

LIGHTCURVE AND ROTATION PERIOD OF THE SLOW ROTATOR 6176 HORRIGAN

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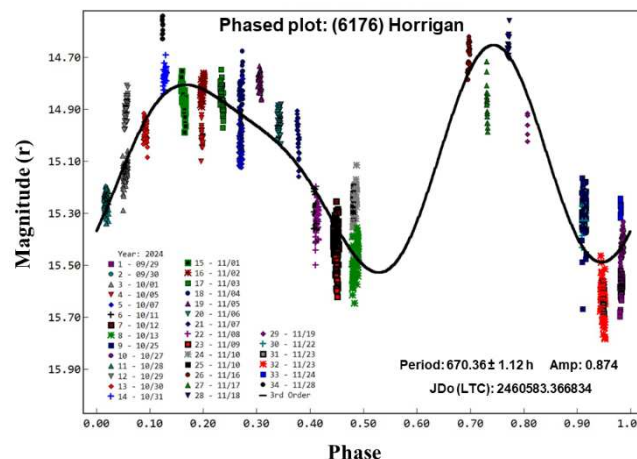
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(Received: 2025 January 15 Revised: 2025 February 1)

Based on preliminary lightcurve measurements of 6176 Horrigan in September 2024, a long period seemed evident. Consequently, an additional two months of observations were devoted to this object. Analysis of the additional collected data has produced a lightcurve with a period of 670.36 ± 1.12 hours and an amplitude of 0.874 magnitudes.

6176 Horrigan is a main-belt asteroid discovered 1985 January 16 by Z. Vavrova at Klet. It has a semi-major axis of 2.252 AU, orbital period of 3.381 years, eccentricity of 0.154 and inclination of 5.663 deg. (JPL, 2024). This 5.62 km asteroid has an absolute magnitude of 13.49 and a geometric albedo of 0.321. No previous rotation period and lightcurve were reported for this object at the best of our knowledge. Observations were conducted by using a 0.30-m Newtonian telescope at f/4, equipped with a Moravian KAF 1603 ME CCD camera (1536×1024 array of 9.0-micron pixels) unfiltered (Elianto II Observatory) and a 0.50-m Ritchey-Chretien telescope operating at f/8, using a FLI-PL4240 CCD camera (2048×2048 array of 13.5-micron pixels) unfiltered (OASDG, Agerola, Naples, L07). A total of 1368 lightcurve data points were collected in 34 observing sessions from 2024 September 29 to 2024 November 28 with exposing times ranging from 180 s through 360 s. Photometry and period determination were carried out with *TychoTracker Pro* Version 11.8 (Parrott, 2024). Comparison star magnitudes were obtained from the ATLAS catalog (Tonry et al., 2018), which is incorporated directly into Tycho. A measuring aperture equal to 4× FWHM of the target was used for asteroids and comp stars. Interference from field stars resulted in the exclusion of affected observations.

From the collected data we show that this asteroid belongs to the category of objects with a slow rotation. A period of 670.36 ± 1.12 h was computed with an amplitude of 0.874 ± 0.120 mag.



References

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Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period (h)	P.E.	Amp	A.E.	Grp
6176	Horrigan	2024 09/29-11/28	6.1,25.6	16	-7	670.36	1.12	0.87	0.12	MB

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 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).