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LIGHTCURVES ANALYSIS OF 1677 TYCHO BRAHE, 1802 ZHANG HENG, AND 18151 LICCHELLI

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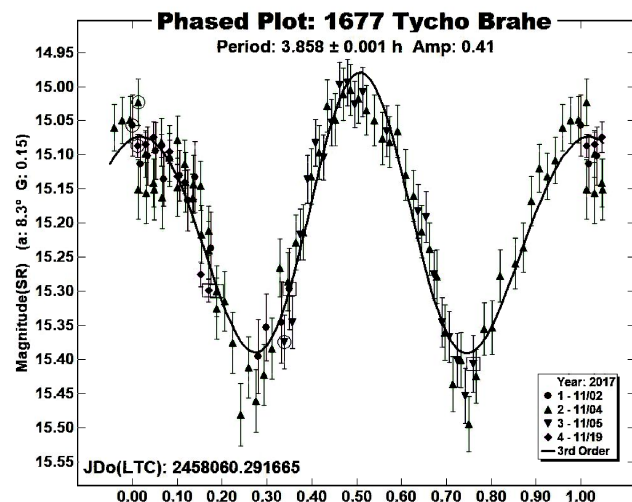
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Photometric observations of three main-belt asteroids were carried out at the R. P. Feynman Observatory on year 2017. The synodic period and lightcurve amplitude were found for 1677 Tycho Brahe, 1802 Zhang Heng, and 18151 Licchelli.

CCD observations of three main-belt asteroids were carried out at the R. P. Feynman Observatory on year 2017 using an Orion 0.30-m newtonian reflector equipped with a CCD Atik 460EX (bin 2×2), as part of an educational project involving high school students. Lightcurves analysis was done by the authors with *MPO Canopus* (Warner, 2023). All the images were calibrated with dark and flat frames and converted to standard magnitudes using solar colored field stars from CMC15 catalogue.

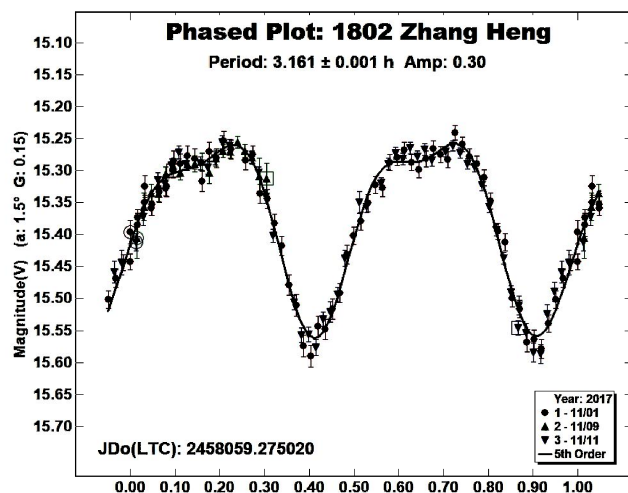
1677 Tycho Brahe is a medium albedo middle main-belt asteroid. Observations were made over four nights using a SR filter. The period analysis shows a synodic period of $P = 3.858 \pm 0.001$ h with an amplitude $A = 0.41 \pm 0.05$ mag. The period is close to the previously published results in the asteroid lightcurve database (LCDB; Warner et al., 2009) referred to hereinafter as "LCDB".



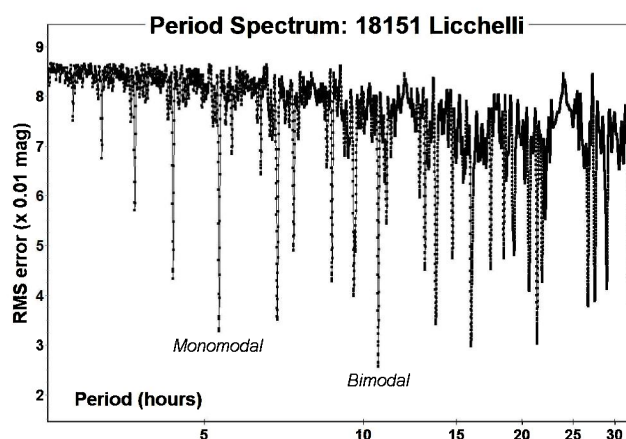
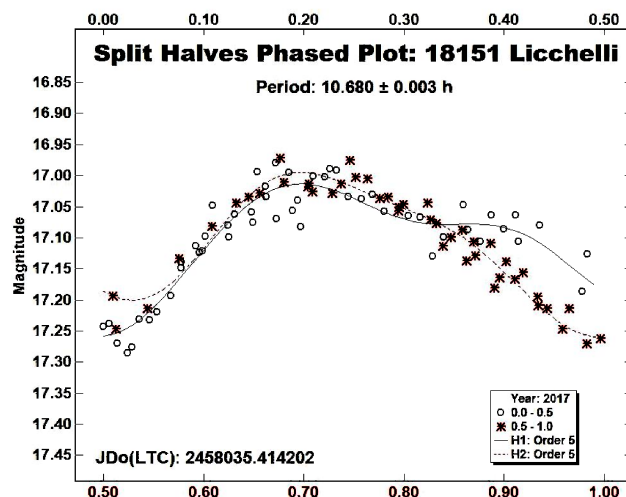
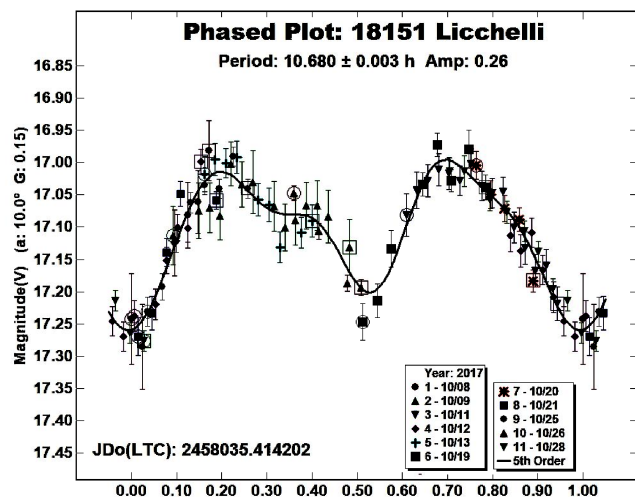
Number	Name	2017 mm/dd	Phase	L_{PAB}	B_{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
1677	Tycho Brahe	11/02-11/19	8.3, 9.9	44	18	3.858	0.001	0.41	0.05	MB-M
1802	Zhang Heng	11/01-11/11	1.4, 4.6	39	-3	3.161	0.001	0.30	0.03	MB-O
18151	Licchelli	10/08-10/28	10.0, 1.5	34	-3	10.680	0.003	0.26	0.03	MB-O

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).

1802 Zhang Heng is a medium albedo outer main-belt asteroid. Unfiltered observations were made over three nights. The period analysis shows a synodic period of $P = 3.161 \pm 0.001$ h with an amplitude $A = 0.30 \pm 0.03$ mag. The period is close to the previously published results in the LCDB.



18151 Licchelli is an outer main-belt asteroid. We started observing this asteroid after a photometric session dedicated to exoplanets, so the observations were conducted with an Astrodon Exoplanet-BB filter. To maintain consistency, the same filter was used for all subsequent observations, which were carried out over eleven nights. The period spectrum shows a deeper minimum close to 10 hours and the split halves plot shows that the two halves are quite different, so we prefer the bimodal solution of $P = 10.680 \pm 0.003$ h with an amplitude $A = 0.26 \pm 0.03$ mag. For this asteroid, no periods were found in the LCDB.



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