COLLABORATIVE ASTEROID PHOTOMETRY FROM UAI: 2022 JULY-SEPTEMBER

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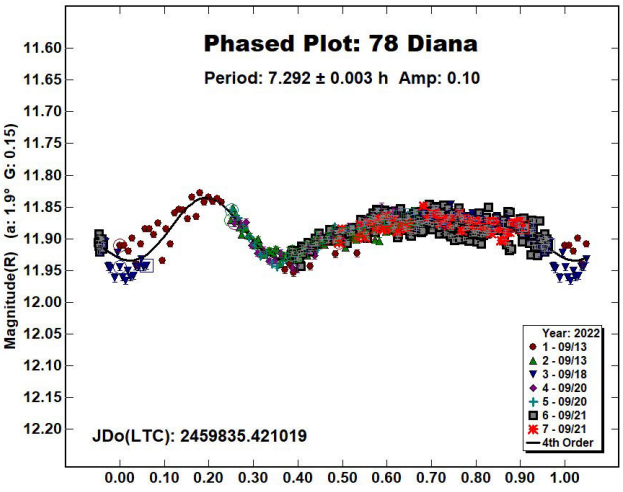
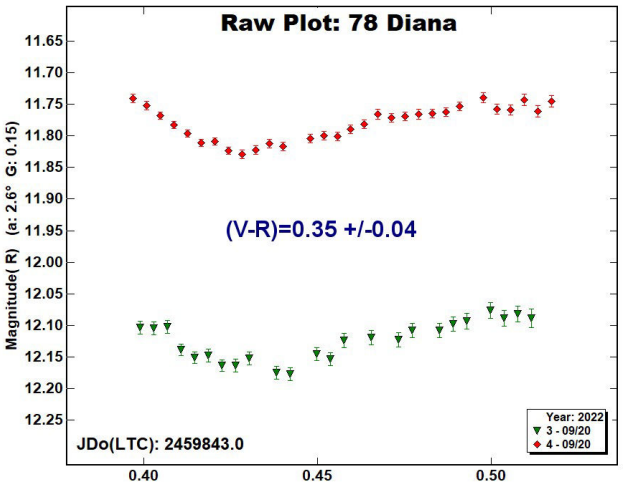
Photometric observations of six asteroids were made in order to acquire lightcurves for shape/spin axis modeling. The synodic period and lightcurve amplitude were found for 78 Diana, 198 Ampella, 895 Helio, 1060 Magnolia, 1543 Bourgeois, 1806 Derice. We also found color indices for 78 Diana, 198 Ampella, 895 Helio, 1060 Magnolia and H-G parameters for 198 Ampella.

Collaborative asteroid photometry was done inside the Italian Amateur Astronomers Union (UAI; 2022) group. The targets were selected mainly in order to acquire lightcurves for shape/spin axis modeling. Table I shows the observing circumstances and results.

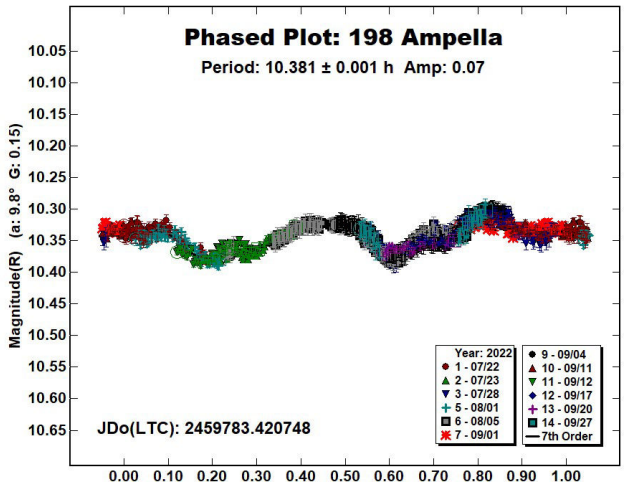
The CCD observations of six asteroids were made in 2022 July-September using the instrumentation described in the Table II. Lightcurve analysis was performed at the Balzaretto Observatory with *MPO Canopus* (Warner, 2021). All the images were calibrated with dark and flat frames and converted to standard magnitudes using solar colored field stars from CMC15 and ATLAS catalogues, distributed with MPO Canopus. For brevity, the following citations to the asteroid lightcurve database (LCDB; Warner et al., 2009) will be summarized only as "LCDB".

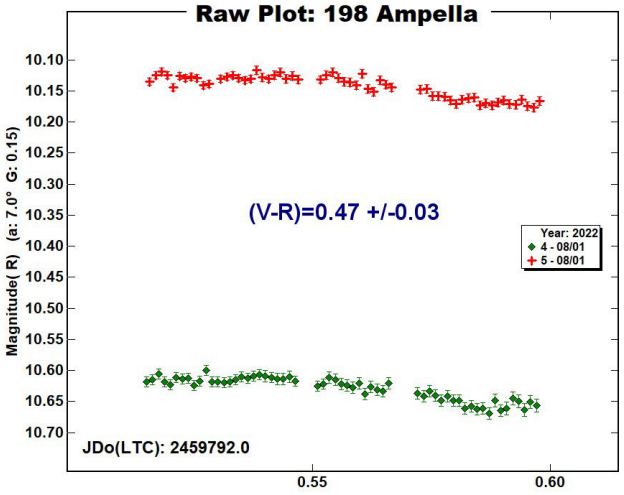
78 Diana is a Ch-type (Bus & Binzel, 2002) middle main-belt asteroid. Collaborative observations were made over three nights. The period analysis shows a synodic period of P = 7.292 ± 0.003 h with an amplitude A = 0.10 ± 0.04 mag. The period is close to the previously published results in the LCDB. Multiband photometry was made by M. Scarfi (K78) on 2022 September 20. We found the color index (V-R) = 0.35 ± 0.04, consistent with a C-type asteroid (Shevchenko and Lupishko, 1998).

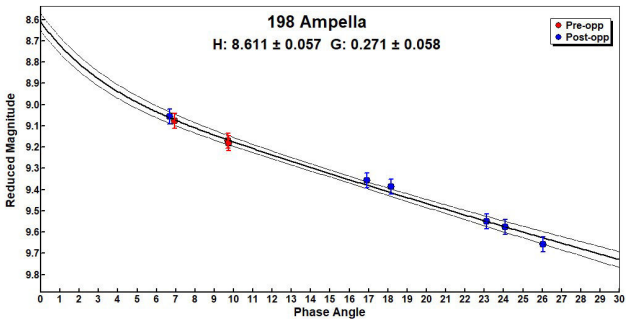




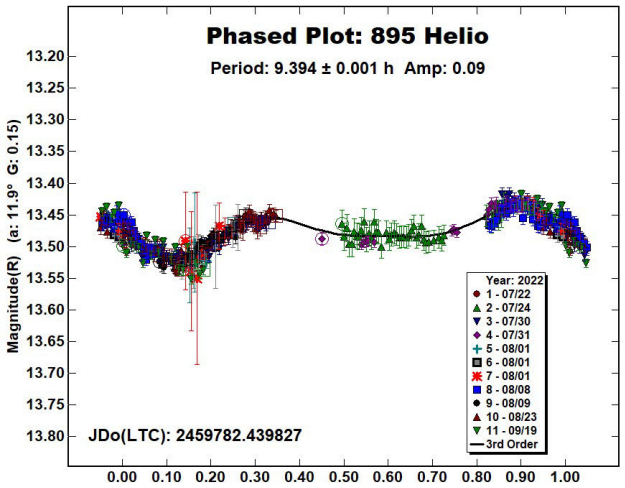
198 Ampella is an S-type (Bus & Binzel, 2002) inner main-belt asteroid. Collaborative observations were made over eleven nights. The period analysis shows a synodic period of P = 10.381 ± 0.001 h with an amplitude A = 0.07 ± 0.02 mag. The period is close to the previously published results in the LCDB. Multiband photometry was made by G. Baj (K38) on 2022 August 1. We found the color index (V-R) = 0.47 ± 0.03. The wide phase angles covered by the observations allowed us to determine the H-G parameters. The R band magnitudes were converted to V band adding the color index (V-R) and evaluating the half peak to peak magnitude using a Fourier model of the same order of the lightcurve plot (Buchheim, 2010). We found H = 8.61 ± 0.06 and G = 0.27 ± 0.06. Both the color index (V-R) and G value are close to an S-type asteroid (Shevchenko and Lupishko, 1998).

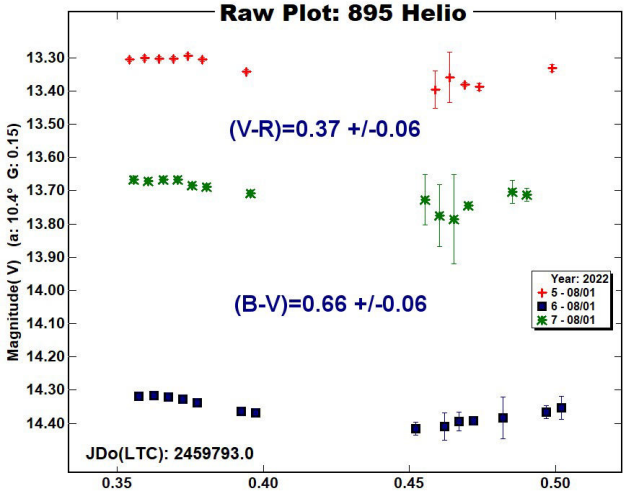




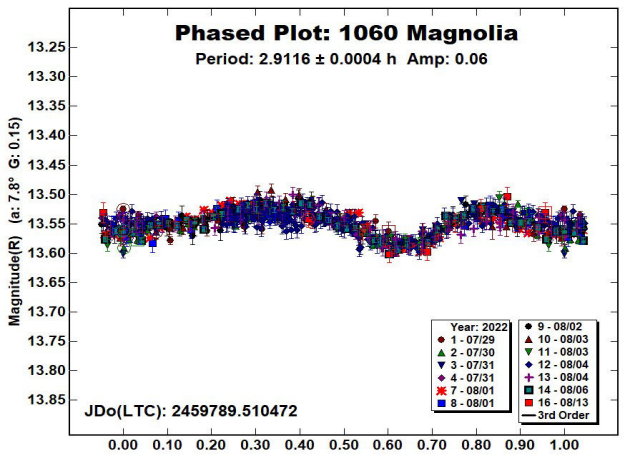


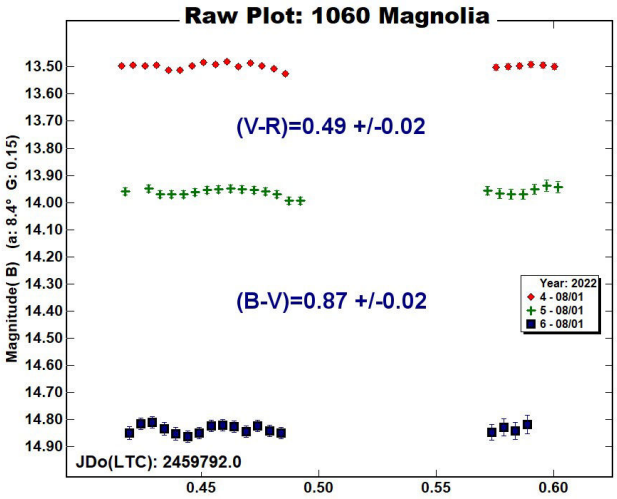
895 Helio is a B-type (Bus & Binzel, 2002) outer main-belt asteroid. Collaborative observations were made over eight nights. The period analysis shows a synodic period of P = 9.394 ± 0.001 h with an amplitude A = 0.09 ± 0.02 mag. The period is close to the previously published results in the LCDB. Multiband photometry was made by P. Bacci and M. Maestripieri (104) on 2022 August 1. We found color indices (B-V) = 0.66 ± 0.06; (V-R) = 0.37 ± 0.06, consistent with a low albedo asteroid (Shevchenko and Lupishko, 1998).



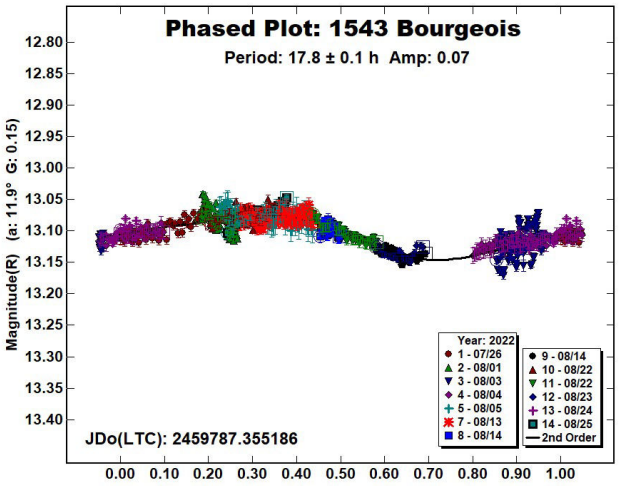


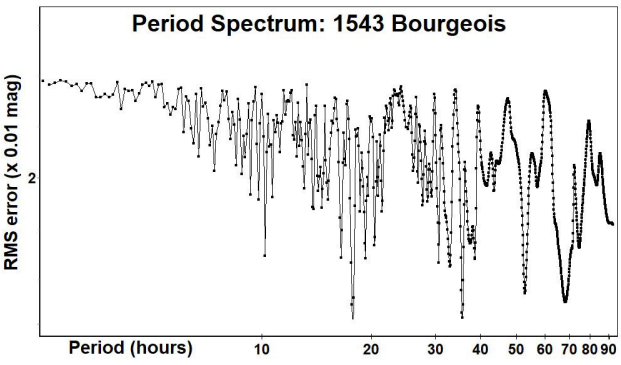
1060 Magnolia is a medium albedo inner main-belt asteroid. Collaborative observations were made over nine nights. We found a synodic period of P = 2.9116 ± 0.0004 h with an amplitude A = 0.06 ± 0.02 mag. The period is close to the previously published results in the LCDB. Multiband photometry was made by P. Bacci and M. Maestripieri (104) on 2022 August 1 and by M. Iozzi (L63) on 2022 August 13. We found color indices (B-V) = 0.87 ± 0.02; (V-R) = 0.49 ± 0.02, consistent with a medium albedo asteroid (Shevchenko and Lupishko, 1998).

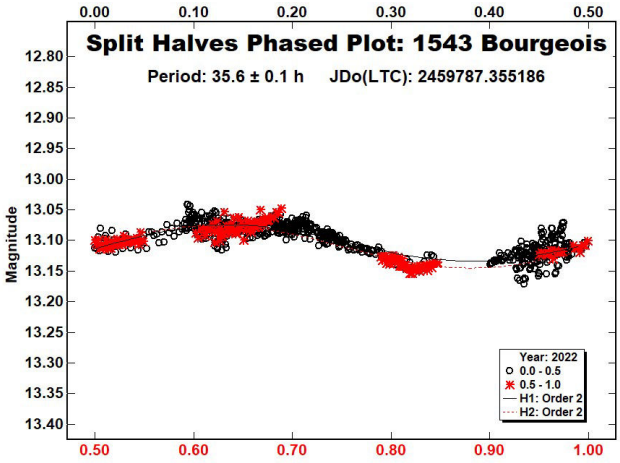




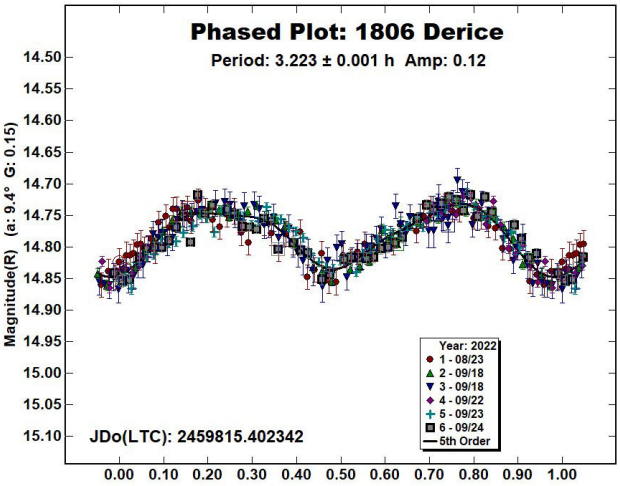
1543 Bourgeois is a medium albedo middle main-belt asteroid. Collaborative observations were made over ten nights. The period spectrum shows two solutions close to 18 and 36 hours. The split halves plot shows that the two halves are almost identical for the period of 35.6 h, so we prefer the monomodal solution of $P = 17.8 \pm 0.1$ h with an amplitude $A = 0.07 \pm 0.03$ mag. The period is quite different from the one reported on LCDB of 2.48 h.







1806 Derice is a low albedo inner main-belt asteroid. Collaborative observations were made over five nights. We found a synodic period of $P = 3.223 \pm 0.001$ h with an amplitude $A = 0.12 \pm 0.03$ mag. The period is close to the previously published results in the LCDB.



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Number	Name	2022 mm/dd	Phase	L_{PAB}	B_{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
78	Diana	09/13-09/21	*1.7,2.9	353	4	7.292	0.003	0.10	0.04	MB-M
198	Ampella	07/22-09/27	*9.7,26.0	315	11	10.381	0.001	0.07	0.02	MB-I
895	Helio	07/22-09/19	*11.7,12.9	326	28	9.394	0.001	0.09	0.02	MB-O
1060	Magnolia	07/29-08/13	7.9,13.7	304	10	2.9116	0.0004	0.06	0.02	MB-I
1543	Bourgeois	07/26-08/25	*11.8,11.7	319	9	17.8	0.1	0.07	0.03	MB-M
1806	Derice	08/23-09/24	*9.4,8.0	348	5	3.223	0.001	0.12	0.03	MB-I

Table I. Observing circumstances and results. The first line gives the results for the primary of a binary system. The second line gives the orbital period of the satellite and the maximum attenuation. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extrema during the period. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009).

Observatory (MPC code)	Telescope	CCD	Filter	Observed Asteroids (#Sessions)
HOB Astronomical Observatory (L63)	0.20-m SCT f/6.0	ATIK 383L+	C,V, Rc	78(3),198(5),1060(3), 1543(4)
Iota Scorpii(K78)	0.40-m RCT f/8.0	SBIG STXL-6303e (bin 2x2)	V,Rc	78(1),895(4),1543(2), 1806(2)
Hypatia Observatory (L62)	0.25-m RCT f/5.3	MORAVIAN C2-7000A	Rc	198(5),1060(3)
Osservatorio Astronomico Nastro Verde (C82)	0.35-m SCT f/6.3	SBIG ST10XME (bin 2x2)	C	1060(2),1543(1),1806(3)
Blessed Hermann Observatory (L73)	0.30-m SCT f/6.0	QHY 174MGPS (bin 2x2)	Rc	78(1),1543(2)
Astronomical Observatory of the University of Siena(K54)	0.30-m MCT f/5.6	SBIG STL-6303e(bin 2x2)	Rc	1060(2),1543(1)
Seveso Observatory (C24)	0.30-m SCT f/10.0	MORAVIAN KAF 8300 (bin 3x3)	Rc	78(1),895(1)
M57 (K38)	0.35-m RCT f/5.5	SBIG STT1603ME	V,Rc	198(1),895(1)
GAMP (104)	0.60-m NRT f/4.0	Apogee Alta	B,V, Rc	895(1),1060(1)
BSCR Observatory (K47)	0.41-m NRT f/3.2	DTA Discovery 1600	C	895(1),1543(1)
Osservatorio Serafino Zani (130)	0.40-m RCT f/5.8	SBIG ST8 XME (bin 2x2)	C	1060(1)
GiaGa Observatory (203)	0.36-m SCT f/5.8	MORAVIAN G2-3200	Rc	1543(1)
Osservatorio Astronomico Margherita Hack (A57)	0.35-m SCT f/8.3	SBIG ST10XME (bin 2x2)	Rc	1806(1)

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