

LIGHTCURVES OF SIX ASTEROIDS

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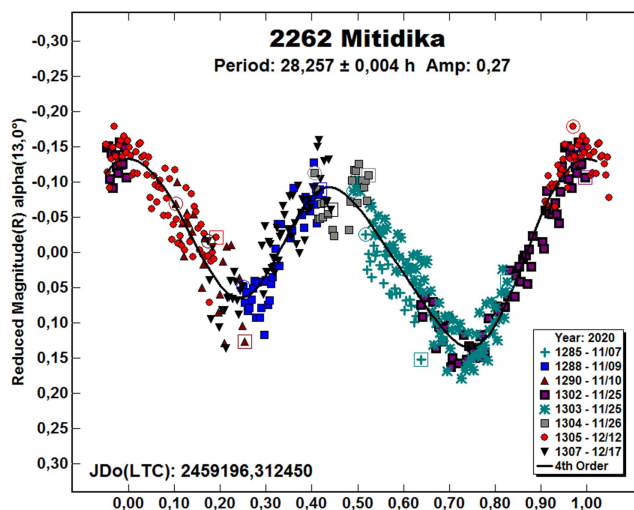
In the following paper we present the result of a photometric survey on six asteroids: 2262 Mitidika, $P = 28.257 \pm 0.004$ h, $A = 0.26$ mag; 3955 Bruckner, $P = 7.549 \pm 0.002$ h, $A = 0.25$ mag; (16559) 1991 VA3, $P = 473.34 \pm 0.27$ h, $A = 1.17$ mag; (21182) 1994 EC2, $P = 12.981 \pm 0.002$ h, $A = 0.10$ mag; (22393) 1994 QV, $P = 3.419 \pm 0.001$ h, $A = 0.23$ mag; (43028) 1999 VE23, $P = 3.940 \pm 0.002$ h, $A = 0.36$ mag.

From 2020 September to 2021 January, the Bigmuskie Observatory worked on six asteroids to determinate their rotational periods. Unfortunately observations during 2020 December and the first days of 2021 January were almost impossibile due to bad weather and so the work on some targets was interrupted and restarted when the brightness was very low. All targets were found on the CALL website ephemeris generator (Warner, 2020).

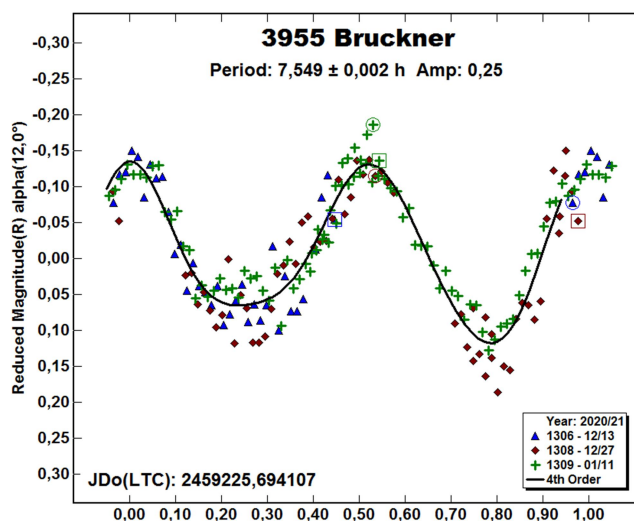
All targets were worked with the same setup: a Marcon 0.30-m $f/8$ Ritchey-Chretien telescope coupled with a Moravian G3 01000 camera equipped with a KAF-1001E CCD with a pixel array of $1024 \times 1024 \times 24$ microns. This provided a pixel scale of exactly 2 arcsec/pixel and a field of view of 36×36 arcmin. Exposures were unguided and taken through a Toptec R filter to reduce light pollution as much as possible. The telescope and camera were under the control of *Maxim DL* (Diffraction Limited, 2020) and *The Sky 6 Pro* (Bisque, 2020). *Voyager* (Starkeeper, 2020) controlled the entire observatory. All photometric reductions were done with *MPO Canopus* v10.7.12.9 (Warner, 2018), which permits obtaining precise night-to-night zero point calibration using the Comparison Star Selector utility.

2262 Mitidika: A previous period of 28.0933 ± 0.0005 h measured by Pál et al. (2020) is reported in the LCDB (Warner et al., 2009).

Observed over a period of forty days and eight sessions showed a slightly different rotational period of $P = 28.257 \pm 0.004$ h with an amplitude of $A = 0.26$ mag. An attempt to fit the sessions at the previously reported period produced poor results.



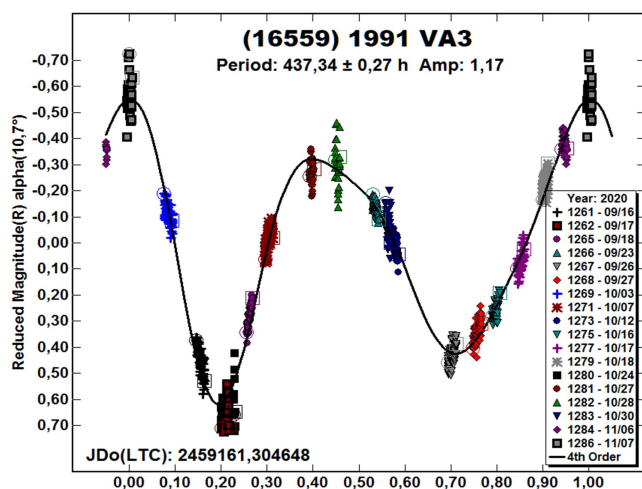
3955 Bruckner was observed on three nights from 2020 December 13 to 2021 January 10. The final result is a period of $P = 7.549 \pm 0.002$ h, $A = 0.25$ mag.



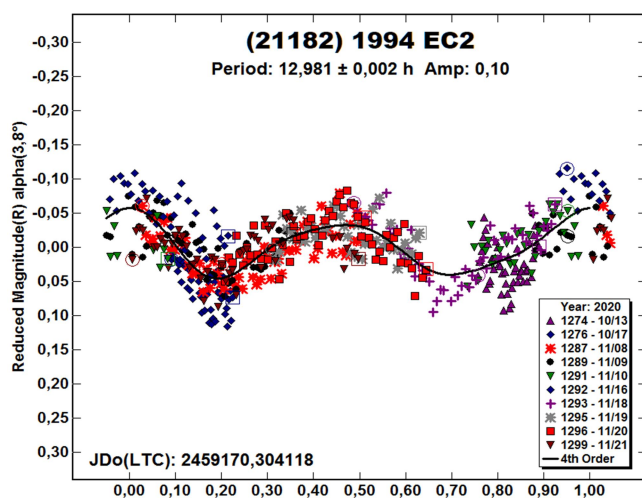
(16559) 1991 VA3. This target required about two months of work and eighteen sessions due to its very long period. The previous period of 435.193 ± 0.005 h found in the LCDB Database was measured by Pál et al. (2020). The period found at the Bigmuskie Observatory is $P = 437.34 \pm 0.27$ h, $A = 1.17$ mag but a solution at 435 h is also possible, even if *MPO Canopus* prefers the longer one.

Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
2262	Mitidika	2020 11/07-12/18	13, 14.3	62	16	28.257	0.004	0.26	0.05	MB-I
3955	Bruckner	2020 12/13-01/11	12.03, 5.6	110	13	7.549	0.002	0.25	0.05	EOS
16559	1991 VA3	2020 09/16-11/07	10.6, 24.9	353	15	437.34	0.27	1.17	0.05	EUN
21182	1994 EC2	2020 10/13-11/21	3.7, 27.4	18	9	12.981	0.002	0.10	0.05	PHO
22393	1994 QV	2020 09/30-11/22	14, 18.7	26	9	3.419	0.001	0.23	0.05	MB
43028	1999 VE23	2020 11/19-11/23	9.7, 7.5	73	1	3.940	0.002	0.36	0.05	MB-I

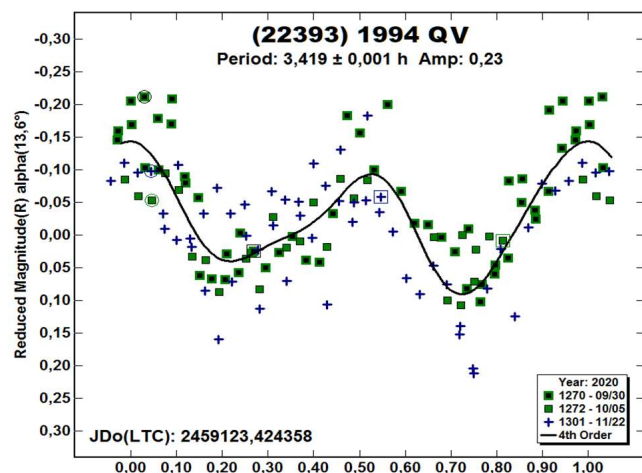
Table I. Observing circumstances and results. The phase angle is given for the first and last date. If preceded by an asterisk, the phase angle reached an extremum during the period. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude/latitude at mid-date range (see Harris et al., 1984). Grp is the asteroid family/group (Warner et al., 2009).



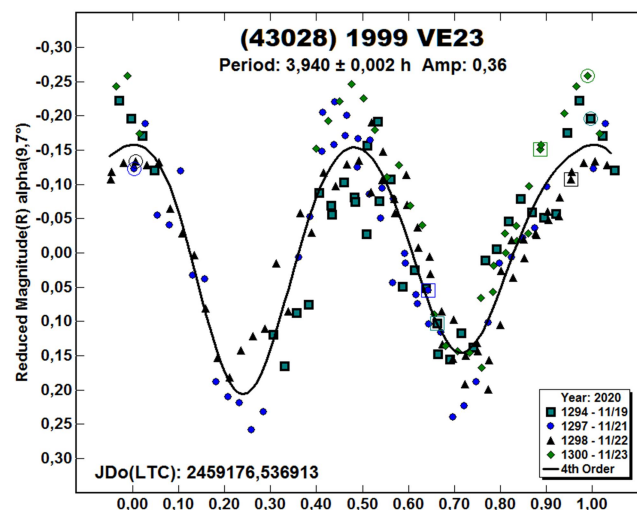
(21182) 1994 EC2. Due to the very low amplitude and a period close to half an Earth day, it took a month of observations and ten sessions to reach the final result of $P = 12.981 \pm 0.002$ h and $A = 0.10$ mag.



(22393) 1994 QV. This target was observed in three sessions but separated by a fairly long period of time. The first one on 30 September was worked in the second part of the night after the work on another asteroid ended. Observations continued on 5 October and then, after a long period of bad weather, on 22 November. The period found is $P = 3.419 \pm 0.001$ h and $A = 0.23$ mag.



(43028) 1999 VE23. After four sessions, the period was found to be $P = 3.940 \pm 0.002$ h and $A = 0.36$ mag.



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