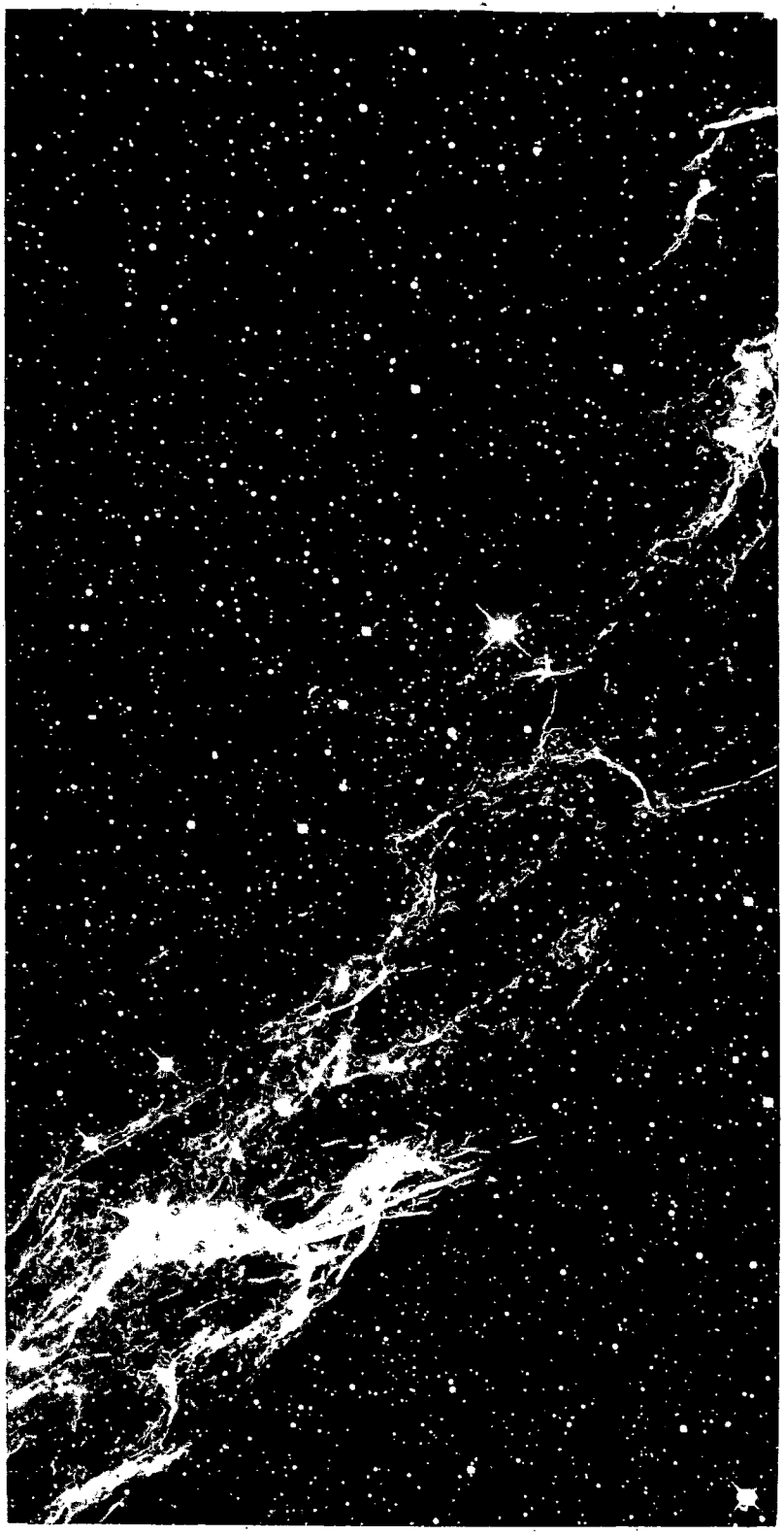
ASTRO SCIENCES



Technical Memorandum P-42

ASTEROID SELECTION FOR MISSION OPPORTUNITIES

Appendix: Asteroid Data Sheets

Technical Memorandum

P-42

ASTEROID SELECTION FOR MISSION OPPORTUNITIES

APPENDIX

ASTEROID DATA SHEETS

IIT RESEARCH INSTITUTE

ASTEROID DATA SHEET

1 CERES

MAGNITUDE

B(a,0): 7.56 B(1,0): 4.11 wt: 4.0

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
.63	20	.13	20			Ahmed (1954)
				0.71	0.42	Gehrels (1970)
.73	22	.45	22			Gr. & K. (1954)
.72	4	.42	4			Ge.&Ow. (1962)

SPECTRAL REFLECTIVITY CURVE

Color = B
Curve = B2

R/B = 0.94

PHASE FACTORS

B	V	U	B-V	U-B	
	0.050				Ahmed (1954)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	
8-9°	-1.8 %	17°	0.32	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
9.078	-	0.04		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS: $6.0 \pm 0.7 \times 10^{-10}$ ⊙ Schubart (1971)

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Polarization		0.03-0.05		Veverka (1970)
Thermal IR	840-920	0.054-0.060		Matson (1972)
Direct filar	770(?)			Dollfus (1971)
Thermal IR	1160 ± 80		1.6 ± 0.7	Allen (1971)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.766 AU	0.101	0.169

FAMILY MEMBERSHIP

Williams: Ceres

Arnold: A-67

ASTEROID DATA SHEET

2 PALLAS

MAGNITUDE

B(a,0):	B(1,0):	wt:	REFERENCE
8.64	5.18	6.0	

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.65	0.26	Gehrels (1970)
.67	13					Gr.&K. (1954)

SPECTRAL REFLECTIVITY CURVE

Color = B
Curve = B3

R/B = 0.95

PHASE FACTORS

B	V	U	B-V	U-B	REFERENCE
			-0.01		Chapman (1971)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	REFERENCE
9-10°	-1.3 %	18°	0.28	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	REFERENCE
9-12?	0.12	0.15		Gehrels (1970)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density	
Polarization		0.04-0.07		Veverka (1970)
Thermal IR	370-660	0.037-0.13		Matson (1972)
Direct	700 ± 250			Dollfus (1971)
Micrometer	490(?)			Gehrels (1970)
Occultation	> 430			Taylor (1962)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.769 AU	0.256	0.588

FAMILY MEMBERSHIP

Williams: Pallas

Arnold: B-28

ASTEROID DATA SHEET

3 JUNO

MAGNITUDE

B(a,0): 9.67 B(1,0): 6.43 wt: 6.0

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
.86	16	.44	16			Gr.&K. (1954)
				0.81	0.39	Gehrels (1970)
.85	15	.43	15			Gr.&K. (1954)
.83	12	.43	12			Gr.&K. (1954)
.83	21	.48	21			Ge.&Ow. (1962)

SPECTRAL REFLECTIVITY CURVE

Color = MR R/B = 1.57

Curve = R3B Broad, deep band 0.97 μ. Possible band 0.61 μ.

PHASE FACTORS

B	V	U	B-V	U-B	
	0.025				Gr.&K. (1954)
			~ 0.002		Chapman (1971)

POLARIZATION

α_{min}	P_{min}	α_x	h (%/deg)	
8-9°	-0.8 %	19°	0.10	Veverka (1970)

LIGHT CURVE

Period (hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.213	-	0.15		Gehrels (1970)

POLE

Ecliptic Long: 71? Ecliptic Lat: 49? Obliquity: 28? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density	
Polarization		0.18-0.24		Veverka (1970)
Direct filar	195(?)			Dollfus (1971)
Thermal IR	290 ± 20			Allen (1971)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.668 AU	0.22	0.246

FAMILY MEMBERSHIP

Williams: Juno

Arnold:

ASTEROID DATA SHEET

4 VESTA

REFERENCE

MAGNITUDE

B(a,0): 6.85 B(1,0): 4.31 wt: 8.0

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.77	0.46	Gehrels (1970)
.78	4	.45	4			Gr.& K. (1954)

SPECTRAL REFLECTIVITY CURVE

Color = M R/B = 1.34

Curve = M3 Very deep band 0.95 μ. Strongest yet observed.

PHASE FACTORS

B	V	U	B-V	U-B	
	0.0253		+ 0.0018	+ 0.0027	Gehrels (1967)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	
10-11°	-0.5 %	21°.5	0.08	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.342 129	0.10	0.13		Gehrels (1970)
10.68	-	-		Mc.&Bu. (1972)

POLE

Ecliptic Long: 57? 14? Ecliptic Lat: 74? 80? Obliquity: 12? 3? Vesely (1971)

MASS: $1.20 \pm 0.12 \times 10^{-10}$ ⊙ Hertz (1968)

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Polarization		0.23-0.32		Veverka (1970)
Thermal IR	560-640	0.093-0.11		Matson (1972)
Direct	410(?)			Dollfus (1971)
Polarization	515^{+85}_{-60}	0.25 ± 0.07		Veverka (1971)
Thermal	570 ± 10		2.5 ± 0.7	Allen (1971)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.362 AU	0.263	0.111

FAMILY MEMBERSHIP

Williams: Vesta

Arnold:

ASTEROID DATA SHEET

5 ASTRAEA

MAGNITUDE

B(a,0): 11.05 B(1,0): 8.00 wt: 2.9

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.82	0.36	Gehrels (1970)
.82	12	.35	12			Ge.&Ow.(1962)
.85	20	.40	20			Ge.&Ow.(1962)

SPECTRAL REFLECTIVITY CURVE

Color = VR R/B = 1.61

Curve = R1, R2A, or R3A

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
16.806	0.21	0.27		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	84-160	0.046-0.16		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.579 AU	0.214	0.082

FAMILY MEMBERSHIP

Williams: Astraea

Arnold:

ASTEROID DATA SHEET

6 HEBE

REFERENCE

MAGNITUDE

B(a,0): 9.40 B(1,0): 6.7 wt: 3.5

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.82	0.41	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

Color = MR R/B = 1.48
Curve = R3B 0.95 μ band not so deep as appears. Possible band 0.67 μ.

PHASE FACTORS

B	V	U	B-V	U-B	
	0.045				Ahmed (1954)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.74	0.06	0.20		Taylor (1971)
7.28	-	0.17		Yang (1965)

POLE

Ecliptic Long: 145? Ecliptic Lat: 15? Obliquity: 77? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	210-280	0.047-0.093		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.426 AU	0.155	0.249

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

7 IRIS

MAGNITUDE

B(a,0): 9.44 B(1,0): 6.84 wt: 8.0

COLOR

B-V	α_5	U-B	α_5	B-V	U-B	REFERENCE
.84		.41				Gr.& K. (1954)
				0.83	0.45	Gehrels (1970)
.84	8	.53	8			Ge.&Ow. (1962)
.86	24	.48	24			vanHout. (1958)
.87	22	.46	22			vanHout. (1958)
.84	4					vanHout. (1958)

SPECTRAL REFLECTIVITY CURVE

Color = R R/B = 1.70

Curve = R2A Deep band >1.05 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.135	0.04	0.29		Gehrels (1970)

POLE

Ecliptic Long: 193? 184? Ecliptic Lat: 15? 55? Obliquity: 69? 29? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	250-300	0.038-0.050		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.386 AU	0.210	0.115

FAMILY MEMBERSHIP

Williams:

Arnold:

ASTEROID DATA SHEET

8 FLORA

MAGNITUDE

B(a,0): 9.59 B(1,0): 7.48 wt: 6.0

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
.88	14			0.86	0.45	vanHout.(1958) Taylor (1970)
.88	11	.48	11			vanHout.(1958)
.88	10	.49	10			vanHout.(1958)
.88	8	.47	8			vanHout.(1958)

Color = VR SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B	
	0.028		+ 0.002	+ 0.004	Veverka (1970)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	
9^c	-0.7 %	19^o	0.12	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
13.6	0.01	0.04		Gehrels (1970)

POLE

Ecliptic Long: 157? Ecliptic Lat: 10? Obliquity: 84? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Polarization		0.13-0.19		Veverka (1970)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.202 AU	.1390*	.0990*

FAMILY MEMBERSHIP
Williams:
Arnold: 8

* Values from Arnold's listing of Asteroid data.

ASTEROID DATA SHEET

9 METIS

MAGNITUDE

B(a,0): 9.87 B(1,0): 7.27 wt: 5.5

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
.84	3	.50	3			
				0.85	0.50	Gehrels (1970)
.85	4	.51	4			Gr.& K. (1954)
.85	5	.49	5			Gr.& K. (1954)
.85	9	.48	9			Gr.& K. (1954)
.84	5	.50	5			Ge.&Ow. (1962)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B	
	+ 0.034		+ 0.001	0.000	Veverka (1970)
	+ 0.049				Gr.&K. (1954)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	
9°	-0.8 %	20°.5	0.10	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.064	0.06	0.26		Gehrels (1970)
5.10	-	0.38		Yang (1965)

POLE

Ecliptic Long: 186? 348? Ecliptic Lat: 15? 76? Obliquity: 80? 8? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density	
Polarization		0.18-0.24		Veverka (1970)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.386 AU	.1249*	.0832*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

10 HYGIEA

REFERENCE

MAGNITUDE

B(a,0): 10.73 B(1,0): 6.57 wt: 4.5

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.70	0.40	Gehrels (1970)
.69	5	.36	5			Gr.& K. (1954)
.68	5	.37	5			Gr.& K. (1954)

SPECTRAL REFLECTIVITY CURVE

Color = B R/B = 1.11
Curve = B3 Probable band 0.61 μ. Possible shallow band 1.00 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
18?	-	0.20		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.151 AU	0.127	0.09

FAMILY MEMBERSHIP

Williams: Hygiea

Arnold:

ASTEROID DATA SHEET

11 PARTHENOPE

MAGNITUDE

B(a,0): 10.54 B(1,0): 7.78 wt: 8.3

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.80	0.38	Gehrels (1970)
.80	6	.36	6			Wo.& K. (1963)
.82	7	.42	7			Wo.& K. (1963)
.81	15	.39	15			vanHout.(1958)

SPECTRAL REFLECTIVITY CURVE

Color = M
Curve = M4 or M1

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
10.67	0.07	0.12		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.452 AU	0.074	0.069

FAMILY MEMBERSHIP

Williams: Parthenope

Arnold: A-76

ASTEROID DATA SHEET

12 VICTORIA

REFERENCE

MAGNITUDE

B(a,0): 11.27 B(1,0): 8.81 wt: 2.2

COLOR

B-V	α	U-B	α	B-V	U-B

Color = VR
Curve = R1

SPECTRAL REFLECTIVITY CURVE

R/B = 1.63

Possible shallow band 1.10 μ. Possible band 0.64 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8.654	-	0.2		Taylor (1971) Te.&Bu.(1969)

POLE

Ecliptic Long: 242? Ecliptic Lat: 17? Obliquity: 74? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.333 AU	0.170	0.164

FAMILY MEMBERSHIP

Williams: Victoria

Arnold: A-77

ASTEROID DATA SHEET

13 EGERIA

REFERENCE

MAGNITUDE

B(a,0): 11.01 B(1,0): 7.97 wt: 1.5

COLOR

B-V	α	U-B	α	B-V	U-B

Color = B
Curve = B2

SPECTRAL REFLECTIVITY CURVE

R/B =1.05

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
7.045	-	0.12	Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.576 AU	0.124	0.282

FAMILY MEMBERSHIP

Williams: Triplet

Arnold:

ASTEROID DATA SHEET

14 IRENE

MAGNITUDE

B(a,0): 10.48	B(1,0): 7.41	wt: 2.0	REFERENCE

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.81	0.38	Gehrels (1970)
.81	10	.40	10			Gr.& K. (1954)
.82	12	.39	12			Gr.& K. (1954)

SPECTRAL REFLECTIVITY CURVE

Color = MR R/B = 1.50

Curve = R3B Poor statistics. Probable band 0.92 μ. Possible band 0.65 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
11?	-	0.04		Gehrels (1970)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.588 AU	0.194	0.151

FAMILY MEMBERSHIP

Williams: Triplet

Arnold:

ASTEROID DATA SHEET

15 EUNOMIA

MAGNITUDE

B(a,0): 9.48 B(1,0): 6.29 wt: 6.0

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.80	0.42	Gehrels (1970)
.82	13	.44	13			Gr.& K. (1954)
.81	6	.41	6			Gr.& K. (1954)
.83	20	.45	20			vanHout.(1958)
.83	22	.45	22			vanHout.(1958)

Color = M SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B	
	+ 0.042		+ 0.002	+ 0.001	Gr.&K. (1954)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	
9-10°	-0.7 %	21°	0.13	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
6.083	0.42	0.53		Gehrels (1970)

POLE

Ecliptic Long: 250? Ecliptic Lat: 74? Obliquity: 11? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density	
Polarization		0.12-0.17		Veverka (1970)
Thermal IR	122-280	0.073-0.38		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.642 AU	.0945*	.2211*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

16 PSYCHE

REFERENCE

MAGNITUDE

B(a,0): 10.64 B(1,0): 6.89 wt: 6.1

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.70	0.24	Gehrels (1970)
.71	10	.26	10			vanHout.(1958)
.71	12	.24	12			vanHout.(1958)

SPECTRAL REFLECTIVITY CURVE

Color = BM
Curve = M1

R/B = 1.22

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
4.303	-	0.11		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.923 AU	0.099	0.045

FAMILY MEMBERSHIP
Williams:
Arnold: B-13

ASTEROID DATA SHEET

17 THETIS

MAGNITUDE

B(a,0): 11.49 B(1,0): 8.69 wt: 4.0

COLOR

B-V	α_7	U-B	α	B-V	U-B	REFERENCE
.86						Gr.& K. (1954)
				0.84	0.42	Gehrels (1970)
.82	9	.41	9			Gr. & K. (1954)
.86	16	.46	16			Gr. & K. (1954)
.86	3	.40	3			vanHout. (1958)
.82	4	.39	4			vanHout. (1958)

SPECTRAL REFLECTIVITY CURVE

Color = R R/B = 1.54

Curve = R4 Poor statistics. Possible band 0.98 μ.

PHASE FACTORS

B	V	U	B-V	U-B	
	+ 0.040				Gr.&K. (1954)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
12.275	0.12	0.36		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.469 AU	0.142	0.085

FAMILY MEMBERSHIP
Williams:
Arnold: B-25

ASTEROID DATA SHEET

18 MELPOMENE

MAGNITUDE

B(a,0): 10.16 B(1,0): 7.79 wt: 6.1

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.81	0.35	Gehrels (1970)
.86	28	.50	28			Ge.&Ow. (1962)
.86	28	.44	28			Ge.&Ow. (1962)

Color = MR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
14	-	0.35		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.296 AU	.1837*	.1741*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

19 FORTUNA

REFERENCE

MAGNITUDE

B(a,0): 11.08 B(1,0): 8.35 wt: 3.3

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.46	-	0.25		Taylor (1971)
7.43	0.21	0.25		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	250-300	0.010-0.013		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.442 AU	.1320*	.0384*

FAMILY MEMBERSHIP

Williams:

Arnold: A-82

ASTEROID DATA SHEET

20 MASSALIA

MAGNITUDE

B(a,0):	B(1,0):	wt:	REFERENCE
10.13	7.48	2.0	

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.81	0.43	Gehrels (1970)
.84	27	.48	27			Ge.&Ow. (1962)

Color = MR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B	REFERENCE
	+ 0.032				Gehrels (1956)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	REFERENCE
8°	-0.7 %	19°	0.10	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	REFERENCE
8.0980	0.17	0.24		Gehrels (1970)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:	REFERENCE
10?	78?	12?	Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	REFERENCE
Polarization		0.18-0.24		Veverka (1970)
Thermal IR	138-160	0.076-0.10		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.409 AU	.1613*	.0240*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

21 LUTETIA

REFERENCE

MAGNITUDE

B(a,0): 11.40 B(1,0): 8.68 wt: 2.3

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = B
Curve = B4

R/B = 0.99

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
6.133	-	0.15	Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.435 AU	0.128	0.036

FAMILY MEMBERSHIP
Williams: Fortuna
Arnold: A-82

ASTEROID DATA SHEET

22 KALLIOPE

REFERENCE

MAGNITUDE

B(a,0): 11.20 B(1,0): 7.48 wt: 4.1

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.71	0.28	Gehrels (1970)
.71	7	.28	7			Ge.&Ow. (1962)

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
4.147	0.14	0.30		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.909 AU	.0845*	.2200*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

23 THALIA

REFERENCE

MAGNITUDE

B(a,0): 11.49 B(1,0): 8.34 wt: 3.9

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.89	-	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

Color = VR

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
6.15	-	0.19		Taylor (1971)
12.308	-	0.21		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.625 AU	.2582*	.1609*

FAMILY MEMBERSHIP

Williams:

Arnold:

ASTEROID DATA SHEET

24 THEMIS

REFERENCE

MAGNITUDE

B(a,0): 12.31 B(1,0): 8.18 wt: 2.8

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8.5	-	0.14		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.138 AU	.1572*	.0190*

FAMILY MEMBERSHIP

Williams:

Arnold: 1

ASTEROID DATA SHEET

25 PHOCAEA

REFERENCE

MAGNITUDE

B(a,0): 11.70 B(1,0): 9.07 wt: 4.0

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.92	0.51	Gehrels (1970)
.99	11					vanHout.(1958)
.92	11	.52	11			vanHout.(1958)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
9.945?	-	0.18		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.401 AU	.2307*	.3776*

FAMILY MEMBERSHIP
Williams:
Arnold: 5

ASTEROID DATA SHEET

27 EUTERPE

REFERENCE

MAGNITUDE

B(a,0): 11.06 B(1,0): 8.56 wt: 2.2

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8.500	-	0.15		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	70-164	0.026-0.14		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.347 AU	.1855*	.0146*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

28 BELLONA

REFERENCE

MAGNITUDE

B(a,0): 11.62 B(1,0): 8.15 wt: 3.5

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
15.7	-	0.22		Taylor (1971)
16.52	-	0.23		Mc.&Bu.(1972)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.775 AU	.1732*	.1512*

FAMILY MEMBERSHIP
Williams:
Arnold: A-66

ASTEROID DATA SHEET

29 AMPHITRITE

MAGNITUDE

B(a,0):	B(1,0):	wt:	REFERENCE
10.25	7.26	4.4	

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.87	-	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

Color = R R/B = 1.47

Curve = R3C Probable shallow band 0.95 μ. Possible band 0.65 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.389	-	0.13		Gehrels (1970)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.554 AU	0.065	0.110

FAMILY MEMBERSHIP

Williams: Amphitrite

Arnold:

ASTEROID DATA SHEET

30 URANIA

MAGNITUDE

B(a,0): 11.32 B(1,0): 8.78 wt: 4.8

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.88	0.45	Gehrels (1970)
.91	8	.47	8			Ge.&Ow. (1962)
.86	4	.43	4			Ge.&Ow. (1962)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
13.668	-	0.14		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.365 AU	.1035*	.0476*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

32 POMONA

REFERENCE

MAGNITUDE

B(a,0): 11.81 B(1,0): 8.74 wt: 2.9

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.588 AU	.1136*	.1087*

FAMILY MEMBERSHIP

Williams:

Arnold:

ASTEROID DATA SHEET

34 CIRCE

REFERENCE

MAGNITUDE

B(a,0): 12.86 B(1,0): 9.58 wt: 4.4

COLOR

B-V	α	U-B	α	B-V	U-B

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.687 AU	.1121*	.0976*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

37 FIDES

REFERENCE

MAGNITUDE

B(a,0): 11.68 B(1,0): 8.49 wt: 6.6

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.89	-	Gehrels (1970)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.643 AU	.1175*	.0555*

FAMILY MEMBERSHIP
Williams:
Arnold: A-83

ASTEROID DATA SHEET

38 LEDA

REFERENCE

MAGNITUDE

B(a,0): 13.07 B(1,0): 9.68 wt: 4.4

COLOR

B-V	α	U-B	α	B-V	U-B

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.740 AU	.1626*	.1392*

FAMILY MEMBERSHIP
Williams:
Arnold: A-66

ASTEROID DATA SHEET

39 LAETITIA

MAGNITUDE

B(a,0): 10.86 B(1,0): 7.41 wt: 12.6

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
.89	11	.52	11			Gr.& K.(1954)
				0.87	0.49	Taylor (1971)
.88	7	.49	7			Gr.& K.(1954)
.88	16	.66	16			Ge.&Ow.(1962)
.91	20	.55	20			vanHout.(1958)
.91	22	.47	22			vanHout.(1958)

SPECTRAL REFLECTIVITY CURVE

Color = VR R/B = 1.84

Curve = R2A Broad band 1.05 μ. Possible band 0.64 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.138 243	0.18	0.54		Taylor (1971)
5.133	0.18	0.29		Yang (1965)

POLE

Ecliptic Long: 130? 103? Ecliptic Lat: 10? 61? Obliquity: 75? 21? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	104-196	0.052-0.19		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.769 AU	0.084	0.172

FAMILY MEMBERSHIP

Williams: Ceres

Arnold:

ASTEROID DATA SHEET

40 HARMONIA

MAGNITUDE

B(a,0): 10.74 B(1,0): 8.45 wt: 2.4

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.83	0.42	Gehrels (1970)
.88	22	.43	22			Gr.& K. (1954)
.81	14	.46	14			Ge.&Ow. (1962)
.84	7	.44	7			Ge.&Ow. (1962)

SPECTRAL REFLECTIVITY CURVE

Color = R
Curve = R3A
Probable band 0.94 μ.
R/B = 1.64

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
9.1358	-	0.22		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.267	0.02	0.066

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

42 ISIS

REFERENCE

MAGNITUDE

B(a,0): 11.57 B(1,0): 8.84 wt: 2.7

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
	-	0.26	Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.441 AU	.1921*	.1327*

FAMILY MEMBERSHIP

Williams:

Arnold: A-81

ASTEROID DATA SHEET

43 ARIADNE

REFERENCE

MAGNITUDE

B(a,0): 11.30 B(1,0): 9.18 wt: 2.1

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = VR
Curve = R1

Probable band 1.02 μ.

R/B = 1.95

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.75	-	0.13		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.203 AU	0.135	0.07

FAMILY MEMBERSHIP

Williams: Flora II

Arnold: 7

ASTEROID DATA SHEET

44 NYSA

REFERENCE

MAGNITUDE

B(a,0): 10.71 B(1,0): 8.02 wt: 3.9

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.67	0.22	Gehrels (1970)
.70	22	.24	22			Gr.& K. (1954)
.69	23	.24	23			Gr.& K. (1954)
.70	7	.27	7			Ge.&Cw. (1962)

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
6.418	0.22	0.48		Gehrels (1970)
6.422	0.40	0.51		Yang (1965)

POLE

Ecliptic Long: 358? 105? Ecliptic Lat: 84? 30? Obliquity: 4? 58? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	106-190	0.041-0.11		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.422 AU	.1718*	.0549*

FAMILY MEMBERSHIP

Williams:

Arnold: A-74

ASTEROID DATA SHEET

45 EUGENIA

REFERENCE

MAGNITUDE

B(a,0): 11.87 B(1,0): 8.52 wt: 3.5

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
	-	0.5	Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.721 AU	.1123*	.1049*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

51 NEMAUSA

REFERENCE

MAGNITUDE

B(a,0): 11.21 B(1,0): 8.66 wt: 5.6

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.81	-	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

Color = M
Curve = M2
Probable broad band 1.02 μ.
R/M = 1.29

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.785	-	0.14		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.366 AU	0.116	0.177

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

52 EUROPA

REFERENCE

MAGNITUDE

B(a,0): 11.69 B(1,0): 7.63 wt: 6.0

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.69	-	Gehrels (1970)

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude		Remarks
	Min.	Max.	

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.096 AU	.1185*	.1126*

FAMILY MEMBERSHIP

Williams:

Arnold:

ASTEROID DATA SHEET

54 ALEXANDRA

REFERENCE

MAGNITUDE

B(a,0): 12.15 B(1,0): 8.82 wt: 2.2

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
7.05	-	0.12	Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.708 AU	.1868*	.2185*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

57 MNEMOSYNE

REFERENCE

MAGNITUDE

B(a,0): 12.52 B(1,0): 8.35 wt: 2.4

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.15 AU	.0766*	.2668*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

60 ECHO

REFERENCE

MAGNITUDE

B(a,0): 12.67 B(1,0): 10.05 wt: 2.1

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.84	0.44	Gehrels (1970)
.85	11	.46	11			Ge.&Ow. (1962)

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
Long	-	0.1		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.393 AU	.2009*	.0688*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

61 DANAË

REFERENCE

MAGNITUDE

B(a,0): 12.64 B(1,0): 8.77 wt: 5.0

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.85	0.43	Gehrels (1970)
.85	7	.41	7			Wo.& K. (1963)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
11.45	-	0.30		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.989 AU	.1308*	.3246*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

62 ERATO

REFERENCE

MAGNITUDE

B(a,0): 13.96 B(1,0): 9.83 wt: 5.3

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.76	0.40	Gehrels (1970)

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.134 AU	.1467*	.0224*

FAMILY MEMBERSHIP
Williams:
Arnold: 1

ASTEROID DATA SHEET

64 ANGELINA

REFERENCE

MAGNITUDE

B(a,0): 12.12 B(1,0): 8.85 wt: 1.8

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.682 AU	.1511*	.0398*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

68 LETO

REFERENCE

MAGNITUDE

B(a,0): 11.77 B(1,0): 8.29 wt: 2.2

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = MR R/B = 1.58

Curve = R2B Deep band 1.08 μ. Fairly sharp drop-off into UV short of 0.38 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	138-176	0.028-0.047		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.784 AU	0.142	0.132

FAMILY MEMBERSHIP

Williams: Leto

Arnold: A-66

ASTEROID DATA SHEET

69 HESPERIA

REFERENCE

MAGNITUDE

B(a,0): 12.13 B(1,0): 8.28 wt: 1.8

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.979 AU	.1830*	.1497*

FAMILY MEMBERSHIP

Williams:

Arnold:

ASTEROID DATA SHEET

70 PANOPAEA

REFERENCE

MAGNITUDE

B(a,0): 12.28 B(1,0): 9.15 wt: 1.8

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.614 AU	.1620*	.1890*

FAMILY MEMBERSHIP
Williams:
Arnold: A-72

ASTEROID DATA SHEET

77 FRIGA

REFERENCE

MAGNITUDE

B(a,0): 12.89 B(1,0): 9.65 wt: 5.2

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.669 AU	.1116*	.0470*

FAMILY MEMBERSHIP
Williams:
Arnold: A-83

ASTEROID DATA SHEET

78 DIANA

REFERENCE

MAGNITUDE

B(a,0): 12.27 B(1,0): 9.13 wt: 5.7

COLOR

B-V	α	U-B	α	B-V	U-B

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
8?	-	0.15	Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.619 AU	.2307*	.1605*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

79 EURYNOME

REFERENCE

MAGNITUDE

B(a,0): 12.02 B(1,0): 9.28 wt: 2.1

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = VR R/B = 1.63

Curve = R3A Fairly sharp band 0.95 μ. Possible band 0.67 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h (%/deg)

LIGHT CURVE

Period (hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.444	0.175	0.090

FAMILY MEMBERSHIP

Williams: Eurynome

Arnold: B-25

ASTEROID DATA SHEET

80 SAPPHO

REFERENCE

MAGNITUDE

B(a,0): 11.66 B(1,0): 9.29 wt: 2.6

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	84-104	0.033-0.048		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.297 AU	.1590*	.1606*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

82 ALKMENE

REFERENCE

MAGNITUDE

B(a,0): 12.86 B(1,0): 9.42 wt: 4.5

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = VR R/B = 1.72

Curve = R3A Poor statistics. 0.95 band seems deep.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude		Remarks
	Min.	Max.	

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.763 AU	0.248	0.048

FAMILY MEMBERSHIP

Williams: Triplet

Arnold:

ASTEROID DATA SHEET

85 IO

REFERENCE

MAGNITUDE

B(a,0): 12.12 B(1,0): 8.91 wt: 4.1

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.0?	-	0.17		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.654 AU	.1648*	.2137*

FAMILY MEMBERSHIP
Williams:
Arnold: A-69

ASTEROID DATA SHEET

89 JULIA

REFERENCE

MAGNITUDE

B(a,0): 11.18 B(1,0): 8.19 wt: 2.3

COLOR

B-V	α	U-B	α	B-V	U-B

Color = VR SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B	
	+ 0.035		+ 0.003	+ 0.003	Veverka (1970)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)	
9-10°	-1.0 %	22°	0.15	Veverka (1970)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8?	-	0.2		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Polarization		0.10-0.14		Veverka (1970)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.553 AU	.1490*	.2911*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

91 AEGINA

REFERENCE

MAGNITUDE

B(a,0): 12.81 B(1,0): 9.74 wt: 2.1

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.590 AU	.1118*	.0385*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

92 UNDINA

REFERENCE

MAGNITUDE

B(a,0): 12.28 B(1,0): 8.04 wt: 2.7

COLOR

B-V	α	U-B	α	B-V	U-B

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.200 AU	.0539*	.1516*

FAMILY MEMBERSHIP
Williams:
Arnold: A-90

ASTEROID DATA SHEET

93 MINERVA

REFERENCE

MAGNITUDE

B(a,0): 12.17 B(1,0): 8.75 wt: 4.8

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = B
Curve = B1?

R/B = 1.15

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.754 AU	0.109	0.156

FAMILY MEMBERSHIP

Williams: Ceres

Arnold: A-66

ASTEROID DATA SHEET

95 ARETHUSA

REFERENCE

MAGNITUDE

B(a,0): 12.90 B(1,0): 8.89 wt: 1.8

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.069 AU	.1159*	.2417*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

110 LYDIA

MAGNITUDE

B(a,0):	B(1,0):	wt:	REFERENCE
11.94	8.56	2.7	

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.71	0.30	Taylor (1971)

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B	
	+ 0.032		+ 0.0016	+ 0.0025	Taylor et al (1971)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
10.92673	0.11	0.20		Taylor (1971)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.732 AU	.0484*	.0899*

FAMILY MEMBERSHIP

Williams:

Arnold: A-86

ASTEROID DATA SHEET

115 THYRA

REFERENCE

MAGNITUDE

B(a,0): 11.70 B(1,0): 9.12 wt: 1.5

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.379 AU	.1740*	.2112*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

116 SIRONA

REFERENCE

MAGNITUDE

B(a,0): 12.22 B(1,0): 8.78 wt: 3.1

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
9.6	-	$\geq$0.5	Mc.&Bu. (1972)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.766 AU	.1742*	.0466*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

122 GERDA

REFERENCE

MAGNITUDE

B(a,0): 13.34 B(1,0): 9.08 wt: 7.7

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.68	0.41	Gehrels (1970)

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h (%/deg)

LIGHT CURVE

Period (hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.212 AU	.0981*	.0326*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

124 ALKESTE

REFERENCE

MAGNITUDE

B(a,0): 12.25 B(1,0): 9.09 wt: 5.1

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.630 AU	.0585*	.0560*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

162 LAURENTIA

REFERENCE

MAGNITUDE

B(a,0): 14.02 B(1,0): 10.08 wt: 4.5

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
14?	-	0.3	Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.026 AU	.2068*	.0973*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

179 KLYTAEMNESTRA

REFERENCE

MAGNITUDE

B(a,0): 13.52 B(1,0): 9.68 wt: 4.4

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.974 AU	.0763*	.1547*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

182 ELSA

REFERENCE

MAGNITUDE

B(a,0): 12.72 B(1,0): 10.05 wt: 5.0

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.416 AU	.1748*	.0215*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

186 CELUTA

REFERENCE

MAGNITUDE

B(a,0): 12.92 B(1,0): 10.38 wt: 2.4

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8.6	-	$\geq$0.5		Mc.&Bu. (1972)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.362 AU	.1134*	.2227*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

192 NAUSIKAA

REFERENCE

MAGNITUDE

B(a,0): 11.04 B(1,0): 8.40 wt: 1.9

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = VR
Curve = R3A

R/B = 1.66

Well-defined absorption band 0.97 μ.

PHASE FACTORS

B	V	U	B-V	U-B	
			~ 0.002		Chapman (1971)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
13.625	-	0.20		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.402 AU	0.206	0.130

FAMILY MEMBERSHIP
Williams:
Arnold: J-2

ASTEROID DATA SHEET

196 PHILOMELA

REFERENCE

MAGNITUDE

B(a,0): 11.77 B(1,0): 7.68 wt: 2.1

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8.333	-	0.32		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.113 AU	.0447*	.1079*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

230 ATHAMANTIS

REFERENCE

MAGNITUDE

B(a,0): 11.20 B(1,0): 8.61 wt: 1.9

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7.996	-	0.10		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.382 AU	.0339*	.1774*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

258 TYCHE

REFERENCE

MAGNITUDE

B(a,0): 12.68 B(1,0): 9.55 wt: 3.4

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.614 AU	.1806*	.2538*

FAMILY MEMBERSHIP

Williams:

Arnold: A-70

ASTEROID DATA SHEET

268 ADOREA

REFERENCE

MAGNITUDE

B(a,0): 13.61 B(1,0): 9.55 wt: 6.1

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.69	0.29	Gehrels (1970)

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.095 AU	.1725*	.0247*

FAMILY MEMBERSHIP
Williams:
Arnold: 1

ASTEROID DATA SHEET

321 FLORENTINA

REFERENCE

MAGNITUDE

B(a,0): 15.06 B(1,0): 11.38 wt: 6.4

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.81	0.44	Gehrels (1970)
.82	10	.45	10			vanHout. (1958)

Color = MR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
2.870	-	0.38		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.886 AU	.0478*	.0379*

FAMILY MEMBERSHIP
Williams:
Arnold: 3

ASTEROID DATA SHEET

324 BAMBERGA

REFERENCE

MAGNITUDE

B(a,0): 11.41 B(1,0): 8.14 wt: 4.5

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = M
Curve = M2
Quite deep, narrow band 0.66 μ.
R/B = 1.30

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8?	-	0.07		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	250-310	0.012-0.016		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.682 AU	0.288	0.229

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

337 DEVOSA

REFERENCE

MAGNITUDE

B(a,0): 12.64 B(1,0): 10.05 wt: 2.8

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = M
Curve = M4

R/B = 1.42

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.383 AU	0.154	0.142

FAMILY MEMBERSHIP

Williams: Triplet

Arnold:

ASTEROID DATA SHEET

341 CALIFORNIA

REFERENCE

MAGNITUDE

B(a,0): 14.75 B(1,0): 12.64 wt: 4.8

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.92	-	Gehrels (1970)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.199 AU	.1421*	.0887*

FAMILY MEMBERSHIP
Williams:
Arnold: 7

ASTEROID DATA SHEET

345 TERCIDINA

REFERENCE

MAGNITUDE

B(a,0): 12.57 B(1,0): 10.13 wt: 5.1

COLOR

B-V	α	U-B	α	B-V	U-B

Color = EM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
8.6	-	~0.4		Mc.&Bu. (1972)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.352 AU	.0773*	.1790*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

349 DEMBOWSKA

MAGNITUDE

B(a,0):	B(1,0):	wt:	REFERENCE
11.04	7.29	4.7	

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.96	0.55	Gehrels (1970)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
4.701	0.3	0.4		Taylor (1971)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.924 AU	.0536*	.1360*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

354 ELEONORA

MAGNITUDE

B(a,0): 11.06 B(1,0): 7.56 wt: 3.8

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.93	0.54	Gehrels (1970)
.94	18	.58	18			Gr.& K. (1954)
.95	17	.58	17			Gr.& K. (1954)
.95	16	.58	16			Gr.& K. (1954)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
4.277	0.14	0.30		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.795 AU	.1485*	.3028*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

356 LIGURIA

REFERENCE

MAGNITUDE

B(a,0): 12.54 B(1,0): 9.11 wt: 3.2

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = M
Curve = M4

R/B = 1.39

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.758	0.224	0.168

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

364 ISARA

REFERENCE

MAGNITUDE

B(a,0): 13.26 B(1,0): 11.09 wt: 3.9

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
9.155	0.35	0.50	Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.220 AU	.1501*	.0983*

FAMILY MEMBERSHIP

Williams:

Arnold: 8

ASTEROID DATA SHEET

372 PALMA

REFERENCE

MAGNITUDE

B(a,0): 12.70 B(1,0): 8.53 wt: 3.0

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.160 AU	.2420*	.4170*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

380 FIDUCIA

REFERENCE

MAGNITUDE

B(a,0): 13.87 B(1,0): 10.61 wt: 5.9

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.72	-	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

Color = B

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.670 AU	.0822*	.0887*

FAMILY MEMBERSHIP
Williams:
Arnold: A-87

ASTEROID DATA SHEET

385 ILMATAR

REFERENCE

MAGNITUDE

B(a,0): 12.50 B(1,0): 8.90 wt: 3.9

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.845 AU	.1618*	.2427*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

402 CHLOË

REFERENCE

MAGNITUDE

B(a,0): 12.99 B(1,0): 9.99 wt: 2.1

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.556 AU	.1454*	.1922*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

409 ASPASIA

REFERENCE

MAGNITUDE

B(a,0): 11.67 B(1,0): 8.63 wt: 4.8

COLOR

B-V	α	U-B	α	B-V	U-B

Color = M
Curve = M3

SPECTRAL REFLECTIVITY CURVE

R/B = 1.26

Possible band 0.67 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.575 AU	0.094	0.212

FAMILY MEMBERSHIP

Williams: Sophrosyne

Arnold:

ASTEROID DATA SHEET

433 EROS

MAGNITUDE

B(a,0):	B(1,0):	wt:	REFERENCE
11.52	12.40	2.1	

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.86	0.46	Taylor (1971)
.96	57	.56	57			Gr.& K.(1954)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.270 254	0.0	1.5		Gehrels (1970)

POLE

Ecliptic Long:	Ecliptic Lat:	Obliquity:	
13?	28?	72?	Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
1.458 AU	.223*	.187*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

451 PATIENTIA

REFERENCE

MAGNITUDE

B(a,0): 12.26 B(1,0): 8.26 wt: 1.9

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
	-	0.10	Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.061 AU	.0680*	.2419*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

478 TERGESTE

REFERENCE

MAGNITUDE

B(a,0): 12.81 B(1,0): 8.89 wt: 2.7

COLOR

B-V	α	U-B	α	B-V	U-B

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.013 AU	.1016*	.2432*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

481 EMITA

REFERENCE

MAGNITUDE

B(a,0): 13.24 B(1,0): 9.84 wt: 3.6

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.743 AU	.1357*	.1546*

FAMILY MEMBERSHIP
Williams:
Arnold: A-85

ASTEROID DATA SHEET

485 GENUA

REFERENCE

MAGNITUDE

B(a,0): 13.07 B(1,0): 9.66 wt: 2.9

COLOR

B-V	α	U-B	α	B-V	U-B

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.748 AU	.200*	.2423*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

498 TOKIO

REFERENCE

MAGNITUDE

B(a,0): 13.20 B(1,0): 9.99 wt: 4.6

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.77	0.36	Gehrels (1970)

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.650 AU	.1846*	.1476*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

510 MABELLA

REFERENCE

MAGNITUDE

B(a,0): 14.15 B(1,0): 11.04 wt: 6.9

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.73	0.25	Gehrels (1970)

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude		Remarks
	Min.	Max.	

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.609 AU	.1766*	.1730*

FAMILY MEMBERSHIP

Williams:

Arnold: A-72

ASTEROID DATA SHEET

511 DAVIDA

MAGNITUDE

B(a,0): 11.35 B(1,0): 7.13 wt: 6.5

COLOR

B-V	α	U-B	α	B-V	U-B	REFERENCE
				0.71	0.36	Gehrels (1970)
.71	5	.34	5			Gr.& K. (1954)
.72	7					Gr.& K. (1954)
.71	8	.39	8			Ge.&Ow. (1962)

Color = B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.17	0.06	0.25		Gehrels (1970)

POLE

Ecliptic Long: 306? 122? Ecliptic Lat: 34? 10? Obliquity: 53? 84? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.191 AU	.1645*	.2504*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

532 HERCULINA

REFERENCE

MAGNITUDE

B(a,0): 11.44 B(1,0): 7.98 wt: 3.4

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.83	0.44	Gehrels (1970)
.83	4	.44	4			Gr.& K. (1954)

SPECTRAL REFLECTIVITY CURVE

Color = MR

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
18.813	0.08	0.18		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.773 AU	.2175*	.2622*

FAMILY MEMBERSHIP

Williams:

Arnold: B-17

ASTEROID DATA SHEET

540 ROSAMUNDE

REFERENCE

MAGNITUDE

B(a,0): 14.38 B(1,0): 12.22 wt: 7.3

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.90	0.48	Gehrels (1970)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.219 AU	.1379*	.1063*

FAMILY MEMBERSHIP

Williams:

Arnold: 9

ASTEROID DATA SHEET

554 PERAGA

REFERENCE

MAGNITUDE

B(a,0): 12.06 B(1,0): 9.49 wt: 4.3

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = B
Curve = B1
Possible shallow band 0.66 μ.
R/B = 1.27

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.375 AU	0.148	0.066

FAMILY MEMBERSHIP

Williams: Peraga

Arnold:

ASTEROID DATA SHEET

563 SULEIKA

REFERENCE

MAGNITUDE

B(a,0): 12.90 B(1,0): 9.57 wt: 3.5

COLOR

B-V	α	U-B	α	B-V	U-B

Color = MR

Curve = R4

SPECTRAL REFLECTIVITY CURVE

Possible band 0.91 μ.

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.713 AU	0.232	0.160

FAMILY MEMBERSHIP

Williams: Triplet

Arnold: A-84

ASTEROID DATA SHEET

624 HEKTOR

REFERENCE

MAGNITUDE

B(a,0): 15.29 B(1,0): 8.67 wt: 10.8

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.78	0.24	Gehrels (1970)

Color = M SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period (hr)	Amplitude Min.	Amplitude Max.	Remarks	
6.922 533	0.1	1.1		Gehrels (1970)

POLE

Ecliptic Long: 324? Ecliptic Lat: 10? Obliquity: 75? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter (km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
5.121 AU		

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

658 ASTERIA

REFERENCE

MAGNITUDE

B(a,0): 15.34 B(1,0): 11.72 wt: 5.1

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.87	0.36	Gehrels (1970)

Color = VP

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.855 AU	.0451*	.0368*

FAMILY MEMBERSHIP
Williams:
Arnold: 3

ASTEROID DATA SHEET

674 RACHELE

REFERENCE

MAGNITUDE

B(a,0): 12.23 B(1,0): 8.49 wt: 1.3

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density	
Thermal IR	84-142	0.038-0.10		Matson (1972)

PROPER ORBITAL ELEMENTS

a	e	sin i
2.921 AU	.1982*	.2195*

FAMILY MEMBERSHIP
Williams:
Arnold: B-14

ASTEROID DATA SHEET

675 LUDMILLA

REFERENCE

MAGNITUDE

B(a,0): 12.71 B(1,0): 9.26 wt: 4.1

COLOR

B-V	α	U-B	α	B-V	U-B

Color = R

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.771 AU	.1806*	.1888*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

704 INTERAMNIA

REFERENCE

MAGNITUDE

B(a,0): 11.60 B(1,0): 7.60 wt: 1.1

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

Color = B
Curve = B3

Possible band 0.64 μ.

R/B = 1.09

PHASE FACTORS

B	V	U	B-V	U-B	
			− 0.02		Chapman (1971)

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
?	0.11	0.14		Yang (1965)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.057 AU	0.09	0.324

FAMILY MEMBERSHIP

Williams: Doublet

Arnold:

ASTEROID DATA SHEET

753 TIFLIS

REFERENCE

MAGNITUDE

B(a,0): 14.36 B(1,0): 11.91 wt: 2.6

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
9.84	-	~0.8	Mc.&Bu. (1972)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.330 AU	.2189*	.1628*

FAMILY MEMBERSHIP

Williams:

Arnold: A-77

ASTEROID DATA SHEET

779 NINA

REFERENCE

MAGNITUDE

B(a,0): 12.99 B(1,0): 9.75 wt: 0.8

COLOR

B-V	α	U-B	α	B-V	U-B

Color = BM

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.665 AU	.1910*	.2711*

FAMILY MEMBERSHIP

Williams:

Arnold: B-18

ASTEROID DATA SHEET

911 AGAMEMNON

REFERENCE

MAGNITUDE

B(a,0): 15.55 B(1,0): 8.92 wt: 3.2

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.80	-	Gehrels (1970)

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
7?	-	0.3		Gehrels (1970)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
5.154 AU		

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

976 BENJAMINA

REFERENCE

MAGNITUDE

B(a,0): 14.76 B(1,0): 10.55 wt: 6.9

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.74	0.25	Gehrels (1970)

Color = M

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.183 AU	.1668*	.1506*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

984 GRETIA

REFERENCE

MAGNITUDE

B(a,0): 14.28 B(1,0): 10.76 wt: 5.4

COLOR

B-V	α	U-B	α	B-V	U-B

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks
5.76	-	0.4	Mc.&Bu. (1972)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
2.804 AU	.1594*	.1746*

FAMILY MEMBERSHIP
Williams:
Arnold: A-91

ASTEROID DATA SHEET

1043 BEATE

REFERENCE

MAGNITUDE

B(a,0): 15.08 B(1,0): 11.02 wt: 5.8

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.90	0.45	Gehrels (1970)

Color = VR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.095 AU	.0380*	.1460*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

1287 LORCIA

REFERENCE

MAGNITUDE

B(a,0): 16.04 B(1,0): 12.13 wt: 3.6

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.85	0.36	Gehrels (1970)

Color = VR SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.012 AU	.0769*	.1770*

FAMILY MEMBERSHIP
Williams:
Arnold: 2

ASTEROID DATA SHEET

1291 PHRYNE

REFERENCE

MAGNITUDE

B(a,0): 15.38 B(1,0): 11.46 wt: 5.7

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.83	0.39	Gehrels (1970)

Color = MR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
3.019 AU	.0713*	.1691*

FAMILY MEMBERSHIP
Williams:
Arnold: 2

ASTEROID DATA SHEET

1437 DIOMEDES

REFERENCE

MAGNITUDE

B(a,0): 15.87 B(1,0): 9.23 wt: 6.1

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.72	0.20	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

Color = B

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude		Remarks	
	Min.	Max.		
16-20	0.35	0.42		Taylor (1971)

POLE

Ecliptic Long: Ecliptic Lat: Obliquity:

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
5.083 AU		

FAMILY MEMBERSHIP

Williams:

Arnold:

ASTEROID DATA SHEET

1566 ICARUS

REFERENCE

MAGNITUDE

B(a,0): 12.24 B(1,0): 17.62 wt: 2.5

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.80	0.66	Gehrels (1970)

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
2.273	0.05	0.22		Gehrels (1970)

POLE

Ecliptic Long: 235? Ecliptic Lat: 28? Obliquity: 76? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
1.078 AU	.827*	.374*

FAMILY MEMBERSHIP
Williams:
Arnold:

ASTEROID DATA SHEET

1620 GEOGRAPHOS

REFERENCE

MAGNITUDE

B(a,0): 13.38 B(1,0): 15.97 wt: 1.4

COLOR

B-V	α	U-B	α	B-V	U-B	
				0.82	-	Gehrels (1970)

Color = MR

SPECTRAL REFLECTIVITY CURVE

PHASE FACTORS

B	V	U	B-V	U-B

POLARIZATION

α_{min}	P_{min}	α_x	h(%/deg)

LIGHT CURVE

Period(hr)	Amplitude Min.	Amplitude Max.	Remarks	
5.2230	1.2	2.0		Taylor (1971)

POLE

Ecliptic Long: 113? Ecliptic Lat: 85? Obliquity: 18? Vesely (1971)

MASS:

PHYSICAL PARAMETERS

Method	Diameter(km)	Albedo	Density

PROPER ORBITAL ELEMENTS

a	e	sin i
1.244 AU	.335*	.230*

FAMILY MEMBERSHIP
Williams:
Arnold: