Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
1 Ceres													
I	Prograde rotation								- - - - -				Mor77
I	Prograde rotation								- - - - -				Han77
P			270°	+36°	—P—				- - - - -				Joh+83
R			Concentric ring region[6]						- - - - -				Ost87
S	—S—		332°	+70°	—S—		—S—		- - - - -				Sai+93
Synthesis	Prograde rotation								- - - - -				Synthesis
2 Pallas													
EZ			228°	+43°	—E—				0.325440				Sch+76
I	Prograde rotation								- - - - -				Mor77
I	Prograde rotation								- - - - -				Han77
Z			211°	+38°	31°	−38°			- - - - -				Bur+83
AM	44°	+4°	148°	+55°	224°	−4°	328°	−55°	- - - - -	1.14	1.0[1]		Zap+84
A			200°	+40°	20°	−40°			- - - - -				Bin84
A			220°	+15°	40°	−15°			- - - - -				Bin84
A	49°	+6°	157°	+53°	229°	−6°	337°	−53°	- - - - -	1.14	1.0[1]		Bur+85
R			Aspect circle[7]						- - - - -				Ost85
OEAI	—O—		227°	+20°	—E—		—E—		0.325995	1.11	1.03		Lam85
OEA	54°	−6°	—O—		—E—		—E—		0.32555136	1.06	1.05		Mag86
R			Concentric ring region[6]						- - - - -				Ost87
S	100°	−22°	295°	+16°	—S—		—S—		- - - - -	1.10	1.01		Dr+89a
O	70°	+15°	250°	+15°	70°	−15°	250°	−15°	- - - - -	1.11	1.30		Dr+89b
3 Juno													
EA	71°	+49°					—E—		0.3004950				Cha+62
AM	101°	+29°	321°	+57°	141°	−57°	281°	−29°	- - - - -	1.23	1.0[1]		Zap+84
OEA	110°	+40°	—O—		—E—		—E—		0.30040	1.20	1.02		Mag86
E	104°	+36°	316°	+62°	—E—		—E—		0.3003969				Bir+89
EAM	108°	+34°			—E—		—E—		0.3003970	1.18	1.0[2]		Eri+93
EA	108°	+38°	————		—E—		—E—		0.3003970	1.20	1.26		Dot+95
Synthesis	108°	+36°	318°	+60°	—E—		—E—		0.3003970	1.20			Synthesis
4 Vesta													
EA	14°	+80°					—E—		0.2227006				Cai56
EA	—E—		—E—			−90°		−90°	0.4453666	1.14	1.0[1]		Hau58
EA	57°	+74°					—E—		0.2225884				Cha+62
E	126°	+65°			—E—		—E—		0.22258871				Geh67
E	139°	+47°	333°	+39°	—E—		—E—		0.4451021	shape[21]			Tay73
I	Prograde rotation								- - - - -				Mor77
I	Prograde rotation								- - - - -				Han77
E	103°	+43°	301°	+33°	—E—		—E—		0.2225889				Tay+85
E	120°	+65°	325°	+55°	—E—		—E—		0.22258849	1.01	1.4[2]		Mag86
AM	85°	+58°	310°	+60°					- - - - -	1.0[1]	1.27	X[18]	Cel+87
SE	—S—		336°	+55°					0.2225887	1.10	1.14	X[20]	Dr+88a
S	—S—		311°	+67°	—S—		—S—		- - - - -	1.07	1.14		Dr+89a
EA	160°	+52°	340°	+40°	—E—		—E—		0.2225885				Rey+93
Synthesis	—S—		320°	+51°	—ES—		—ES—		0.2225886	1.1	1.2		Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
5 Astraea													
E							328°	−9°	0.7005047				Tay78
AM	131°	+49°	328°	+46°	148°	−46°	310°	−49°	- - - - -	1.29	1.0[1]		Za+86b
R			Concentric ring region[6]						- - - - -				Ost87
EA	125°	+46°	318°	+44°	—E—		—E—		0.700026	1.27			Eri+93
EA	114°	+57°			—E—		—E—		0.700026	1.21	1.15		DeA95
Synthesis	123°	+51°	323°	+44°	—E—		—E—		0.700026	1.24			Synthesis
6 Hebe													
A	145°	+15°					—E—		- - - - -				Geh+62
E			365°	+50°					0.3031020	1.15	1.0[1]		Geh+77
AM	130°	+33°	344°	+30°	164°	−30°	310°	−33°	- - - - -	1.24	1.0[1]		Zap+84
OEA	—O—		355°	+50°	—E—		—E—		0.3031025	1.14	1.2		Mag86
R			Concentric ring region[6]						- - - - -				Ost87
E			363°	+60°	—E—		—E—		0.3031024				Mic88
EA			365°	+27°	—E—		—E—		0.3031023	1.13	1.06		DeA95
EA	—O—		353°	+24°	—E—		—E—		0.3031026	1.14	1.00		Dot+95
EA			check[5]						- - - - -				Lag+95
Synthesis	—O—		358°		—E—		—E—		0.3031025	1.14			Synthesis
7 Iris													
EA			184°	+55°	—E—				0.2967853	shape[9]			Cai56
AM			193°	+15°	13°	−15°			- - - - -				Geh+62
AM	11°	+41°					191°	−41°	- - - - -	1.31	1.35		Tay77
EA	15°	+25°	195°	+15°	—E—		—E—		0.29745197	1.18	1.40		Mag86
AM	18°	+33°	193°	+16°	13°	−16°	198°	−33°	- - - - -	1.19	1.21		Za+86b
R			Concentric ring region[6]						- - - - -				Ost87
EA	8°	+35°	187°	+5°	—E—		—E—		0.29745195	1.24	1.36		DeA95
Synthesis	13°	+33°	192°	+10°	—E—		—E—		0.29745196	1.23	1.3		Synthesis
8 Flora													
A	157°	+10°					—E—		- - - - -				Geh+62
A	140°		320°		140°		320°		- - - - -				Zap+83
A	148°	+45°	328°	+45°	148°	−45°	328°	−45°	- - - - -	1.12	1		Hol+87
AM	135°	+43°	327°	+32°	147°	−32°	315°	−43°	- - - - -	1.10	1.28		DiM+89
EA	139°	+14°					319°	−14°	- - - - -	1.05	1.16		DeA95
AM	122°	+37°					302°	−37°	- - - - -	1.097	1.062		Bla+98
9 Metis													
AM	156°	+15°					336°	−15°	- - - - -				Geh+62
A			348°	+76°	168°	−76°			- - - - -				Cha+62
AM	191°	+56°					371°	−56°	- - - - -	1.30	1.70		Zap+79
AM	186°	+43°	362°	+26°	182°	−26°	366°	−43°	- - - - -	1.32	1.34		Zap+84
R			Concentric ring region[6]						- - - - -				Ost87
EAM	183°	+25°	361°	+9°	—E—		—E—		0.2116324	1.27	1.26		Dr+88b
EAM	180°	+30°	360°	+20°	—E—		—E—		0.2116322	1.27	1.26		Mag90a
EAM	181°	+23°	360°	+7°	—E—		—E—		0.2116323	1.27	1.24		Dru+91
EA	185°	+31°			—E—		—E—		0.2116323	1.31	1.22		DeA95
Synthesis	182°	+28°	360°	+13°	—E—		—E—		0.2116323	1.30	1.24		Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
10 Hygiea													
I					Retrograde rotation				- - - - -				Mor77
EA	—E—		—E—		112°	−41°	299°	−39°	1.152462	1.36	1.04		Mic+91
EA	—E—		—E—		100°	−34°	285°	−34°	1.150969	1.28	0.65		Eri+93
EAM	—E—		—E—		117°	−37°	304°	−35°	1.150977	1.30	1.18		Mic93
AM	118°	+44°					298°	−44°	- - - - -	1.343	1.144		Bla+98
AM	122°	+42°					302°	−42°	- - - - -	1.343	1.444		Bla+98
Synthesis	—E—		—E—		108°	−36°	294°	−35°	- - - - -	1.29			Synthesis
11 Parthenope													
AM	64°	+38°	253°	+51°	73°	−51°	244°	−38°	- - - - -	1.225	1.208		Bla+98
12 Victoria													
A			242°	+17°	62°	−17°			0.36060				Tem+69
R			Concentric ring region[6]						- - - - -				Ost87
EA	9°	+55°	176°	+40°	—E—		—E—		0.3608665	1.25	1.00		Dot+95
14 Irene													
AM			270°	+34°	90°	−34°			- - - - -	1.148	1.080		Bla+98
15 Eunomia													
EA	—E—		—E—			−90°		−90°	0.253448				Gro+54
EA	—E—		—E—				337°	−82°	0.25344810	1.51	?		Cai56
EA	—E—		—E—			−90°		−90°	0.253448				HG+58
EA	—E—		—E—		70°	−74°			0.25344810				Cai60
EA	—E—		—E—			−90°		−90°	0.25336				Sca+75
A	164°	+52°	————		————		344°	−52°	- - - - -	1.6	1.0[1]		Pii+85
A	170°	+57°	————		————		350°	−57°	- - - - -	1.6	1.4[1]		Pii+85
E	Prograde rotation				—E—		—E—		0.25336				Lup+85
EA	—E—		—E—		106°	−73°	351°	−61°	0.25344806	1.50	1.0		Mag86
E	—E—		—E—		131°	−71°	360°	−50°	0.25344810				Mic88
EAM	—E—		—E—		82°	−78°	352°	−61°	0.25344805	1.40	1.06		Dr+88b
EA	—E—		—E—		108°	−74°	350°	−59°	0.25344808	1.44	1.0		Mag90a
EAM	—E—		—E—		106°	−73°	————		0.25344806	1.44	1.02		Dru+91
EA	—E—		—E—		96°	−63°			0.25344806	1.47	1.00		DeA92
E	—E—		—E—		Retrograde rotation				- - - - -				Kru+92
EAM	—E—		—E—		102°	−76°	354°	−57°	0.25344814	1.36	1.20		Mic93
EA	—E—		—E—		106°	−73°			0.25344806	1.47	1.00		DeA95
Synthesis	—E—		—E—		106°	−74°	352°	−58°	0.25344808	1.42	1.1		Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
16 Psyche									
EZ	————	225° +5°	—E—	—E—	0.17483120				Zho+82
Z		222° +4°	42° −4°		0.174831	1.3	1.3		Lup+83
AM	40° +23°	217° +31°	37° −31°	220° −23°	- - - - -	1.32	1.26		Zap+84
E	41° +33°	223° +37°			0.1748143				Ted+85
AM	39° +35°	220° +40°	40° −40°	219° −35°	- - - - -	1.33	1.33		Ted+85
EA	—E—	—E—	36° −21°	217° −14°	0.17483113	1.19	1.16		Mag86
R		Concentric ring region[6]			- - - - -				Ost87
EAM	—E—	—E—	————	215° −17°	0.17483117	1.27	1.35		Dr+88b
EAM	—E—	—E—	35° −19°	216° −12°	0.17483106	1.16	1.34		Mag90a
AMF	37° +0°	217° +8°	37° −8°	217° −0°	- - - - -				Lum+90
AM	33° +25°	211° +29°	31° −29°	213° −25°	- - - - -	1.39	1.38		Dot+92
EA	—E—	—E—	35° −27°	215° −22°	0.17483104	1.35[2]	1.36		DeA93
Synthesis	—E—	—E—	35° −21°	215° −15°	0.1748311	1.3	1.3		Synthesis
17 Thetis									
AM	69° +43°	268° +55°	88° −55°	249° −43°	- - - - -	1.25	1.35[1]		Za+86b
EA	Prograde rotation		—E—	—E—	- - - - -				Lag+95
EAM	—E—	—E—	————	253° −33°	0.5112699	1.40	1.40		Mic+95
18 Melpomene									
EA	—E—	—E—	0° −0°	341° −36°	0.482218				Hof+90
19 Fortuna									
I	Prograde rotation				- - - - -				Mor77
I	Prograde rotation				- - - - -				Han77
E	Prograde rotation		—E—	—E—	0.310125				Lup+85
R		Concentric ring region[6]			- - - - -				Ost87
EAM	65° +48°	————	—E—	—E—	0.3101343	1.24	0.94		Dr+88b
E	70° +50°	250° +50°	—E—	—E—	0.3101342	1.21	1.1		Mag90a
EAM	68° +52°	————	—E—	—E—	0.3101343	1.23	0.93		Dru+91
EA	98° +51°	266° +48°	—E—	—E—	0.3101340	1.27	1.00		DeA95
AM	65° +49°	244° +48°	64° −48°	245° −49°	- - - - -	1.445	1.096		Bla+98
Synthesis	79° +51°	258° +49°	—E—	—E—	0.3101342	1.24	1.0		Synthesis
20 Massalia									
A	10° +78°			190° −78°	- - - - -				Cha+62
AM	30° +49°	207° +51°	27° −51°	210° −49°	- - - - -	1.27	1.0[1]		Bar+85
A	30° +54°	205° +79°	25° −79°	210° −54°	- - - - -	1.25	2.4[2]		McC+85
E	—E—	—E—			0.337419				Lup+85
EA	20° +80°	200° +80°	—E—	—E—	0.3373993	1.16			Mag86
E	Prograde rotation		—E—	—E—	- - - - -				Kru+92
EA	31° +69°	208° +69°	—E—	—E—	0.3373994	1.27	1.00		Dot+95
Synthesis	28° +74°	205° +74°	—E—	—E—	0.3373994				Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
21 Lutetia													
E	Prograde rotation				——E——		——E——		0.340277				Lu+87a
AM	42°	+40°	223°	+48°	43°	−48°	222°	−40°	- - - - -	1.25	1.09		Lu+87c
EAM	55°	+44°	241°	+40°	——E——		——E——		0.3400260	1.30	1.7[2]		Mic92
A	48°	+31°	233°	+38°	53°	−38°	228°	−31°	- - - - -	1.29	1.25		Dot+92
EAM	33°	+9°	214°	+15°	——E——		——E——		0.340244	1.25	2.7		Mic93
EA	41°	+42°			——E——		——E——		0.3400252	1.41	1.08		DeA95
EA	50°	+10°	230°	+10°	——E——		——E——		0.340151	1.22	1.4		Lag+95
EAM	————		240°	+37°	——E——		——E——		0.3404874	1.26	1.15		Mic96a
22 Kalliope													
AM			215°	+45°	35°	−45°			- - - - -	1.34	1.23		Sca+78
AM	13°	+17°	214°	+42°	34°	−42°	193°	−17°	- - - - -	1.34	1.18		Zap+84
EAM			199°	+14°	19°	−11°			0.1728092	1.4	1.18		Mag86
A			203°	+29°	23°	−29°			- - - - -	1.33	1.24		Sur+86
M			201°	+22°	21°	−22°			- - - - -	1.32	1.13		Sur+86
EAM	——E——		——E——		————		194°	−8°	0.17284164	1.32	1.27		Dr+88b
EAM					20°	−23°	195°	+2°	0.1728416	1.6	1.2		Mag90a
EA	——E——		——E——		18°	−23°			0.17284168	1.32	1.18		Mi+90a
AMF	18°	+0°	204°	+23°	24°	−23°	198°	−0°	- - - - -				Lum+90
EAM	——E——		——E——		————		193°	−7°	0.17284164	1.31	1.27		Dru+91
EA	——E——						190°	−1°	0.1728415	1.33	1.27		DeA92
A	10°	+12°	203°	+45°	23°	−45°	190°	−12°	- - - - -	1.32	1.18		Dot+92
EA	——E——		——E——				190°	−1°	0.17284154	1.33	1.27		DeA95
Synthesis	——E——		——E——		21°	−23°	191°	−2°	0.1728416	1.32	1.2		Synthesis
23 Thalia													
A D	Solution curve								- - - - -	1.15[2]			Tan+91
EAM	198°	+72°	354°	+47°	——E——		——E——		0.5133960	1.18	1.45		Mic93
EA	——E——		——E——		15°	−55°	180°	−35°	0.513202	1.28			Lag+95
24 Themis													
AM			274°	+52°	94°	−52°			- - - - -	1.191	1.148		Bla+98
28 Bellona													
AM	93°	+18°	285°	+37°	105°	−37°	273°	−18°	- - - - -	1.31	1.18		Zap+84
EAM	73°	+17°	265°	+43°	——E——		——E——		- - - - -	1.24	1.20		Mic93
29 Amphitrite													
A	165°	+45°	345°	+45°	165°	−45°	345°	−45°	- - - - -	1.14	1.0[1]		Ted+81
A	160°	+53°	320°	+45°	140°	−45°	340°	−53°	- - - - -	1.13	1.00		McC+84
AM	142°	+50°	308°	+40°	128°	−40°	322°	−50°	- - - - -	1.13	1.0[1]		Zap+84
EAM	——E——		——E——		135°	−15°	320°	−25°	0.22458835	1.06	1.06		Mag86
EAM	——E——		——E——		136°	−33°	————		0.2245882	1.13	1.14		Dr+88b
S	——S——		——S——		134°	−36°	——S——		- - - - -	1.22	1.06		Dr+89a
EAM	——E——		——E——		133°	−17°	318°	−25°	0.22458829	1.05	1.16		Mag90a
EA	——E——		——E——		145°	−43°			0.22458832	1.18	1.00		DeA95
Synthesis	——ES——		——ES——		136°	−32°	——S——		0.22458832	1.1	1.1		Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
30 Urania													
EAM	114°	+34°	293°	+33°					- - - - -	1.5	1.1		Mic96a
31 Euphrosyne													
AM	186°	+67°	317°	+4°	137°	−4°	6°	−67°	- - - - -	1.12	1.0[1]		Bar+85
A	178°	+72°	315°	+5°	135°	−5°	358°	−72°	- - - - -	1.12	1.00		McC+85
EAM	—E—		—E—		126°	−31°	————		0.2316828	1.14	1.59		Mic93
A D	300°	+75°	282°	+30°	102°	−30°	120°	−75°	- - - - -	1.08			Lic+94
EAM	—E—		—E—		————		273°	−60°	0.2304828	1.09	1.60		Kry+96
32 Pomona													
AM	91°	+34°	263°	+46°	83°	−46°	271°	−34°	- - - - -	1.34	1.0[1]		Za+86b
EA	103°	+59°	267°	+70°	—E—		—E—		0.393652	1.4			Eri+93
EA	83°	+33°	253°	+43°	—E—		—E—		- - - - -	1.76	1.00		DeA95
EA	89°	+43°	260°	+57°	—E—		—E—		0.393654	1.40	1.00		Dot+95
Synthesis	92°	+45°	261°	+57°	—E—		—E—		0.393653				Synthesis
36 Atalante													
AM			299°	+19°	119°	−19°			- - - - -	1.282	1.000		Bla+98
37 Fides													
EA	100°	+5°	280°	−5°					0.305573	1.2			Mag86
39 Laetitia													
EA	—E—						280°	−66°	0.2144712	shape[9]			Cai56
A	114°	+28°					294°	−28°	- - - - -				HG+58
EA	—E—						283°	−61°	0.2144712	1.7	3.3		Cai60
AM	130°	+10°					310°	−10°	- - - - -				Geh+62
M	121°	+37°					301°	−37°	- - - - -	1.64	1.80		Sat76
A	128°	+38°	339°	+48°	159°	−48°	308°	−38°	- - - - -	1.53	1.31[2]		McC+84
AM	116°	+49°	338°	+57°	158°	−57°	296°	−49°	- - - - -	1.58	2.08		Zap+84
A	111°	+56°	365°	+70°	185°	−70°	291°	−56°	- - - - -	1.53	3.1[2]		McC+85
E	Prograde rotation				—E—		—E—		0.21409				Lup+85
EAM	129°	+30°	324°	+35°	—E—		—E—		0.21409332	1.49	1.49		Mag86
EAM	————		318°	+26°	—E—		—E—		0.21409327	1.45	1.48		Dr+88b
EAM	130°	+29°	325°	+37°	—E—		—E—		0.21409333	1.50	1.50		Mag90a
AMF	125°	+19°	317°	+26°	137°	−26°	305°	−19°	- - - - -				Lum+90
EAM	————		319°	+28°	—E—		—E—		0.21409330	1.49	1.48		Dru+91
AMF			327°	+36°	147°	−36°			- - - - -			X[16]	Lum+91
EA			325°	+23°	—E—		—E—		0.21409327	1.42	1.10		DeA95
Synthesis	127°	+24°	324°	+31°	—E—		—E—		0.21409330	1.47			Synthesis
40 Harmonia													
A D	Solution curve								- - - - -	1.31[2]			Tan+91
EAM	————		208°	+21°	—E—		—E—		0.3712522	1.24	2.07		Mic93

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
41 Daphne													
AM	15°	+36°	157°	+28°	195°	−36°	337°	−28°	- - - - -	1.51	1.00		Bar83
AM	19°	+35°	159°	+32°	199°	−35°	339°	−32°	- - - - -	1.44	1.0[1]		Bar+85
EA	—E—		—E—		186°	−40°	335°	−33°	0.2495001	1.30	1.0		Mag86
AM	18°	+48°	135°	+43°	198°	−48°	315°	−43°	- - - - -	1.31	1.16		Za+86b
R	Concentric ring region[6]								- - - - -				Ost87
EAM	—E—		—E—		————		334°	−32°	0.2494996	1.28	1.23		Dr+88b
EA	—E—		—E—		197°	−36°	344°	−38°	0.2494994	1.28	1.00		Mag90a
EAM	—E—		—E—		————		340°	−32°	0.2494993	1.25	1.19		Dru+91
EA	—E—		—E—		190°	−27°	343°	−31°	0.24949931	1.37	1.00		DeA95
L	————		————		196°	−31°	————		0.2494993	shape[31]			Ka+02
Synthesis	—E—		—E—		193°	−31°	342°	−34°	0.2494994	1.3	1.1		Synthesis
42 Isis													
AM			302°	+36°	122°	−36°			- - - - -	1.419	1.000		Bla+98
EAM	—E—		—E—		117°	−5°	288°	−16°	0.5665417				Den+98
43 Ariadne													
A	73°	+40°	249°	+43°	69°	−43°	253°	−40°	- - - - -	1.69	1.8[2]		McC+84
AM	73°	+25°	248°	+20°	68°	−20°	253°	−25°	- - - - -	1.79	1.10		Bar+86
E	—E—		—E—		55°	−16°	241°	−21°	0.2400784				Mic88
EAM	78°	+13°	256°	+13°	—E—		—E—		0.2400924	1.40	1.10		Dr+88b
EA	—E—		—E—		68°	−14°	251°	−16°	0.2400828	1.76	1.01		Mag90a
EAM	—E—		—E—		————		248°	−10°	0.2400830	1.60	1.24		Dru+91
EA	—E—		—E—		————		249°	−14°	0.2400817	1.59	1.10		DeA92
E	—E—		—E—		Retrograde rotation				- - - - -				Kru+92
AMD	72°	+13°	250°	+8°	70°	−8°	252°	−13°	- - - - -	1.84	1.52		Det+92[25]
EAMD			250°	+1°	70°	−1°			- - - - -	1.0[1]	1.0[1]	X[15]	Det+92[25]
EAMD	73°	+25°	248°	+20°	68°	−20°	253°	−25°	- - - - -	shape[14]			Det+92[25]
EAMD	70°	+5°					250°	−5°	- - - - -	shape[14]			Det+92[25]
E	—E—		—E—		70°	−22°	254°	−24°	0.24008258				Det+92[25]
EAM	—E—		—E—		68°	−22°	253°	−28°	0.2400824	1.64	1.16		Mic93
EA	—E—		—E—		————		249°	−14°	0.2400817	1.59	1.10		DeA95
EA	—E—		—E—		————		251°	−9°	0.2400824	1.68	1.10		Dot+95
Synthesis	—E—		—E—		69°	−16°	252°	−16°	0.2400823	1.6	1.1		Synthesis
44 Nysa													
EA			—E—		178°	−84°			0.26737846	shape[9]			Cai56
AM	105°	+30°					285°	−30°	- - - - -				Geh+62
EA			358°	+84°	—E—				0.26730938				Cha+62
AM	100°	+50°					280°	−50°	- - - - -	1.58	1.30		Zap+79
E	100°	+60°	265°	+55°	—E—		—E—		0.26755902				Tay+83
EA	94°	+59°	288°	+63°	—E—		—E—		0.26755895				Mag83
AM	99°	+49°	295°	+54°	115°	−54°	279°	−49°	- - - - -	1.51	1.18		Zap+84
EAM	105°	+57°	300°	+61°	—E—		—E—		0.26755902	1.37	1.4		Mag86
AMF	112°	+46°	304°	+47°	124°	−47°	292°	−46°	- - - - -				Lum+90
EA	92°	+47°	283°	+49°	—E—		—E—		0.26755903	1.44	1.13		DeA93
L	98°	+58°	————		————		————		0.26755904	shape[31]			Ka+02
Synthesis	102°	+50°	296°	+52°	—E—		—E—		0.26755902	1.44			Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
45 Eugenia									
E	—E—	—E—	115° −34°	286° −26°	0.2374645				Tay+88
EAM	—E—	—E—	127° −44°	————	0.2374646	1.33	1.65		Dr+88b
EAM	—E—	—E—	125° −35°	296° −26°	0.2374646	1.36	1.48		Mag90a
AMF	128° +16°	313° +25°	133° −25°	308° −16°	- - - - -				Lum+90
A D		Solution curve			- - - - -	1.42[2]			Tan+91
EA	—E—	—E—	109° −27°		0.2374650	1.33	1.23		DeA95
EA		check[5]			- - - - -				Lag+95
Synthesis	—E—	—E—	122° −33°	297° −23°	0.2374647	1.36			Synthesis
47 Aglaja									
EAM	139° +33°	313° +19°	—E—	—E—	0.549549	1.21	1.20		Mic96a
48 Doris									
AM	113° +27°			293° −27°	- - - - -	1.445	1.000		Bla+98
51 Nemausa									
E F	—E—	—E—	133° −61°	?[4]	0.324368				Kri91
E F	—E—	—E—	166° −62°	?[4]	- - - - -				Kri92
EA	176° +62°			356° −62°	- - - - -	1.15	1.00		DeA95
52 Europa									
A	0° +37°	203° +38°	23° −38°	180° −37°	- - - - -	1.12	1.0[1]		Bar+86
EAM	17° +65°	————	—E—	—E—	- - - - -	1.11	2.79		Mic93
EA	—E—	—E—	80° −55°	250° −40°	0.2346504	1.21	1.30		Dot+95
EAM	—E—	—E—	84° −32°	257° −18°	0.2347019	1.20	1.17		Mic+95
54 Alexandra									
A D		Solution curve			- - - - -	1.3[2]			Tan+91
EA	160° +45°	290° +55°	—E—	—E—	0.292766				Bel+93
55 Pandora									
AM	36° +32°	226° +19°	46° −19°	216° −32°	- - - - -	1.27	1.10		Za+86b
EAM	—E—	—E—	————	202° −26°	0.2001593	1.76	1.52		Dr+88b
EAM	32° +40°	224° +32°	—E—	—E—	0.2001596	1.34	1.47		Dru+91
EAM	————	239° +28°	—E—	—E—	0.2001595	1.29	1.32		Mic93
EA	—E—	—E—	50° −18°	216° −34°	0.2001603	1.29	1.25		DeA95
EA	25° +30°	220° +30°	—E—	—E—	0.2001686	1.29	1.1		Lag+95
EAM	28° +48°	232° +42°	—E—	—E—	0.2001685	1.32	1.25		Mic96a
60 Echo									
EAM	95° +34°	275° +42°	—E—	—E—	1.048226	1.50[2]	1.38		Mic93
63 Ausonia									
AM	130°	310°	130°	310°	- - - - -	2.4	1.0		Zap+83
AM	127° +38°	298° +28°	118° −28°	307° −38°	- - - - -	2.25	1.0[1]		Zap+84
EAM	—E—	—E—	120° −30°	305° −30°	0.3873987	2.06	1.04		Mag86
E	—E—	—E—			0.387230				Lu+87a
EA	—E—	—E—		313° −42°	0.3873992	2.16	1.04		DeA95
EAM	—E—	—E—	122° −26°	310° −40°	0.3874027	2.08	1.05		Mic96a

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
64 Angelina													
EAM	119°	+29°	299°	+27°	—E—		—E—		0.3647784	1.38	1.05		Mic93
65 Cybele													
EAM	—E—		—E—		26°	−52°	———		0.1661266	1.08	1.74		Dr+88b
EAM	—E—		—E—		25°	−49°	———		0.1683549	1.09	1.69		Dru+91
EA	—E—		—E—		34°	−23°			0.1683552	1.05	1.37		DeA95
Synthesis	—E—		—E—		Retrograde rotation				0.1683551	1.07			Synthesis
65 Maja													
AM			345°	+50°	165°	−50°			- - - - -	1.660	1.000		Bla+98
69 Hesperia													
E	131°	+42°	315°	+59°	—E—		—E—		0.2358226				Ve+89b
E					—E—		—E—		- - - - -				Kru+92
EA			243°	+51°	—E—		—E—		0.2356040	1.25	1.45		DeA+95
AM	64°	+39°	250°	+42°	70°	−42°	244°	−39°	- - - - -	1.247	1.250		Bla+98
71 Niobe													
AM			274°	+14°	94°	−14°			- - - - -	1.202	1.345		Bla+98
77 Frigga													
AM	57°	+39°					236°	−40°	- - - - -	1.224	1.010		Bla+98
79 Eurynome													
EA	64°	+45°	226°	+52°	—E—		—E—		0.2490706	1.28	2.0[2]		Mi+90a[24]
EA	62°	+26°	226°	+41°	—E—		—E—		0.2490708	1.24	1.20		DeA93
EA	56°	+28°	236°	+38°	—E—		—E—		0.2490705	1.25	1.42		DeA+95
EAM	40°	+35°	214°	+38°	—E—		—E—		0.2490716	1.22	1.22		Mic96a
Synthesis	61°	+33°	229°	+44°	—E—		—E—		0.2490707	1.26			Synthesis
80 Sappho													
R			Concentric ring region[6]						- - - - -				Ost87
83 Beatrix													
EAM	—E—		—E—		3°	−37°	172°	−31°	0.4213796	1.26	1.16		Kru+94
EA	—E—		—E—		6°	−46°	173°	−38°	- - - - -	1.22	1.10		DeA95
Synthesis	—E—		—E—		4°	−42°	172°	−34°	- - - - -	1.24	1.1		Synthesis
85 Io													
EA	120°	+89°	303°	+82°	123°	−82°	300°	−89°	- - - - -	1.18	1.00		Dot+95
EAM[32]	—E—		—E—		—E—		285°	−52°	0.28646325	1.15	1.8		Eri+99
EAM[32]	—E—		—E—		108°	−46°	290°	−16°	0.2864629	1.19			Eri+99

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
87 Sylvia													
EAM	89°	+52°	288°	+40°	—E—		—E—		0.2159852	1.41	1.17		Dr+88b
EAM	66°	+67°	296°	+59°	—E—		—E—		0.2159851	1.44	1.5		Mag90a
EAM	89°	+52°	291°	+42°	—E—		—E—		0.2159853	1.43	1.17		Dru+91
EAM	84°	+55°	297°	+50°	—E—		—E—		0.2159859	1.37	1.41[2]		Mic93
EA	86°	+45°			—E—		—E—		0.2159850	1.45	1.05		DeA95
Synthesis	82°	+55°	295°	+50°	—E—		—E—		0.2159853	1.42			Synthesis
88 Thisbe													
AM	32°	+69°	205°	+54°	25°	−54°	212°	−69°	- - - - -	1.13	1.0[1]		Za+86b
EAM	————		129°	+78°	—E—		—E—		0.2517222	1.12	1.30		Dr+88b
EA	40°	+70°	200°	+70°	—E—		—E—		0.2517223	1.13			Mag90a
EAM	————		110°	+58°	—E—		—E—		0.2517222	1.15	1.16		Dru+91
EA			243°	+74°	—E—		—E—		0.2517224	1.11	1.22		DeA95
Synthesis	Prograde rotation				—E—		—E—		0.2517223	1.13	1.2		Synthesis
107 Camilla													
EAM	71°	+61°	233°	+74°	—E—		—E—		0.2018306	1.45	1.72		Dr+88b
EAM	74°	+55°	239°	+76°	—E—		—E—		0.2018305	1.46	1.6		Mag90a
EAM	————		229°	+73°	—E—		—E—		0.2018305	1.47	1.49		Dru+91
EA			230°	+69°	—E—		—E—		0.2018307	1.46	1.58		DeA95
Synthesis	72°	+58°	232°	+72°	—E—		—E—		0.2018306	1.46	1.6		Synthesis
108 Hecuba													
AM	79°	+13°					259°	−13°	- - - - -	1.180	1.101		Bla+98
AM	79°	+6°					259°	−6°	- - - - -	1.180	1.101		Bla+98
110 Lydia													
EAM	24°	+75°	210°	+78°					- - - - -	1.17			Mic96a
115 Thyra													
EA	175°	+60°	330°	+60°	—E—		—E—		0.301565	1.14	1.30		Dot+95
AM	197°	+30°	358°	+35°	17°	−30°	178°	−35°	- - - - -	1.224	1.088		Bla+98
121 Hermione													
EA	163°	+12°	342°	+30°	162°	−30°	343°	−12°	- - - - -	1.10	1.00		DeA95
AM	40°	+32°					220°	−32°	- - - - -	1.294	1.288		Bla+96
AM			240°	+42°	60°	−42°			- - - - -	1.294	1.393		Bla+98
125 Liberatrix													
EAM	80°	+74°	————		—E—		—E—		0.1653422	1.28	2.68		Dr+88b
E		+70°		+70°	—E—		—E—		0.1653425				Mag90a
EAM	————		228°	+71°	—E—		—E—		0.1653420	1.35	1.23		Dru+91
EA	15°	+47°	181°	+53°	—E—		—E—		0.1653418	1.55	1.10		DeA95
Synthesis	Prograde rotation				—E—		—E—		0.1653422				Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
129 Antigone									
AM	331° +30°	133° +48°	313° −48°	151° −30°	- - - - -	1.37	1.0[1]		Bar+85
EA	20° +50°	180° +72°	—E—	—E—	0.2065566	1.27	1.0		Mag86
EAM	————	196° +64°	—E—	—E—	0.2065486	1.27	1.05		Dr+88b
EA	38° +27°	202° +53°	—E—	—E—	0.2065485	1.32	1.02		Mag90a
EAM	————	195° +65°	—E—	—E—	0.2065486	1.23	1.07		Dru+91
AM	42° +36°	208° +68°	18° −68°	222° −36°	- - - - -	1.45	1.05		Dot+92
EA		194° +72°	—E—	—E—	0.2065483	1.32	1.01		DeA95
Synthesis	40° +32°	200° +68°	—E—	—E—	0.2065484	1.3	1.04		Synthesis
130 Elektra									
EAM	—E—	—E—	190° −81°	————	0.2176951	1.29	1.63		Dr+88b
EAM	—E—	—E—	180° −85°	240° −40°	0.2176942	1.41	1.2		Mag90a
EAM	—E—	—E—	344° −86°	246° −32°	0.2176942	1.32	1.06		Mic93
EA	—E—	—E—	192° −83°		0.2176950	1.55	1.45		DeA95
Synthesis	—E—	—E—	−80°	243° −36°	0.2176946	1.4			Synthesis
133 Cyrene									
E	Prograde rotation		—E—	—E—	0.5295				Har+84
135 Hertha									
A D	Solution curve				- - - - -	1.23			Tan+91
AM	135° +46°	310° +43°	130° −43°	315° −46°	- - - - -	1.34	1.22		Dot+92[22]
EAM	—E—	—E—	126° −28°	310° −31°	0.347818	1.36	1.20		Mic93
EA	106° +2°			286° −2°	0.350238	1.16	1.14		Lag+95
EAM	118° +52°	291° +47°			- - - - -	1.25	1.24		Mic96a
139 Juewa									
EAM	117° +50°	————	—E—	—E—	- - - - -	1.21	1.68		Mic93
144 Vibilia									
R	Concentric ring region[6]				- - - - -				Ost87
150 Nuwa									
AM		253° +1°	73° −1°		- - - - -	1.116	1.043		Bla+96
AM		257° +1°	77° −1°		- - - - -	1.097	1.015		Bla+98
AM		253° +27°	73° −27°		- - - - -	1.097	1.015		Bla+98
161 Athor									
AM	1° +48°	209° +47°	29° −47°	181° −48°	- - - - -	1.367	0.850		Bla+98
165 Loreley									
AM		339° +65°	159° −65°		- - - - -	1.191	1.274		Bla+98

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
173 Ino									
EAM	—E—	—E—	198° −21°	356° −47°	- - - - -	1.23	1.69		Mic93
EA	—E—	—E—	186° −22°	365° −21°	- - - - -	1.12	1.06		DeA95
Synthesis	—E—	—E—	192° −22°	360° −34°	- - - - -	1.2			Synthesis
192 Nausikaa									
A	130° +40°			310° −40°	- - - - -				Sc+76a
EA	—E—	—E—	————	325° −45°	0.567670	1.35	1.50		Dot+95
196 Philomela									
EAM	78° +26°	266° +24°	86° −24°	258° −26°	- - - - -	1.58	1.06		Mic92
EAM	—E—	—E—	99° −16°	273° −22°	- - - - -	1.33	1.17		Mic93
A D	102° +26°	287° +26°	107° −26°	282° −26°	- - - - -	1.50			Lic+94
EA	105° +20°			285° −20°	- - - - -	1.40	1.00		DeA95
EAM	————	277° +20°	—E—	—E—	0.3475556[2]	1.32	1.16		Kry+96
AM		278° +20°	98° −20°		- - - - -	1.472	0.914		Bla+98
201 Penelope									
EAM	78° −3°	258° +4°			0.1561283[2]	1.47	1.22		Dr+88b
EAM	—E—	—E—	80° −35°	260° −25°	0.1561443	1.50	1.23		Mag90a
EAM	74° −2°	————			0.1561287	1.53	1.24		Dru+91
EAM			————	261° −34°	0.1561440	1.55	1.34		Dru+91
EAM	—E—	—E—	85° −40°	260° −25°	0.1561439	1.42	1.3		Eri+93
EAM	—E—	—E—	————	258° −22°	0.1561433	1.32	1.06		Mic93
EA	—E—	—E—	93° −14°	————	0.15614438	1.65	1.20		DeA95
EAM	—E—	—E—	84° −39°	260° −20°	0.1561439	1.49	1.20		Mic96a
Synthesis	—E—	—E—	89° −27°	260° −27°	0.1561439	1.5	1.2		Synthesis
216 Kleopatra									
EA	71° +21°	234° +38°	—E—	—E—	0.2243864				Mag83
A	67° +15°	231° +31°	51° −31°	247° −15°	- - - - -	2.83			Zap+84
E	71° +21°	234° +38°	—E—	—E—	- - - - -				Kos86
EA	72° +20°	235° +34°	—E—	—E—	0.2243865	2.78	1.5[2]		Mag86
E			—E—	—E—	0.22438596				Lu+87a
EAM	69° +10°	————	—E—	—E—	0.2243870	2.54	1.32		Dr+88b
EAM	71° +19°	236° +34°	—E—	—E—	0.2243868	2.71	1.30		Mag90a
EAM	69° +10°	————	—E—	—E—	0.2243868	2.56	1.33		Dru+91
AM	78° +25°	229° +45°	49° −45°	258° −25°	- - - - -	2.80	1.36		Dot+92
EA	72° +8°		—E—	—E—	0.22438654	2.54	1.20		DeA95
Synthesis	72° +16°	232° +38°	—E—	—E—	0.2243867	2.6	1.3		Synthesis
218 Bianca									
EAM		340° +60°			- - - - -	1.20	1.33		Kry+96

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
225 Henrietta													
EAM	—E—		—E—		————		241°	−56°	- - - - -	1.27	1.89		Mic93
EAM	135°	+13°							- - - - -	1.23	1.08		Mic+00
230 Athamantis													
AM	91°	+44°	240°	+51°	60°	−51°	271°	−44°	- - - - -	1.318	1.195		Bla+98
236 Honoria													
AM			358°	+66°	178°	−66°			- - - - -	1.224	1.142		Bla+96[34]
238 Hypatia													
EA	139°	+27°	337°	+50°	157°	−50°	319°	−27°	- - - - -	1.38	1.00		DeA95
243 Ida													
EA	—E—		—E—		75°	−56°	264°	−64°	0.1930680	1.81	1.18		Bin+93
EAM	—E—		—E—		81°	−55°	263°	−56°	0.1930680	1.81	1.25	X	Bin+93
AMF					67°	−47°	247°	−47°	- - - - -	1.88	1.04	X	Bin+93
EAM	—E—		—E—		71°	−52°	252°	−54°	0.1930680	1.78	1.10	X	Bin+93
EAM	—E—		—E—		83°	−62°	266°	−64°	0.1930680	1.86	1.31		Bin+93[27]
AM					81°	−52°	264°	−54°	- - - - -	2.04	1.15		Bin+93
C	—C—		—C—		—C—		262°	−68°	- - - - -				Da+94b
C	—C—		—C—		—C—		262°	−67°	0.1930680				Da+96
L	————		————		85°	−47°	262°	−55°	0.19306825	shape[31]			Ka+01
Synthesis	—C—		—C—		—C—		262°	−68°	0.1930680	1.8	1.2		Synthesis
250 Bettina													
EAM	—E—		—E—		104°	−16°	————		0.2106225	1.32	1.38		Dru+91
AM	96°	+46°	283°	+21°	103°	−21°	276°	−46°	- - - - -	1.51	1.01		Dot+92[22]
EAM	—E—		—E—		85°	−9°	260°	−35°	0.2106218	1.33	1.66		Mic92
EAM	—E—		—E—		99°	−16°	272°	−48°	0.2106014	1.33	1.3		Eri+93
EAM	—E—		—E—		102°	−30°	272°	−55°	0.2106224	1.36	1.34		Mic93
EA	—E—		—E—				272°	−32°	0.2106016	1.45	1.05		DeA95
EA	—E—		—E—		106°	−11°			0.2106219	1.45	1.05		DeA95
EA				check[5]					- - - - -				Lag+95
Synthesis	—E—		—E—		103°	−18°	272°	−45°		1.4			Synthesis
281 Lucretia													
A		+90°		+90°		−90°		−90°	- - - - -				Tay+76
287 Nephthys													
AM	99°	+54°					279°	−54°	- - - - -	1.306	1.207		Bla+96[34]
291 Alice													
EAM	66°	+54°	247°	+55°					- - - - -	1.30	1.20		Kry+96

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
334 Chicago													
EAM	13°	+32°	188°	+42°	—E—		—E—		0.383246	1.68	1.06		Mic93
AM	18°	+46°	180°	+59°	0°	−59°	198°	−46°	- - - - -	2.089	1.742		Bla+98
337 Devosa													
EAM	—E—		—E—		————		199°	−51°	0.1938078	1.24	1.34		Mic92
EAM	————		199°	+59°	—E—		—E—		0.1931106	1.20	1.79		Mic93
EA	—E—		—E—				193°	−73°	0.1938078	1.30	1.30		DeA95
338 Budrosa													
A	152°	+24°	321°	+33°	141°	−33°	332°	−24°	- - - - -	1.5			GiH+95
349 Dembowska													
E	150°	+25°	330°	+5°	—E—		—E—		0.1958834	<1.3			Mag86
AM	163°	+49°	330°	+29°	150°	−29°	343°	−49°	- - - - -	1.28	1.15		Za+86b
E					—E—		—E—		0.195895				Lu+87a
EAM	153°	+35°	————		—E—		—E—		0.19588337	1.30	1.12		Dr+88b
EAM	157°	+30°	331°	+15°	—E—		—E—		0.1958835	1.29	1.11		Mag90a
AMF	148°	+35°	180°	+28°	0°	−28°	328°	−35°	- - - - -				Lum+90
EAM	153°	+36°	————		—E—		—E—		0.19588333	1.30	1.13		Dru+91
EA	152°	+40°			—E—		—E—		0.1958841	1.35	1.10		DeA95
Synthesis	153°	+36°	331°	+22°	—E—		—E—		0.1958836	1.31	1.12		Synthesis
354 Eleonora													
EA			360°	+35°	—E—				- - - - -				Lup+81
A	132°	+45°	357°	+38°	177°	−38°	312°	−45°	- - - - -	1.36	1.0[1]		Zap+84
A	137°	+44°	363°	+28°	183°	−28°	317°	−44°	- - - - -	1.35	1.0[1]		Bur+85
A			355°	+36°	175°	−36°			- - - - -				Pii+85
EA	159°	+22°	339°	+2°	—E—		—E—		0.1782160	1.23	1.0		Mag86
EAM	170°	+39°	366°	+2°	—E—		—E—		0.17821593	1.17	1.24		Dr+88b
EAM	148°	+35°	350°	+21°	—E—		—E—		0.1782161	1.21	1.11		Mag90a
EAM	————		364°	+9°	—E—		—E—		0.17821596	1.17	1.20		Dru+91
EA			365°	+22°	—E—		—E—		0.1782158	1.26	1.00		DeA95
Synthesis	147°	+37°	360°	+17°	—E—		—E—		0.1782159	1.21	1.1		Synthesis
356 Liguria													
R			Concentric ring region[6]						- - - - -				Ost87
360 Carlova													
EA	108°	+51°	337°	+47°	157°	−47°	288°	−51°	- - - - -	1.57	1.00		Dot+95
EAM[32]	105°	+47°	————		—E—		—E—		0.2578997	1.42	1.52		Mic+00

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950)								Sidereal period	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	(days)	a/b	b/c		
372 Palma													
AM	44°	+78°	241°	+7°	61°	−7°	224°	−78°	- - - - -	1.202	1.066		Bla+98
376 Geometria													
EAM	50°	+36°	230°	+38°					- - - - -	1.35	1.70		Kry+96
377 Campania													
AM	86°	+3°	266°	0°	86°	0°	266°	−3°	- - - - -	1.318	0.898		Bla+96[34]
386 Siegena													
AM	56°	+14°					236°	−14°	- - - - -	1.116	0.776		Bla+98
389 Industria													
EAM	—E—		—E—		98°	−55°	314°	−50°	- - - - -	1.26	1.38		Mic93
AM			307°	+52°	127°	−52°			- - - - -	1.393	1.245		Bla+98
409 Aspasia													
AM	73°	+48°	216°	+35°	36°	−35°	253°	−48°	- - - - -	1.137	1.080		Bla+98
416 Vaticana													
EAM[32]	132°	+58°	310°	+22°	—E—		—E—		0.2238486	1.50[2]	1.19[2]		Mic+00
423 Diotima													
AM	170°	+63°	345°	+31°	165°	−31°	350°	−63°	- - - - -	1.14	1.50		Za+86b
EA	140°	+55°	————		—E—		—E—		0.1989448	1.16	1.05		Dot+95

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b b/c	Albedo varieg.	Reference code
433 Eros								
V	29° +22°		—V—		- - - - -			Zes32
A	4° +45°		184° −45°		- - - - -			Ros32
AM	2° +53°		182° −53°		- - - - -	1.79 1.18		Kru+36
V A		—V—	169° −62°		- - - - -			Wat37
VEA		moving[3]	—E—		0.2195937			Sto40
EA	−7° +13°		—E—		0.21959390			Bey53
EA	10° +46°		—E—		0.21959386	4.0 1.0[1]		Cai56
E	13° +28°		—E—		- - - - -			Ves71
A	17° +10°				0.21959			Sc+76b
A	15° +9°				- - - - -	2.3		Mi+76
E	16° +12°		—E—		0.219599	shape[8]		Dun76
A	moving[3]				- - - - -	4.0 1.25		Che+77
AM	15° +20°				- - - - -	2.33 1.00		Lum+81
S	23° +37°		—S—		- - - - -	2.79 1.03		Dr+85a
E	22° +9°		—E—		0.219588			Tay85
E	16° +6°		—E—		- - - - -			Kos86
A		check[5]			- - - - -			Mi+90b
E					0.219593957			Mag90b
C	19° +14°	————	————	————	- - - - -	shape[10]		Th+00
L	16° +9°	————	————	————	0.21959387	shape[31]		Ka+01
C[32,33]	17° +11°	————	————	————	0.21959273	shape[10]		Mill+02
Synthesis	18° +13°		—ES—		0.2195939			Synthesis
451 Patientia								
AM	153° +67°	345° +25°	165° −25°	333° −67°	- - - - -	1.07 1.0		Za+86b
495 Eulalia								
Z		224° +2°	44° −2°		- - - - -			Bin87
505 Cava								
Z	113° +4°			293° −10°	- - - - -			You+85
EAM	138° +40°	325° +27°			- - - - -	1.22 1.20		Mic96a
511 Davida								
AM	122° +10°			302° −10°	- - - - -			Geh+62
A	————	306° +34°	126° −34°	————	- - - - -			Cha+63
E		285° +45°	—E—		- - - - -			Ves+85
AM	92° +33°	303° +34°	123° −34°	272° −33°	- - - - -	1.19 1.13		Za+86a
S	—S—	291° +37°	—S—	—S—	- - - - -	1.30 1.4		Dru+86
AM		307° +32°	127° −32°		- - - - -	1.25 1.14		Dru+86
EAM	————	300° +32°	—E—	—E—	0.21372345	1.25 1.16		Dr+88b
EAM	99° +26°	299° +26°	—E—	—E—	0.21372348	1.22 1.13		Mag90a
EAM	————	300° +32°	—E—	—E—	0.21372345	1.25 1.16		Dru+91
EAM	96° +32°	303° +31°	—E—	—E—	0.2137234	1.23 1.12		Mic93
EA		298° +22°	—E—	—E—	0.21372354	1.24 1.06		DeA95
EA		check[5]			- - - - -			Lag+95
Synthesis	—S—	300° +27°	—E—	—E—	0.21372347	1.24 1.12		Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
516 Amherstia									
EA	75° +63°	256° +55°	76° −55°	255° −63°	- - - - -	1.82	1.85		DeA95
EAM	76° +30°				- - - - -	1.53	1.23		Mic96a
EAM	75° +17°			225° −17°	0.3116333[2]	1.36	1.82		Mic+00
532 Herculina									
S				132° −59°	- - - - -	1.21	1.01		Dr+85b
E			96° −1°		0.3918711	1.0[1]	1.0[1]	X[19]	Tay+87
EAM		284° +34°			0.3918764	1.13	1.05		Kwi+92
EA			87° −7°		0.3918710	1.24	1.06		DeA95
EAM	————	291° +18°	—E—	—E—	0.3918720	1.21	1.13		Mic+95
A[28]		295° +18°			- - - - -	1.21	1.20		Mic96b
554 Perago									
R		Concentric ring region[6]			- - - - -				Ost87
579 Sidonia									
Z	96° +7°			276° −7°	- - - - -				Bin87
584 Semiramis									
EAM	—E—	—E—	————	327° −55°	0.2112053	1.19	1.28		Dr+88b
EAM	—E—	—E—	110° −40°	320° −30°	0.211206	1.17	1.1		Mag90a
EAM	—E—	—E—	112° −51°	————	0.2112062	1.36	1.34		Mic93
EA	—E—	—E—	122° −56°	315° −43°	0.2112060	1.27	1.14[2]		DeA95
EAM	—E—	—E—	————	334° −51°	0.2112061	1.25	1.12		Mic96a
624 Hektor									
E	————	324° +10°	—E—	—E—	0.28843884	shape[8]			Dun+69
A		313° +11°	133° −11°		- - - - -	2.00	2.63[11]		Pou81
A		315° +10°	135° −10°		- - - - -	2.02	1.0[1]		Pou81
EA	144° +10°			322° −4°	0.2884382				Mag83
AM	152° +29°	314° +15°	134° −15°	332° −29°	- - - - -	2.66	1.13		Zap+84
A D	152° +27°	315° +16°	135° −16°	332° −27°	- - - - -	2.26	1.35[2]		Pos+85
EA	—E—	—E—	134° −15°	330° −30°	0.2883544	2.70	1.43		Mag86
EAMD		314° +17°	—E—	—E—	0.288335	2.22	1.19		Uch+87
E	—E—	—E—	134° −17°	336° −32°	0.2883546				Mic88
EA	—E—	—E—		328° −26°	0.2883541	2.57	1.30		DeA92
AMD	152° +27°	315° +16°	135° −16°	332° −27°	- - - - -	2.26	1.36[2]		Det+92[25]
EAMD	145° +3°			325° −3°	- - - - -	1.0[1]	1.0[1]	X[15]	Det+92[25]
EAMD	149° +22°			329° −22°	- - - - -	shape[14]			Det+92[25]
EAMD	144° +11°			324° −11°	- - - - -	shape[14]			Det+92[25]
E	—E—	—E—	133° −17°	336° −33°	0.28835459				Det+92[25]
EA	—E—	—E—		328° −26°	0.2883541	2.57	1.30		DeA95
AM	147° +20°	316° +3°	136° −3°	327° −20°	- - - - -	2.779	1.000		Bla+98
Synthesis	—E—	—E—	134° −16°	329° −25°	0.2883544	2.4	1.3		Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
675 Ludmilla													
EAM	12°	−45°			—E—		—E—		0.3215510	1.44	1.89		Vel+95
EAM	15°	−35°	205°	−50°	—E—		—E—		0.321551	1.37	1.3		Vel+95
683 Lanzia													
EA	198°	+55°	342°	+55°	162°	−55°	378°	−55°	- - - - -	1.85	1.00		DeA95
EA	—E—		—E—		15°	−52°	195°	−52°	0.1964156	1.15	1.05		Kis+99
694 Ekard													
R			Concentric ring region[6]						- - - - -				Ost87
EAM	96°	+32°	———		—E—		—E—		0.246744	1.42	1.38		Dr+88b
EAM	105°	+29°	267°	+56°	—E—		—E—		0.2467465[2]	1.45	1.32[2]		Dru+91
EAM	98°	+40°	———		—E—		—E—		0.2467460	1.46	1.73		Mic93
EA	86°	+25°	242°	+25°	—E—		—E—		0.2467459	1.34	1.22[2]		DeA95
Synthesis	96°	+31°	254°	+40°	—E—		—E—		0.2467460	1.4			Synthesis
704 Interamnia													
Z	70°	+10°					250°	−10°	- - - - -				Har+79
EAM	—E—		—E—		43°	−21°	224°	−22°	- - - - -	1.19[2]	1.07		Mic93
EA					47°	−3°	227°	+1°	- - - - -	1.11	1.06		DeA95
EAM	51°	+22°	———		—E—		—E—		0.3636372	1.11	1.13		Mic+95
747 Winchester													
EAM	27°	+50°	———		—E—		—E—		- - - - -	1.16	2.60		Mic93
EA			353°	+39°	173°	−39°			- - - - -	1.18	1.00		DeA95
804 Hispania													
EAM	90°	+28°					270°	−28°	- - - - -	1.17	1.92		Mic92
EA	107°	+49°	227°	+50°	47°	−50°	287°	−49°	- - - - -	1.20	2.00		DeA95
852 Wladilena													
A	53°	+24°	235°	+21°	55°	−21°	233°	−24°	- - - - -	1.23	1.15		DeA+95
A	30°	+30°	210°	+30°	30°	−30°	210°	−30°	- - - - -	2.3	1.2		Kis+99
951 Gaspra													
EAM	20°	+22°	198°	+13°	—E—		—E—		0.2934197	1.6	1.1		Mag+92
C	15°	+16°	—C—		—C—		—C—		- - - - -				Dav+92
EA	19°	+20°	———		—E—		—E—		0.2934194	1.59	1.10		DeA92
AMF	15°	+24°							- - - - -	shape[13],[12],[17]			Bar+92
C	19°	+21°	—C—		—C—		—C—		- - - - -				Da+94a
C	19°	+21°	—C—		—C—		—C—		- - - - -	shape[26]			Tho+94
E C									0.2934177				Sim+95
EA	19°	+20°	———		—E—		—E—		0.2934194	1.75	1.00		DeA95
L	20°	+19°	———		———		———		0.2934191	shape[31]			Ka+01
Synthesis	19°	+21°	—C—		—C—		—C—		0.293419				Synthesis

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0	Sidereal period (days)	Ellipsoidal model a/b	b/c	Albedo varieg.	Reference code
1036 Ganymed													
E	Prograde rotation								0.42951				Lu+87b
E					Retrograde rotation								Hah+89
1219 Britta													
E					Retrograde rotation				0.232290				Bin+87
1223 Neckar													
EAM[32]	70°	+45°	225°	+42°	—E—		—E—		0.3232105	1.47	1.28		Mic+00
1566 Icarus													
E	49°	0°	229°	0°					0.09471				Geh+70
EA			214°	+5°					0.094735	1.23	1.40		DeA95
1572 Posnania													
EAM[32]	—E—		—E—		46°	−65°	———		0.3353931	1.35	1.04		Mic+01
1580 Betulia													
A			140°	+20°			320°	−20°	- - - - -	1.21[10]			Ted+78
EAM	80°	+12°			212°	−5°			0.2565	1.7	1.4		Dru+90
1620 Geographos													
E			—E—		20°	−60°			0.2176378	shape[8]			Dun74
A			check[5]						- - - - -				Mi+90b
EAM			—E—		15°	−77°			0.2176342	2.7	1.05		Kwi94
EAM			—E—		15°	−77°			0.2176390	2.7	1.05		Kwi94
EAM			—E—		54°	−52°			0.21763867	2.6	1.1		Mic+94
EAM			—E—		54°	−52°			0.21763866	2.5	1.1		Kwi95
EAM			—E—		54°	−52°			0.21764381	2.5	1.1		Kwi95
EAM	—E—		—E—		56°	−47°	———		0.21763860	2.58	1.00		Mag+96
R	———		———		55°	−46°	———		0.21763863	2.5	1.0[29]		H+O99
L	———		———		55°	−45°	———		0.21763858	shape[31]			Ka+01
Synthesis					55°	−46°			0.21764	2.6	1.1		Synthesis
1627 Ivar													
E	Prograde rotation								0.19991				Lup+86
E	147°	+13°	333°	+18°					0.199953				Ve+89a[23]
EA	110°	+20°	320°	+40°					0.19995				Hah+89
E	—E—		—E—		143°	−37°			0.1999154				Kis+99
A	145°	+34°	325°	+34°	145°	−34°	325°	−34°	- - - - -	2.0	1.09		Kis+99
Synthesis									0.19995				Synthesis
1685 Toro													
EA			200°	+55°	—E—				0.42481	3.2			Dun+73
EA			220°	+30°	—E—				0.424808	2.08	1.80		DeA95

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950) λ_0 β_0	λ_0 β_0	λ_0 β_0	λ_0 β_0	Sidereal period (days)	Ellipsoidal model a/b b/c	Albedo varieg.	Reference code
1862 Apollo								
EA		—E—	56° −26°		0.1277265			Har+87
EA		—E—	38° −36°		0.127754	2.08 1.80		DeA95
2063 Bacchus								
R			24° −26°		0.652	shape[30]		Ben+99
3103 Eger								
E	Prograde rotation				0.2377819			Vel+92
3908 1980 PA								
EAM	177° +23°	312° +61°	—E—	—E—	0.18441	1.3 1.2[2]		Dru+90
4179 Toutatis								
R		Precessing			- - - - -	2.10 1.35[29]		H+O95
6053 1993 BW3								
E	—E—	—E—	175° −9°	359° −26°	0.107238[2]	1.08 1.5		Pra+97
6489 Golevka								
EA[32]	————	347° +35°	—R—	—R—	0.25110	1.4 1.0		Mot+97
R	————	————	————	202° −45°	0.251204	1.01 1.0[29,30]		Hud+00
L	————	————	————	208° −47°	0.251238	shape[31]		Ka+01
Synthesis	————	————	————	205° −46°	0.25122			Synthesis

Footnotes:

[1] Assumed value.
[2] Mean value of two significantly different solutions.
[3] Different spin axis solutions for different apparitions was interpreted as indicating a precessing motion.
[4] Symmetric solution obtained, but quantitative specification is missing.
[5] Consistency check of previous spin vector determinations.
[6] Based on a radar experiment giving constraints on the aspect angle at the time of observation.
[7] Based on two radar experiments giving an aspect circle at the time of observation.
[8] Modelled as a cylinder with hemispherical ends.
[9] Modelled as a cylinder cut out of a sphere.
[10] Complex shape.
[11] Modelled as a Jocobi ellipsoid.
[12] Modelled as 8 octants of ellipsoids put together to form a continous surface.
[13] Modelled as an ellipsoid with a piece removed by a plane cut.
[14] Modelled as an irregular polyhedron.
[15] Modelled as a sphere with free albedo facets.
[16] Results show that there is no significant albedo variegation.
[17] Modelled using a spherical harmonics expansion of the shape.
[18] Albedo model with a single big spot.
[19] Modelled as a sphere with 2 dark regions.
[20] Speckle images showing albedo variegation.
[21] Bi-axial ellipsoid (a/b=1.15) with a flat region just off the South Pole.

[22] Also presented in Ful+91.
[23] Also presented in English in Lup+90.
[24] Also presented in Mi+90c.
[25] Also presented in Det+94.
[26] Detailed model from space images.
[27] Also presented in Mic94.
[28] The spin axis is not aligned with the c-axis of the ellipsoid model.
[29] DEEVE - dynamicaly equivalent equal volume ellipsoid adopted for the complex shape.
[30] Complex radar model.
[31] Convex shape obtained with lightcurve inversion.
[32] Pole coordinates calculated for J2000.
[33] Values for pole coordinates are 17.238, 11.351
[34] Also presented in Bla+98.