

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code	
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
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—								0.3003970	1.18	1.0 ²		Eri+93
EA	108° +38°	—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—								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		

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	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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

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	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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

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	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
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					
EA	—E—		—E—		18° -23°			0.17284168	1.32	1.18				
AMF	18° +0°	204° +23°	24° -23°	198° -0°					-----					
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				

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	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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	—E—		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	—E—		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	—E—		208°	+21°	—E—		—E—		0.3712522	1.24	2.07		Mic93

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code	
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
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—	—E—				108°	-46°	0.2864629	1.19			Eri+99	

Basic data	Spin vector solutions (ecliptic coordinates of equinox 1950)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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 Vibia													
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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—	—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—	—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—	—E—	—E—	85°	-40°	260°	-25°	0.1561439	1.42	1.3		Eri+93
EAM	—E—	—E—	—E—	—E—			258°	-22°	0.1561433	1.32	1.06		Mic93
EA	—E—	—E—	—E—	—E—	93°	-14°	-----		0.15614438	1.65	1.20		DeA95
EAM	—E—	—E—	—E—	—E—	84°	-39°	260°	-20°	0.1561439	1.49	1.20		Mic96a
Synthesis	—E—	—E—	—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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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—	—C—	262°	−68°			-----				Da+94b
C	—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—	—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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code	
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
334 Chicago														
EAM	13° +32°	188° +42°	—E—	—E—	—E—	—E—	—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 Carlota														
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 (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code	
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code	
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c		
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)								Sidereal period (days)	Ellipsoidal model		Albedo varieg.	Reference code	
	λ_0	β_0	λ_0	β_0	λ_0	β_0	λ_0	β_0		a/b	b/c			
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 Jacobi ellipsoid.
- ¹² Modelled as 8 octants of ellipsoids put together to form a continuous 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.