

A COLLECTION OF LIGHTCURVES FROM MODRA: 2007 DECEMBER – 2008 JUNE

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Lightcurve analysis led to rotation periods of main-belt asteroids 651 Antikleia, 653 Berenike, 2363 Cebriones, 12482 Pajka, 23327 Luchernandez, (28292) 1999 CX54, and (74424) 1999 BN. Only tentative results were obtained for rotation periods of 17102 Begzhigitova, 27270 Guidotti, and (74056) 1998 KM9.

Along with photometric observations of principal targets at Modra, all moving targets as faint as magnitude 18 that happen to be in the same field of view are formally processed. The rotation period of faint asteroids cannot always be determined. The result depends mainly on the amplitude of the lightcurve, spin rate, amount of observing time at disposal, and weather conditions. In all, just a small fraction of the observed targets have had lightcurves presented. Among them are usually asteroids with the rotation period derived securely or reasonably securely. Data from only one night and data from very short sessions, unless they are of good quality or done in collaboration with other observers, are omitted. Similarly, a majority of asteroids with the rotation period only tentatively derived are also usually omitted. The dividing line between presenting and omitting targets is quite wide. Here we present lightcurves of several asteroids that were observed from Modra. This time we include some of the tentative results for rotation period with the thought that such information can help photometrists develop good strategies for future apparitions. Table I lists the asteroid we observed along with some aspect data, derived rotation periods, their uncertainties, and amplitudes of the lightcurves. Appropriate lightcurves are in figures, in which correction for light-travel time was applied. The equipment and

data procession was described in Galád (2008).

651 Antikleia. Initial linked data indicated a symmetrical lightcurve with a period of 14.250 h. However, additional data allowed us to reject that solution and, instead, confirm the result found by Sada *et al.* (2005), only the amplitude of the lightcurve in our analysis is lower.

653 Berenike was observed before and after opposition. As with 651 Antikleia, linked observations led to an unambiguous solution, though it differs from the formerly derived value of 14.14 h by Binzel (1987).

2363 Cebriones. This asteroid's rotation period was not easily determined. Initial sessions were linked but short. Additional data indicated a period longer than 3.8 h, the tentative period reported by Binzel and Sauter (1992) based on their data. Only after several weeks did we manage to obtain another set of mutually-linked sessions which helped to find, hopefully, an unambiguous value for the rotation period.

12482 Pajka is a Modra discovery. It was brighter than magnitude 17 in 2008 January. Sessions from consecutive nights were linked to the same magnitude level that led to the secure result for the rotation period.

17102 Begzhigitova. Just two pairs of individually-linked sessions were obtained. The asteroid was fainter than magnitude 17 and the amplitude of the lightcurve was probably small. Thus, the rotation period presented here is just tentatively derived and much slower rotations are not ruled out. A more favourable opposition occurs in 2010 November when the asteroid reaches magnitude 16.5.

23327 Luchernandez was observed on two nights before opposition as a magnitude 18 object. Even though it brightened, no other data were added and so we could not resolve the ambiguity in its rotation period. Except for the solution presented here, we found that 5.49 h comparably fits to the data. Other solutions (longer periods) are less probable thanks to the quite large amplitude of the lightcurve.

27270 Guidotti was observed on two nights as a magnitude 17 object. Many solutions for its rotation period are possible, especially from the interval between 2.6 h and ~7 h. We present just one here – formally the best one.

(28292) 1999 CX54 was about magnitude 17 object but high-quality data were obtained. The rotation period was guessed from the very first session, which was long. Other sessions followed after several weeks, which nailed down the value of the rotation period.

Number	Name	Dates yyyy mm/dd	Phases deg	LPAB deg	BPAB deg	Period [h]	Amp [mag]
651	Antikleia	2007 12/14–2008 01/29	11.6, 20.4	56	5	20.291 ± 0.003	0.13
653	Berenike	2007 12/13–2008 01/26	02.0, 12.0	113	–5	12.4886 ± 0.0007	0.11
2363	Cebriones	2008 04/04–06/01	04.4, 09.2	240	18	20.081 ± 0.001	0.22
12482	Pajka	2007 12/13–2008 02/08	02.6, 16.6	113	–4	3.9428 ± 0.0001	0.21
17102	Begzhigitova	2008 01/25–02/10	06.6, 14.5	114	–3	(5.341 ± 0.001)	0.3
23327	Luchernandez	2007 12/15–17	15.6, 16.6	111	–5	4.933 ± 0.007	0.50
27270	Guidotti	2008 03/23–25	07.7, 08.8	169	3	(2.6 – 7)	0.3
(28292)	1999 CX54	2008 02/25–04/06	05.6, 11.7	168	3	6.4752 ± 0.0001	0.34
(74056)	1998 KM9	2007 12/15–18	14.4, 15.6	111	–6	(17.4 ± 0.1)	0.5
(74424)	1999 BN	2008 02/09–11	13.1, 13.2	140	24	3.733 ± 0.001	0.28

Table I. Asteroids with observation dates, minimum and maximum solar phase angles, phase angle bisector values, derived synodic rotation periods with uncertainties, and lightcurve amplitudes.

(74056) 1998 KM9 was observed on three nights along with 23327 Luchernandez, 653 Berenike, and 12482 Pajka even though it was fainter than magnitude 18. Sessions were linked, so we obtained some indication about the amplitude of the lightcurve, which seemed to be quite large. Thus, from many possible solutions for the rotation period that fit observational data, we prefer to select those with two pairs of maxima and minima in the composite lightcurve. We present the best such case from visual inspection, though we still consider our result as tentative.

(74424) 1999 BN was observed during the favourable apparition in 2008 February. It was brighter than magnitude 17 for the first time since discovery nine years ago at our station.

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