12.60	0.15	4	15.37	0.54	0.070	0.005
47008		1998 UW16	14.30	0.15	1	7.62	0.59	0.058	0.009
47009		1998 UY16	14.60	0.15	1	7.15	0.51	0.050	0.007
47078		1998 YS2	12.70	0.15	2	17.45	1.55	0.056	0.012
47178		1999 TK113	13.50	0.15	2	15.20	1.10	0.038	0.006
47215		1999 TZ319	14.00	0.15	1	7.77	0.65	0.074	0.013
47300		1999 WN4	14.70	0.15	1	8.06	0.51	0.036	0.005
47456		1999 XZ231	14.20	0.15	4	10.53	0.32	0.034	0.002
47511		2000 AN60	13.70	0.15	1	9.15	1.03	0.070	0.016
47552		2000 AR128	12.90	0.15	7	12.67	0.35	0.078	0.005
47556		2000 AL137	12.80	0.15	1	15.88	1.08	0.053	0.008
47560		2000 AD144	13.70	0.15	1	12.45	1.13	0.038	0.007
47644		2000 CO36	12.70	0.15	1	14.82	1.00	0.067	0.010
47664		2000 CE54	13.30	0.15	1	13.45	1.34	0.047	0.010
47678		2000 CT75	12.90	0.15	4	18.23	0.74	0.040	0.003
47761		2000 DR100	13.60	0.15	1	12.95	1.05	0.038	0.006
47786		2000 EQ20	12.30	0.15	2	18.33	1.23	0.065	0.010
47822		2000 EX95	14.40	0.15	1	8.58	0.69	0.042	0.007
47838		2000 EP119	13.80	0.15	2	11.86	0.79	0.038	0.005
47870		2000 FK13	12.20	0.15	3	18.38	0.96	0.081	0.011
48153		2001 FW172	13.20	0.15	3	15.13	0.75	0.047	0.006
48214		2001 KB27	14.10	0.15	4	8.90	0.41	0.059	0.007
48218		2001 KZ38	12.70	0.15	1	21.30	1.50	0.032	0.005
48219		2001 KN39	14.40	0.15	2	10.20	0.74	0.030	0.004
48433		1989 US1	13.40	0.15	8	10.79	0.25	0.070	0.004
48446		1990 RB1	13.70	0.15	2	13.10	0.96	0.034	0.006
48447		1990 TK2	12.90	0.15	1	17.12	1.27	0.042	0.007
48462		1991 RT6	12.40	0.15	2	16.32	1.17	0.074	0.011
48561		1993 UZ2	13.80	0.15	8	9.49	0.24	0.060	0.003
48590		1994 TY2	14.00	0.15	1	6.68	0.54	0.099	0.017
48606		1995 DH	13.60	0.15	3	10.25	0.57	0.073	0.009
48668		1995 XB1	12.70	0.15	4	18.89	0.66	0.042	0.003
48833		1997 YA5	13.10	0.15	4	11.93	0.45	0.079	0.007
48841		1998 BB19	13.30	0.15	2	16.41	1.06	0.031	0.004
48842		1998 BA44	12.70	0.15	2	18.17	1.28	0.046	0.007
49054		1998 RQ34	14.60	0.15	1	8.03	0.55	0.040	0.006
49081		1998 RA64	14.20	0.15	1	9.26	0.67	0.043	0.007
49199		1998 SQ107	14.30	0.15	2	10.51	0.75	0.033	0.005
49239		1998 SE164	13.50	0.15	1	6.60	0.67	0.162	0.034
49241		1998 TQ3	14.20	0.15	2	10.42	0.75	0.034	0.005
49264		1998 UC	14.80	0.15	1	6.37	0.49	0.052	0.008
49368		1998 WN19	14.00	0.15	5	8.67	0.30	0.060	0.004
49413		1998 XZ62	13.80	0.15	1	6.62	0.55	0.122	0.021
49468		1999 AE24	13.90	0.15	5	8.13	0.29	0.081	0.007
49483		1999 BP13	13.10	0.15	6	16.48	0.44	0.038	0.002
49491		1999 BW25	13.30	0.15	3	12.95	0.56	0.052	0.005
49566		1999 CM106	13.50	0.15	3	11.64	0.55	0.052	0.005
49630		1999 GB21	11.90	0.15	2	27.50	1.67	0.041	0.006
49633		1999 GC38	12.80	0.15	4	16.05	0.61	0.053	0.004
49849		1999 XK94	14.00	0.15	3	9.46	0.46	0.052	0.006
50109		2000 AY113	13.80	0.15	3	12.76	0.57	0.037	0.004
50182		2000 AB168	13.00	0.15	2	16.61	1.28	0.043	0.008
50330		2000 CN56	12.30	0.15	1	19.99	1.20	0.053	0.007
50442		2000 DL32	14.10	0.15	1	8.69	0.72	0.054	0.009
50495		2000 DU93	13.00	0.15	4	12.28	0.46	0.075	0.006
50498		2000 DU95	14.10	0.15	1	9.42	0.81	0.046	0.008
50551		2000 EJ20	13.70	0.15	6	12.48	0.33	0.039	0.002
50604		2000 EZ54	13.50	0.15	1	9.23	0.96	0.082	0.017
50607		2000 EE56	13.30	0.15	1	13.36	0.78	0.047	0.006
50684		2000 ER111	12.70	0.15	3	17.23	0.61	0.054	0.004
50847		2000 FG46	13.50	0.15	1	14.21	1.40	0.035	0.007
50862		2000 FX73	12.90	0.15	6	13.03	0.40	0.073	0.005
50976		2000 GD92	13.10	0.15	3	16.26	0.85	0.040	0.005
50982		2000 GO93	13.10	0.15	1	10.46	1.05	0.093	0.019
51071		2000 GJ159	13.10	0.15	2	12.10	0.97	0.074	0.013
51103		2000 HX12	12.70	0.15	1	12.75	1.00	0.090	0.015
51118		2000 HC33	12.50	0.15	2	14.14	1.13	0.089	0.015
51149		2000 HF52	13.20	0.15	7	10.65	0.27	0.085	0.005
51156		2000 HJ56	13.70	0.15	1	9.05	0.83	0.071	0.013
51182		2000 HP76	13.20	0.15	1	13.23	0.90	0.053	0.008
51238		2000 JT34	13.40	0.15	2	13.06	1.02	0.045	0.008
51258		2000 JU59	13.30	0.15	4	11.50	0.36	0.068	0.005
51291		2000 KK29	12.50	0.15	3	19.03	0.75	0.050	0.005
51324		2000 LV8	11.90	0.15	1	14.23	1.29	0.152	0.028
51327		2000 LA19	12.20	0.15	2	18.31	1.36	0.070	0.010
51328		2000 LO19	12.70	0.15	1	15.52	1.23	0.061	0.010
51556		2001 FG171	14.50	0.15	1	10.43	0.72	0.026	0.004
51604		2001 HY28	14.00	0.15	4	9.75	0.40	0.051	0.005
51755		2001 LC3	12.60	0.15	2	12.37	0.85	0.105	0.015
51760		2001 LC7	13.00	0.15	1	9.33	1.33	0.128	0.037
51761		2001 LD7	12.30	0.15	1	14.13	1.22	0.106	0.019
51790		2001 MG23	11.90	0.15	2	19.02	1.39	0.085	0.013
51854		2001 OG100	12.70	0.15	1	11.42	1.51	0.113	0.030
51915		2001 QF71	13.00	0.15	1	15.12	1.02	0.049	0.007
51919		2001 QL86	12.10	0.15	3	18.89	1.01	0.072	0.008
51921		2001 QU90	13.00	0.15	5	16.11	0.34	0.044	0.002
51924		2001 QW96	13.00	0.15	2	15.69	1.34	0.046	0.008
51943		2001 QK181	13.30	0.15	1	15.98	1.28	0.033	0.006
51966		2001 QG282	13.00	0.15	1	11.70	1.07	0.081	0.015
52235		1979 MW2	14.40	0.15	1	10.34	1.02	0.029	0.006
52345		1993 FG1	14.40	0.15	3	8.57	0.36	0.043	0.004
52457		1995 AE4	14.40	0.15	2	6.91	0.67	0.072	0.017
52520		1996 JK3	14.70	0.15	1	6.48	0.61	0.055	0.011
52652		1997 YV18	13.80	0.15	5	11.87	0.40	0.038	0.003
52658		1998 BJ6	14.30	0.15	1	9.02	0.77	0.041	0.007
52677		1998 DY20	13.20	0.15	1	15.73	0.97	0.037	0.005
52705		1998 FA77	13.40	0.15	1	12.31	1.40	0.051	0.012
52706		1998 FO77	12.90	0.15	1	24.64	1.67	0.020	0.003
53121		1999 AJ21	13.90	0.15	1	7.05	0.65	0.098	0.019
53124		1999 AC23	13.00	0.15	1	10.92	1.06	0.093	0.019
53161		1999 CP6	14.40	0.15	2	8.92	0.64	0.039	0.006
53168		1999 CV10	12.90	0.15	6	10.54	0.29	0.113	0.007
53402		1999 JG119	12.80	0.15	2	16.34	1.10	0.050	0.007
53435		1999 VM40	14.70	0.15	6	2.92	0.08	0.277	0.016
53845		2000 FZ11	13.80	0.15	1	9.51	1.24	0.059	0.016
53848		2000 FT13	13.40	0.15	1	15.19	1.23	0.033	0.006
54003		2000 GN91	13.50	0.15	2	9.14	0.72	0.085	0.014
54053		2000 GV126	13.40	0.15	1	12.60	1.21	0.049	0.010
54098		2000 HW3	14.60	0.15	1	8.77	1.18	0.033	0.009
54108		2000 HU9	14.20	0.15	1	14.39	1.06	0.018	0.003
54206		2000 HM83	13.40	0.15	1	12.41	0.89	0.050	0.008
54391		2000 KO67	13.50	0.15	5	15.96	0.42	0.028	0.002
54423		2000 LO24	12.80	0.15	1	15.21	1.17	0.058	0.009
54428		2000 LN27	12.20	0.15	6	20.57	0.58	0.056	0.003
54444		2000 MU5	12.30	0.15	2	15.24	1.66	0.093	0.021
54476		2000 OK16	13.20	0.15	2	14.15	1.00	0.051	0.008
54478		2000 OG23	13.70	0.15	1	11.87	0.99	0.042	0.007
54521		2000 QD1	13.60	0.15	1	14.96	1.48	0.029	0.006
54637		2000 SL141	13.50	0.15	4	12.26	0.53	0.049	0.005
54656		2000 SX362	10.40	0.15	1	47.90	3.98	0.053	0.009
54674		2000 XN4	12.60	0.15	1	11.76	1.05	0.117	0.022
54799		2001 MR14	14.90	0.15	2	8.08	0.55	0.031	0.004
54808		2001 ME24	12.40	0.15	2	22.51	1.46	0.038	0.005
54850		2001 OZ11	13.40	0.15	1	13.81	0.94	0.040	0.006
54875		2001 OT47	14.00	0.15	1	8.36	0.66	0.064	0.011
54911		2001 OM83	13.90	0.15	2	10.30	0.84	0.059	0.013
54941		2001 OA108	13.50	0.15	1	16.61	1.04	0.026	0.003
54991		2001 QT10	14.10	0.15	2	6.39	0.50	0.099	0.016
55006		2001 QZ24	13.70	0.15	3	12.98	0.68	0.035	0.004
55059		2001 QG73	12.30	0.15	2	19.49	1.15	0.060	0.008
55132		2001 QB182	13.60	0.15	1	11.48	1.19	0.049	0.010
55147		2001 QT199	13.90	0.15	1	9.88	0.65	0.050	0.007
55440		2001 TY85	15.40	0.15	1	6.26	0.53	0.031	0.005
55476		2001 TS239	12.40	0.15	2	17.68	1.20	0.072	0.011
55524		2001 VP55	14.10	0.15	1	7.40	0.54	0.074	0.011
55580		2002 JB110	12.50	0.15	2	8.58	0.69	0.245	0.042
55677		3201 T-1	14.30	0.15	5	10.84	0.39	0.029	0.002
55940		1998 GU8	13.00	0.15	3	14.01	0.82	0.058	0.007
56092		1999 BK	15.20	0.15	1	6.97	0.61	0.030	0.005
56326		1999 VV203	12.10	0.15	1	19.39	1.40	0.068	0.010
56396		2000 EX129	14.40	0.15	1	9.28	0.72	0.036	0.006
56702		2000 LQ28	13.10	0.15	4	12.20	0.52	0.069	0.006
56752		2000 OA5	13.30	0.15	3	11.96	0.69	0.061	0.008
56768		2000 OS27	13.10	0.15	4	17.22	0.59	0.035	0.003
56788		2000 OA54	14.60	0.15	1	14.16	1.22	0.013	0.002
56998		2000 SA310	12.70	0.15	2	16.07	1.19	0.057	0.008
57049		2001 LJ7	14.30	0.15	1	6.96	0.62	0.069	0.013
57100		2001 OM69	14.20	0.15	2	9.05	0.71	0.045	0.007
57108		2001 OS74	12.80	0.15	5	23.63	0.48	0.025	0.001
57610		2001 TK116	13.10	0.15	2	14.96	1.17	0.045	0.007
57642		2001 TH196	14.30	0.15	1	9.54	0.72	0.037	0.006
57664		2001 UY17	13.20	0.15	4	13.74	0.49	0.050	0.004
58007		2002 TL234	13.30	0.15	2	12.31	0.93	0.056	0.008
58044		2002 WF	13.30	0.15	1	15.67	1.05	0.034	0.005
58068		3143 T-1	14.20	0.15	1	11.44	0.74	0.028	0.004
58211		1992 HF4	14.50	0.15	1	7.24	0.55	0.053	0.008
58213		1992 QP	15.50	0.15	2	5.41	0.50	0.044	0.010
58373	Albertoalonso	1995 SR	14.70	0.15	3	7.55	0.39	0.047	0.006
58474		1996 RU10	16.20	0.15	1	7.06	0.67	0.012	0.002
58688		1998 BJ4	13.40	0.15	5	10.22	0.31	0.075	0.005
58721		1998 DX14	13.40	0.15	1	14.56	1.83	0.036	0.009
58804		1998 FM110	14.30	0.15	1	9.23	0.83	0.039	0.007
59244		1999 CG6	14.40	0.15	1	6.52	0.62	0.072	0.014
59340		1999 CV116	14.80	0.15	1	5.73	0.50	0.065	0.012
59651		1999 JK91	13.50	0.15	3	14.50	0.73	0.035	0.003
59867		1999 RT105	13.60	0.15	2	18.69	1.46	0.020	0.003
59915		1999 RF159	12.40	0.15	3	19.22	0.92	0.059	0.007
61189		2000 NE29	14.50	0.15	1	11.90	1.00	0.020	0.003
61197		2000 OG3	13.40	0.15	3	15.43	0.73	0.033	0.003
61541		2000 QF64	13.80	0.15	4	12.26	0.51	0.036	0.003
61640		2000 QT105	13.00	0.15	5	9.60	0.35	0.141	0.013
62128		2000 SO1	11.80	0.15	5	22.48	0.56	0.069	0.004
62133		2000 SD5	14.90	0.15	2	6.91	0.46	0.041	0.006

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_{V}	$\sigma(p_{\mathrm{V}})$
62149		2000 ST19	13.30	0.15	1	15.80	1.05	0.034	0.005
62269		2000 SD91	12.90	0.15	1	11.82	1.45	0.087	0.022
62300		2000 SY116	12.80	0.15	2	15.68	1.37	0.054	0.010
62470		2000 SH216	13.90	0.15	1	14.17	1.06	0.024	0.004
62759		2000 UK9	13.70	0.15	1	17.05	1.15	0.020	0.003
62877		2000 UQ90	13.60	0.15	1	11.93	1.24	0.045	0.010
62954		2000 VD36	13.60	0.15	1	17.37	1.13	0.021	0.003
63068	Moraes	2000 WT123	14.30	0.15	1	10.67	0.79	0.030	0.005
63313		2001 FV28	15.00	0.15	2	8.64	0.52	0.025	0.003
63392		2001 JE7	14.20	0.15	1	6.32	0.74	0.092	0.022
63442		2001 NO6	13.80	0.15	1	11.31	0.74	0.042	0.006
63450		2001 NP17	14.70	0.15	1	13.26	0.92	0.013	0.002
63520		2001 PF	14.70	0.15	2	11.51	1.09	0.018	0.004
63529		2001 PY19	14.90	0.15	2	8.10	0.68	0.031	0.006
63880		2001 RX142	14.60	0.15	1	9.91	0.68	0.026	0.004
63892		2001 SX4	13.40	0.15	2	10.98	0.84	0.064	0.010
63893		2001 SY4	14.30	0.15	7	9.32	0.25	0.044	0.003
65122		2002 CB59	13.80	0.15	8	12.34	0.27	0.037	0.002
65391		2002 RJ25	15.60	0.15	1	6.19	0.66	0.027	0.006
65454		2002 VD69	14.30	0.15	2	9.67	0.79	0.036	0.006
65461		2002 WU12	14.80	0.15	1	7.25	0.77	0.040	0.009
65866		1997 PA4	13.30	0.15	1	23.02	1.89	0.016	0.003
65871		1997 UC22	12.40	0.15	1	21.02	1.86	0.044	0.008
65965		1998 HR7	14.10	0.15	1	7.55	0.57	0.071	0.011
66039		1998 QS74	14.10	0.15	1	10.98	1.11	0.034	0.007
66062		1998 RG1	12.90	0.15	2	15.21	1.04	0.055	0.008
66432		1999 NL46	15.10	0.15	2	6.94	0.51	0.034	0.005
66633		1999 RB212	14.10	0.15	1	10.18	0.60	0.039	0.005
66770		1999 TH207	13.10	0.15	3	15.55	0.81	0.042	0.005
66866		1999 VS45	14.30	0.15	4	12.23	0.56	0.024	0.002
67100		2000 AL76	13.90	0.15	2	13.74	0.96	0.027	0.004
67134		2000 AB149	12.90	0.15	1	17.78	1.26	0.039	0.006
67626		2000 SP180	14.10	0.15	3	7.16	0.35	0.085	0.009
67918		2000 WW109	15.30	0.15	1	6.56	0.56	0.031	0.005
67940		2000 WT143	15.60	0.15	1	5.99	0.48	0.028	0.005
67965		2000 WX181	13.70	0.15	1	10.61	1.05	0.052	0.011
67999		2000 XC32	14.70	0.15	1	13.61	1.17	0.013	0.002
68085		2000 YH104	12.70	0.15	6	18.25	0.40	0.045	0.002
68130		2001 AO17	12.70	0.15	1	7.39	0.71	0.269	0.053
68133		2001 AQ18	13.00	0.15	1	12.43	0.99	0.072	0.012
68216		2001 CV26	16.40	0.15	3	1.09	0.04	0.415	0.031
68944		2002 PQ130	14.10	0.15	1	8.04	0.57	0.063	0.009
68950		2002 QF15	16.40	0.15	2	1.12	0.03	0.428	0.029
69018		2002 VH24	13.40	0.15	3	10.85	0.52	0.068	0.007
69294		1991 PU9	13.20	0.15	1	16.08	1.01	0.036	0.005
69434	de Gerlache	1996 HC21	12.90	0.15	3	11.13	0.54	0.110	0.012
69758		1998 OP10	13.80	0.15	1	8.44	0.69	0.075	0.013
71098		1999 XV137	13.30	0.15	5	14.49	0.43	0.043	0.003
71215		1999 XY261	13.80	0.15	2	11.93	0.73	0.037	0.005
71655		2000 EF121	13.50	0.15	2	11.91	1.03	0.052	0.009
71666		2000 EK148	13.40	0.15	1	12.57	1.11	0.049	0.009
72430		2001 CY41	13.80	0.15	1	8.70	0.66	0.070	0.011
72574		2001 EJ16	15.10	0.15	1	12.31	1.28	0.011	0.002
72667		2001 FY50	13.20	0.15	3	16.19	0.89	0.035	0.004
72788		2001 FV171	13.10	0.15	1	12.94	0.94	0.061	0.009
72822		2001 HF3	14.50	0.15	1	12.91	1.31	0.017	0.004
72864		2001 HD54	13.40	0.15	1	10.07	0.97	0.076	0.015
72939		2002 BA24	14.30	0.15	1	7.06	0.52	0.068	0.010
73085		2002 GM17	15.40	0.15	1	7.37	0.60	0.022	0.004
73397		2002 LC19	13.20	0.15	2	15.77	1.15	0.037	0.006
73888		1997 EK12	14.80	0.15	3	7.34	0.36	0.041	0.004
73983		1998 DS19	13.00	0.15	1	13.64	1.44	0.060	0.013
74091		1998 QH3	14.00	0.15	1	11.99	0.70	0.031	0.004
74210		1998 RX60	15.20	0.15	1	9.60	0.79	0.016	0.003
74403		1998 YR5	13.30	0.15	2	18.42	1.29	0.025	0.004
74487		1999 CE105	12.20	0.15	1	16.86	1.59	0.082	0.016
74745		1999 RZ191	15.30	0.15	2	6.15	0.44	0.037	0.006
74749		1999 RK195	13.90	0.15	2	8.89	0.67	0.061	0.009
75301		1999 XN34	13.20	0.15	3	15.53	0.72	0.040	0.004
75381		1999 XM89	14.00	0.15	1	10.68	0.95	0.039	0.007
75433		1999 XK126	13.50	0.15	2	8.16	0.66	0.108	0.019
75523		1999 XX206	14.20	0.15	1	10.04	0.75	0.037	0.006
75647		2000 AR59	13.20	0.15	2	9.65	0.86	0.100	0.018
75713		2000 AR118	13.50	0.15	1	13.27	1.12	0.040	0.007
75722		2000 AB128	15.60	0.15	1	9.01	0.77	0.013	0.002
75910		2000 CO53	13.30	0.15	1	10.57	1.21	0.076	0.018
75918		2000 CC61	13.40	0.15	2	10.23	0.67	0.074	0.010
76253		2000 ER93	13.70	0.15	1	7.19	0.66	0.113	0.021
76432		2000 FB24	13.30	0.15	2	12.17	0.64	0.057	0.006
76462		2000 FP44	13.40	0.15	1	10.94	0.97	0.064	0.012
76583		2000 GF136	12.40	0.15	1	20.29	1.53	0.047	0.007
76991		2001 BJ72	14.10	0.15	1	11.35	0.67	0.031	0.004
77427		2001 GX4	13.10	0.15	1	15.78	1.19	0.041	0.006
77494		2001 HM36	14.20	0.15	1	11.93	1.04	0.026	0.005
77576		2001 KS11	13.80	0.15	1	12.75	1.17	0.033	0.006
77735		2001 OJ76	14.00	0.15	1	14.93	1.83	0.020	0.005
77745		2001 OT107	13.20	0.15	1	10.64	1.00	0.082	0.016
77746		2001 OZ107	13.50	0.15	1	10.60	1.01	0.063	0.012
77766		2001 PK59	13.10	0.15	1	20.67	1.42	0.024	0.003
77774		2001 QB12	13.50	0.15	1	15.88	1.02	0.028	0.004
77870	MOTESS	2001 SM	12.90	0.15	1	12.46	0.97	0.079	0.013
78704		2002 TY177	13.20	0.15	1	13.69	0.90	0.050	0.007
78754		2002 TA295	13.30	0.15	4	14.04	0.47	0.046	0.003
78946		2003 SY191	14.30	0.15	1	7.56	0.57	0.059	0.009
79485		1998 FH10	12.70	0.15	2	15.23	1.32	0.066	0.012
79563		1998 QD70	14.10	0.15	2	7.82	0.58	0.067	0.010
79883		1999 AL3	14.50	0.15	1	8.78	0.56	0.036	0.005
80062		1999 JX85	14.20	0.15	1	14.19	1.06	0.018	0.003
80076		1999 JO101	12.70	0.15	4	18.41	0.60	0.046	0.003
80111		1999 RK42	15.00	0.15	1	5.16	0.56	0.066	0.015
80471		2000 AK29	15.40	0.15	1	7.67	0.61	0.021	0.003
81406		2000 GL86	14.60	0.15	1	6.33	0.52	0.064	0.011
81644		2000 HY80	14.30	0.15	1	7.53	0.90	0.059	0.014
81683		2000 JV6	14.70	0.15	2	7.80	0.58	0.040	0.006
81860		2000 KA71	14.60	0.15	1	8.28	0.77	0.037	0.007
81907		2000 NR2	13.10	0.15	1	10.27	1.09	0.096	0.021
81969		2000 QH55	13.80	0.15	1	10.78	1.18	0.046	0.010
82356		2001 MB3	13.70	0.15	2	18.94	1.21	0.016	0.002
82380		2001 MU17	13.20	0.15	2	12.24	0.80	0.062	0.009
82456		2001 OF14	13.50	0.15	1	10.44	0.80	0.065	0.010
82805		2001 QO30	13.00	0.15	2	16.03	1.21	0.044	0.007
82882		2001 QG71	13.30	0.15	2	19.84	1.38	0.022	0.003
83604		2001 SG270	13.10	0.15	2	13.32	1.13	0.059	0.010
83766		2001 TQ159	14.00	0.15	1	12.02	0.86	0.031	0.005
83923		2001 VR16	13.10	0.15	1	14.48	1.75	0.048	0.012
83991		2002 MS1	13.80	0.15	1	11.15	0.71	0.043	0.006
84004		2002 OT3	14.80	0.15	1	6.00	0.53	0.059	0.011
84052		2002 PB69	14.50	0.15	4	8.09	0.36	0.044	0.004
84053		2002 PS71	15.30	0.15	2	6.59	0.57	0.039	0.008
84185		2002 RM107	12.80	0.15	1	12.55	1.04	0.085	0.015
85505		1997 UU3	14.70	0.15	1	6.92	0.72	0.049	0.010
85571		1998 BV21	13.70	0.15	1	6.13	0.62	0.156	0.032
85709		1998 SG36	16.00	0.15	22	1.75	0.02	0.246	0.007
85713		1998 SS49	15.70	0.15	2	2.00	0.06	0.237	0.018
85804		1998 WQ5	15.30	0.15	6	1.78	0.05	0.434	0.024
85851		1999 AS4	14.30	0.15	2	10.25	0.70	0.034	0.005
85852		1999 AA5	14.80	0.15	1	7.43	0.64	0.039	0.007
86039		1999 NC43	16.00	0.15	2	1.43	0.07	0.352	0.039
86053		1999 RY4	13.40	0.15	2	12.08	1.09	0.054	0.010
86061		1999 RT19	12.70	0.15	1	14.27	1.14	0.072	0.012
86113		1999 RC129	12.70	0.15	2	12.30	0.97	0.098	0.016
86185		1999 RN230	13.50	0.15	1	13.62	1.10	0.038	0.006
86281		1999 UZ10	12.40	0.15	1	23.03	2.12	0.037	0.007
86829		2000 GR146	15.90	0.15	1	1.59	0.04	0.307	0.021
87183		2000 OX9	15.00	0.15	1	7.13	0.57	0.035	0.006
87299		2000 PU24	13.40	0.15	6	15.04	0.44	0.035	0.002
87303		2000 PJ26	13.80	0.15	1	10.70	0.75	0.047	0.007
88043		2000 UE110	14.40	0.15	1	8.29	0.79	0.045	0.009
88064		2000 VR46	13.30	0.15	3	10.05	0.44	0.089	0.009
88117		2000 WV132	13.40	0.15	1	11.41	0.94	0.059	0.010
88263		2001 KQ1	15.30	0.15	1	5.15	0.33	0.050	0.007
89352		2001 VC75	14.20	0.15	1	12.30	0.92	0.024	0.004
89363		2001 VC81	13.90	0.15	1	9.38	0.75	0.055	0.009
90045		2002 VC6	14.40	0.15	5	6.67	0.26	0.071	0.006
90485		2004 DY6	14.40	0.15	1	8.43	0.61	0.043	0.007
91191		1998 SE55	12.80	0.15	1	18.78	1.37	0.038	0.006
91229		1999 BN15	14.80	0.15	1	6.90	0.54	0.045	0.007
91281		1999 EQ11	14.50	0.15	4	7.53	0.34	0.050	0.005
91422	Giraudon	1999 OH	13.90	0.15	1	9.70	0.74	0.052	0.008
91776		1999 TJ206	12.70	0.15	1	16.16	1.61	0.056	0.011
92094		1999 XN29	13.20	0.15	1	20.53	1.27	0.022	0.003
92122		1999 XT96	13.00	0.15	1	17.51	1.50	0.036	0.006
92233		2000 AU102	13.00	0.15	1	17.50	1.11	0.036	0.005
92243		2000 AP148	13.60	0.15	1	10.83	1.09	0.055	0.011
92297	Monrad	2000 EL156	13.70	0.15	1	16.54	2.49	0.021	0.006
93075		2000 SE28	14.10	0.15	1	7.69	0.85	0.068	0.015
93221		2000 SE140	13.70	0.15	1	9.41	0.75	0.066	0.011
96705		1999 JB117	15.80	0.15	1	6.03	0.75	0.023	0.006
97329		1999 XO243	13.40	0.15	1	13.54	1.01	0.042	0.007
97514		2000 DL1	14.00	0.15	1	12.28	0.77	0.029	0.004
98935		2001 CV10	12.60	0.15	2	14.01	0.99	0.085	0.013
99167		2001 FX151	13.20	0.15	2	13.75	1.18	0.055	0.011
99229		2001 HK63	14.60	0.15	1	8.97	0.63	0.032	0.005
99895		2002 QS5	14.30	0.15	1	10.40	0.88	0.031	0.005
100327		1995 QX	13.40	0.15	1	8.83	0.74	0.099	0.017
101515		1998 XG27	14.10	0.15	1	8.95	0.96	0.051	0.011
101679		1999 CR108	13.80	0.15	6	8.61	0.22	0.075	0.004
101790		1999 GR36	13.50	0.15	2	9.86	0.74	0.072	0.011
101890		1999 NK55	12.80	0.15	2	17.42	1.17	0.045	0.006
102136		1999 RO182	15.50	0.15	1	10.11	1.06	0.011	0.002
102312		1999 TA98	14.30	0.15	1	7.00	0.94	0.069	0.019
103060		1999 XD137	14.50	0.15	2	6.15	0.51	0.074	0.013
104567		2000 GC75	14.30	0.15	2	8.52	0.67	0.050	0.009
104898		2000 JX5	13.40	0.15	5	8.71	0.25	0.108	0.007
104997		2000 KS2	13.50	0.15	1	12.92	0.96	0.042	0.007
105107		2000 LY14	14.10	0.15	2	8.96	0.70	0.051	0.008
105143		2000 NJ12	14.70	0.15	2	13.51	0.84	0.013	0.002
105194		2000 OA38	13.50	0.15	2	11.28	0.81	0.057	0.008
105210		2000 OK52	13.20	0.15	3	11.59	0.57	0.073	0.008
105243		2000 PB26	13.50	0.15	4	9.70	0.41	0.075	0.007
105427		2000 QL173	13.70	0.15	1	7.66	0.97	0.100	0.026
105504		2000 RX2	13.40	0.15	2	12.89	0.98	0.046	0.007
105564		2000 RR60	13.20	0.15	1	12.05	1.13	0.064	0.012
105598		2000 RD91	13.60	0.15	3	12.15	0.70	0.044	0.005
105627		2000 SY4	14.30	0.15	1	7.78	0.71	0.056	0.011
108310		2001 JD2	14.60	0.15	1	8.23	0.75	0.038	0.007
108435		2001 KU41	14.70	0.15	5	7.69	0.26	0.040	0.003
108455		2001 KD50	13.40	0.15	1	10.66	1.07	0.068	0.014
108522		2001 LQ	14.20	0.15	10	8.28	0.11	0.055	0.002
108806		2001 OK74	14.20	0.15	2	11.02	0.82	0.031	0.005
109229		2001 QC93	13.50	0.15	1	9.74	0.76	0.074	0.012
109300		2001 QK128	14.20	0.15	3	6.04	0.33	0.102	0.012
111125		2001 VL91	14.80	0.15	1	9.00	1.02	0.026	0.006
111245		2001 XE3	14.30	0.15	1	5.87	0.45	0.098	0.016
113724		2002 TL138	14.00	0.15	1	9.65	0.79	0.048	0.008
114190		2002 VP84	13.50	0.15	3	11.72	0.54	0.052	0.005
114534		2003 BT19	13.40	0.15	9	4.37	0.10	0.415	0.020
115488		2003 UL21	13.00	0.15	1	15.22	1.13	0.048	0.007
115657		2003 UW137	13.30	0.15	1	15.47	1.18	0.035	0.006
116695		2004 CQ91	13.70	0.15	2	10.60	0.76	0.056	0.009

Table E.2 (Continued.)

Asteroid			H	G	N_{ID}	d	$\sigma(d)$	p_v	$\sigma(p_v)$
121107		1999 GF5	14.60	0.15	1	9.23	0.56	0.030	0.004
121776		2000 AH30	13.60	0.15	1	10.76	1.09	0.055	0.011
121990		2000 FX11	13.70	0.15	1	10.54	0.79	0.053	0.008
122683		2000 SH1	14.30	0.15	2	8.15	0.60	0.053	0.009
123698		2000 YQ104	13.70	0.15	2	10.51	0.88	0.053	0.009
123855		2001 CE38	13.80	0.15	2	11.85	0.80	0.039	0.006
123982		2001 FA44	14.30	0.15	1	9.32	0.66	0.039	0.006
127211		2002 HK13	13.60	0.15	4	12.62	0.55	0.041	0.004
130339		2000 FC39	13.60	0.15	1	13.31	0.99	0.036	0.006
131382		2001 KY39	13.60	0.15	2	9.90	0.68	0.066	0.009
131400		2001 KT74	13.90	0.15	1	11.30	0.83	0.038	0.006
131417		2001 OC5	14.00	0.15	2	8.12	0.60	0.069	0.011
133037		2003 AB3	14.80	0.15	1	6.09	0.56	0.057	0.011
133492		2003 SN273	14.40	0.15	1	8.19	0.63	0.046	0.007
134421		1998 QT2	14.60	0.15	1	6.99	0.74	0.052	0.011
134705		1999 XA186	14.80	0.15	4	4.88	0.23	0.094	0.009
134851		2000 LG28	13.30	0.15	4	13.76	0.56	0.047	0.004
135083		2001 QR23	14.70	0.15	1	5.72	0.61	0.071	0.015
135984		2002 UC15	13.70	0.15	1	14.32	1.09	0.029	0.005
136079		2003 AR36	14.40	0.15	1	6.99	0.54	0.063	0.010
136604		1993 QD1	14.90	0.15	1	6.79	0.50	0.042	0.006
137123		1999 BX21	14.60	0.15	1	8.20	0.75	0.038	0.007
137189		1999 JU87	14.50	0.15	1	8.57	0.70	0.038	0.006
137805		1999 YK5	16.70	0.15	33	2.55	0.02	0.061	0.001
138127		2000 EE14	17.10	0.15	8	0.72	0.01	0.524	0.022
138577		2000 QX122	13.90	0.15	1	9.16	1.00	0.058	0.013
138597		2000 QZ161	14.10	0.15	1	7.48	0.83	0.072	0.016
138971		2001 CB21	18.40	0.15	1	0.34	0.01	0.649	0.048
139329		2001 KF37	15.00	0.15	1	4.82	0.51	0.076	0.016
139507		2001 PL41	15.10	0.15	1	6.47	0.59	0.038	0.007
139577		2001 QP93	13.60	0.15	2	12.25	1.00	0.045	0.008
139872		2001 RL77	14.60	0.15	1	8.29	0.77	0.037	0.007
139952		2001 RS142	14.40	0.15	1	12.64	1.16	0.019	0.004
140070		2001 SY111	14.50	0.15	2	8.95	0.96	0.037	0.008
140949		2001 VK98	14.60	0.15	1	9.52	0.75	0.028	0.005
141091		2001 XZ42	14.50	0.15	1	9.31	0.99	0.032	0.007
141346		2002 AF16	15.00	0.15	2	6.97	0.55	0.040	0.007
141484		2002 DB4	16.40	0.15	3	1.25	0.04	0.340	0.024
141729		2002 LN23	15.00	0.15	1	7.18	0.56	0.034	0.006
142585		2002 TH96	14.10	0.15	1	8.63	0.71	0.054	0.009
142944		2002 VT69	14.90	0.15	1	7.36	0.46	0.036	0.005
143243		2002 YA26	13.50	0.15	1	8.86	0.73	0.090	0.015
143947		2003 YQ117	15.40	0.15	1	1.75	0.11	0.401	0.054
144695		2004 GY2	14.20	0.15	1	10.49	0.86	0.034	0.006
145294		2005 KX2	14.00	0.15	1	7.40	1.02	0.081	0.023
145566	Andreasphilipp	2006 ON10	15.20	0.15	1	8.14	0.80	0.022	0.004
145616		2006 QV54	15.10	0.15	1	8.38	0.92	0.023	0.005
146148		2000 SN132	13.60	0.15	1	12.21	1.21	0.043	0.009
146340		2001 OF51	14.70	0.15	1	8.43	0.72	0.033	0.006
146627		2001 UD12	13.70	0.15	4	10.50	0.45	0.054	0.005
146881		2002 CH11	14.40	0.15	1	7.70	0.70	0.052	0.010
148170		1999 YE1	15.00	0.15	1	5.89	0.50	0.051	0.009
148351		2000 RH43	13.60	0.15	2	10.51	0.77	0.059	0.009
153271		2001 CL42	17.20	0.15	5	1.96	0.05	0.062	0.003
153652		2001 TC103	13.40	0.15	2	7.71	0.53	0.130	0.019
154269		2002 SM	18.00	0.15	2	1.40	0.06	0.057	0.005
154453		2003 CJ11	15.30	0.15	1	2.04	0.06	0.322	0.024
154555		2003 HA	16.60	0.15	1	0.82	0.04	0.597	0.064
159510		2000 XJ40	14.40	0.15	1	7.40	0.64	0.056	0.010
159929		2005 UK	17.40	0.15	4	2.06	0.08	0.047	0.004
161080		2002 MC1	14.50	0.15	1	10.51	0.92	0.025	0.005
161438		2003 WY170	15.80	0.15	1	6.27	0.70	0.022	0.005
162116		1998 SA15	19.40	0.15	1	0.94	0.04	0.035	0.003
164184		2004 BF68	19.40	0.15	2	0.67	0.04	0.082	0.010
165626		2001 FX135	14.30	0.15	1	16.60	0.74	0.012	0.001
169320		2001 TC138	14.50	0.15	1	12.12	0.86	0.019	0.003
169590		2002 GJ68	15.40	0.15	1	5.08	0.73	0.047	0.014
176345		2001 TS16	14.40	0.15	1	13.29	1.05	0.017	0.003
176871		2002 UP3	15.10	0.15	1	6.80	0.52	0.035	0.006
181287		2006 OF7	14.80	0.15	3	7.38	0.36	0.040	0.004
183017		2002 PV93	16.30	0.15	1	5.14	0.64	0.020	0.005
184990		2006 KE89	16.50	0.15	1	1.58	0.08	0.179	0.020
189786		2002 DX3	14.80	0.15	1	10.00	0.84	0.021	0.004
207673		2007 PQ26	15.10	0.15	3	7.83	0.38	0.028	0.003
210191		2007 OT6	14.60	0.15	1	8.44	0.53	0.036	0.005
211711		2003 YF1	14.70	0.15	1	7.22	0.53	0.045	0.007
219315		2000 ET118	15.20	0.15	2	5.10	0.38	0.057	0.009
225618		2001 AO26	13.90	0.15	1	9.88	0.63	0.050	0.007
230411		2002 LZ20	15.20	0.15	1	6.21	0.69	0.038	0.009
243923		2001 NQ1	14.28	0.15	1	6.44	0.51	0.083	0.014
244571		2002 WU	14.87	0.15	1	5.38	0.47	0.069	0.012
255302		2005 VK122	14.89	0.15	3	8.13	0.44	0.033	0.004
256412		2007 BT2	17.06	0.15	3	2.76	0.14	0.038	0.004
265491		2005 GF11	14.48	0.15	1	7.76	0.84	0.047	0.010
306611		2000 PA9	14.55	0.15	1	7.04	0.62	0.054	0.010
306715		2000 WY50	14.28	0.15	3	5.76	0.29	0.105	0.011
306866		2001 SN268	15.52	0.15	1	3.91	0.32	0.071	0.012
307005		2001 XP1	17.89	0.15	1	1.87	0.08	0.035	0.003
308680		2006 DY62	14.44	0.15	1	7.73	0.51	0.050	0.007
327625		2006 HU55	14.76	0.15	1	8.63	0.64	0.030	0.005
331766		2002 YO5	14.88	0.15	1	6.16	0.52	0.052	0.009
334352		2001 YF52	15.11	0.15	9	5.88	0.12	0.048	0.002
		1993 ME1	15.99	0.15	6	3.64	0.13	0.056	0.004
		2000 KW43	19.94	0.15	1	0.72	0.07	0.036	0.007
		2000 SB1	15.01	0.15	8	5.69	0.13	0.054	0.003
		2001 VE	15.58	0.15	1	5.05	0.43	0.041	0.007
		2002 AJ153	14.82	0.15	1	6.36	0.40	0.052	0.007
		2002 JP121	15.26	0.15	1	10.11	0.80	0.014	0.002
		2002 PE130	18.13	0.15	2	1.50	0.10	0.044	0.006
		2005 GO22	18.57	0.15	2	0.90	0.05	0.084	0.009
		2005 SE71	18.14	0.15	1	0.55	0.03	0.324	0.038
		2006 BQ6	19.73	0.15	1	0.30	0.01	0.256	0.021
	P/2006 HR30	2006 HR30	12.10	0.15	23	21.58	0.16	0.057	0.001
		2006 KD40	18.54	0.15	2	1.28	0.04	0.042	0.003
		2006 LD1	20.87	0.15	1	0.12	0.01	0.508	0.088
		2006 MJ10	18.73	0.15	1	0.79	0.05	0.091	0.012
		2006 MW12	16.14	0.15	1	7.21	0.69	0.012	0.002
		2006 PF1	19.50	0.15	1	0.41	0.02	0.170	0.018
		2006 QH169	15.02	0.15	1	6.57	0.75	0.040	0.009
		2006 QL39	13.57	0.15	4	10.91	0.35	0.056	0.004
		2006 SA6	19.34	0.15	1	0.68	0.06	0.071	0.013
		2006 SE285	16.43	0.15	1	3.56	0.30	0.037	0.006
		2006 UD185	14.39	0.15	3	8.76	0.42	0.048	0.005
		2006 UL217	20.72	0.15	1	0.14	0.01	0.487	0.073
		2006 VV2	16.79	0.15	1	1.03	0.03	0.318	0.024
		2006 WT1	19.99	0.15	1	0.35	0.02	0.150	0.018
		2007 AG	20.11	0.15	6	0.33	0.01	0.158	0.008
		2007 DF8	20.32	0.15	2	0.47	0.02	0.059	0.006
		2007 FM3	16.87	0.15	5	3.14	0.13	0.033	0.003
		2007 HE15	19.60	0.15	1	0.37	0.02	0.182	0.021

Note: Number, name, provisional designation of asteroid are from the minor planet center, as of October 27th 2012. H, G, N_{ID}, d, $\sigma(d)$, p_{v}, and $\sigma(p_{\mathrm{v}})$ are the absolute magnitude, the slope parameter, number of detections by AKARI, the mean diameter, the uncertainty in diameter, the mean geometric albedo, and the uncertainty in albedo, respectively.