

LIGHTCURVE AND ROTATION PERIOD OF 4222 NANCITA

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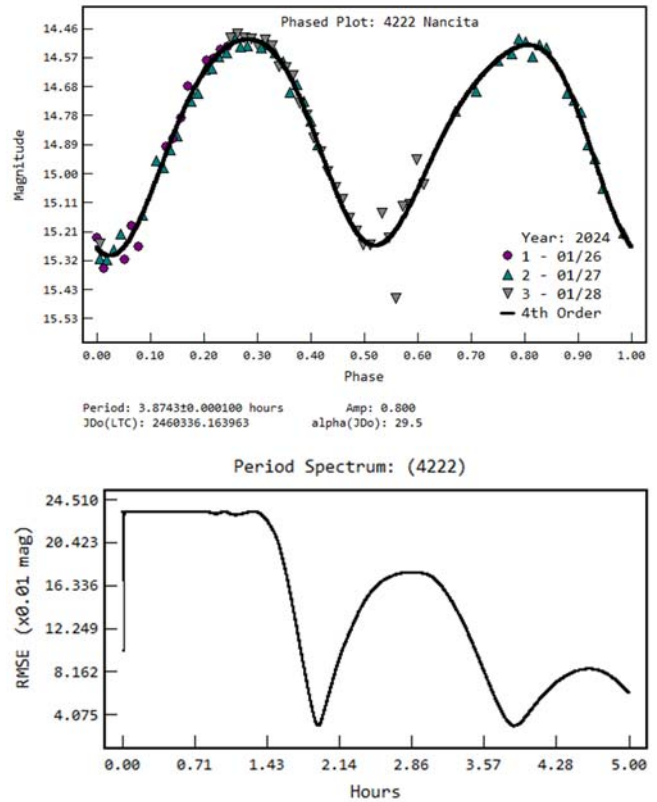
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Unfiltered CCD photometric observations of 4222 Nancita were obtained in Hebei, China from Dec 2023 to Jan 2024. We report a synodic rotation period of 3.8743 ± 0.0001 hours and an amplitude of 0.800 ± 0.042 magnitudes.

4222 Nancita was discovered by E.F. Helin at Palomar on 1988 March 13. It is a Mars-crosser with a semimajor axis of 2.366 AU, eccentricity 0.297, inclination 3.742° , and an orbital period of 3.64 years. Its absolute magnitude is $H = 12.42$ (http://ssd.jpl.nasa.gov/sbdb_query.cgi). The WISE/NEOWISE satellite (Masiero et al., 2014) found a diameter $D = 9.636 \pm 0.121$ km with an absolute magnitude $H = 12.4$.

Photometric observations of 4222 Nancita were conducted at Huanyu Observatory in January 2024 using a 0.13-m/f7.7 refractor and ASI 2600MM-Pro CMOS camera. An exposure time of 180 seconds was used for each image. All observations were made unfiltered with 1×1 binning at a plate scale of 0.78 arcsec/pixel. Data reduction and period analysis were performed with *Tycho* (Parrott, 2024). The asteroid and five comparison stars were measured. Comparison stars were selected with color indices within the range of $0.5 < B-V < 0.95$, aligning with the typical color range of asteroids.

A total of 85 data points were collected over the period from 2024 January 26 to 2024 January 28. The period analysis shows a synodic rotation period $P = 3.8743 \pm 0.0001$ h with an amplitude $A = 0.800 \pm 0.042$ mag. These results are in perfect agreement with previous results published in the Asteroid Lightcurve Database (LCDB; Warner et al., 2009; Higgins et al., 2006; Āurech et al., 2018).



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Number	Name	yyyy mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E.	Amp	A.E.	Grp
4222	Nancita	2024 01/26-01/28	29.5, 29.9	82	-4	3.8743	0.0001	0.80	0.04	MC

Table 1. Observing circumstances and results. The phase angle is given for the first and last date. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris et al., 1984). Exp is the exposure (sec) or average if a range of exposures was used. Grp is the asteroid family/group (Warner et al., 2009).