

A PHOTOMETRIC INVESTIGATION OF 526 JENA

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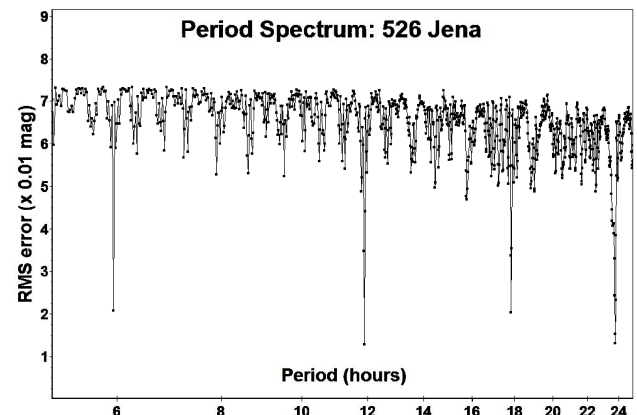
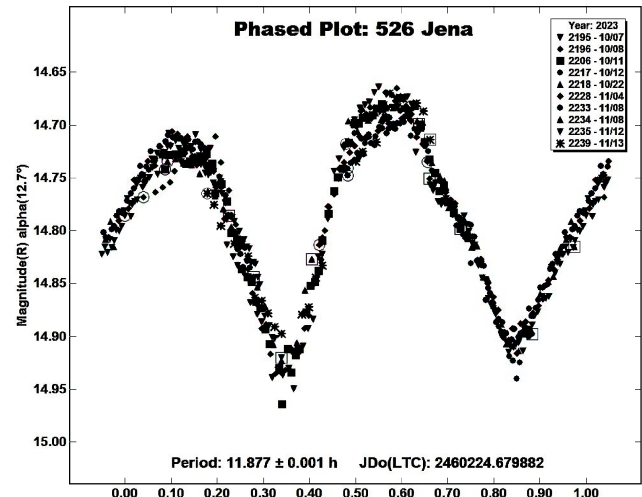
(Received: 2023 November 20)

We find for 526 Jena a synodic rotation period 11.877 ± 0.001 h; amplitude 0.25 ± 0.02 mag; color index $V - R = 0.37$; and in the V band $H = 10.07$, $G = 0.10$.

Earlier published rotation periods of 526 Jena suggested a period slightly less than $2/5$ of the Earth's rotation period: Barucci et al. (1994), 9.474 h; Behrend (2008web), 9.48 h; Hamanowa and Hamanowa (2011), 9.479 h. More recently Erasmus et al. (2020) published a period 11.877 hours, slightly less than $1/2$ of the Earth's rotation period, and $5/4$ of the earlier published period. All showed moderate amplitude bimodal lightcurves. Ambiguity arose as to whether there were 4 or 5 maxima and minima in a time of about 23.75 hours, slightly less than the Earth's rotation period.

The authors of this paper, widely spaced in longitude in North America and Europe, respectively, agreed to collaborate to obtain full phase coverage of the lightcurve of 526 Jena. An equipment list for all observers is provided in Table II. Image measurement and lightcurve construction were with *MPO Canopus* software with calibration star magnitudes for solar colored stars from the CMC15 catalog reduced to the Cousins R band. Zero-point adjustments of a few $\times 0.01$ magnitude were made for best fit. To reduce the number of data points on the lightcurves and make them easier to read, data points have been binned in sets of 3 with maximum time difference 5 minutes.

Ten sessions 2023 Oct. 7 - Nov. 13 provide a very good fit to a slightly asymmetric bimodal lightcurve with synodic period 11.877 ± 0.001 hours and amplitude 0.25 ± 0.02 magnitudes with full phase coverage. The period spectrum between 5 hours and 25 hours shows that a period near 9.48 hours can be definitively ruled out. This new result agrees with Erasmus et al. (2020).



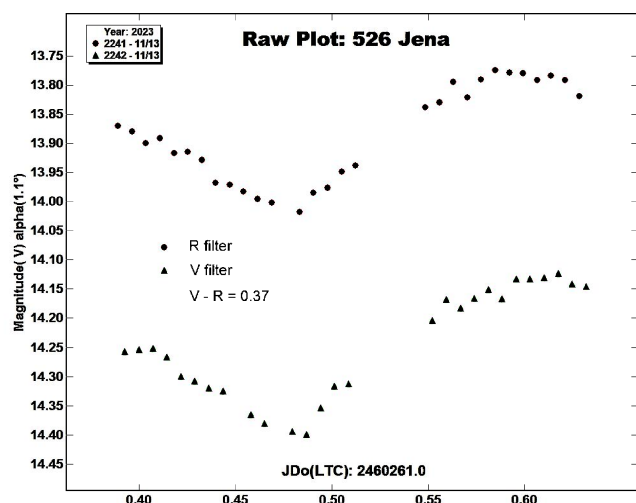
On 2023 Nov. 13, P. Aceti and M. Banfi obtained alternating data points in the V and R filters that show $V - R = 0.37 \pm 0.03$. This value is within the usual range 0.38 ± 0.05 for asteroids with C-type taxonomic classifications (Shevchenko and Lupishko, 1998).

Number	Name	2023/mm/dd	Phase	LPAB	BPAB	Period(h)	P.E	Amp	A.E.
526	Jena	10/07-11/13	12.7, 1.1	50	-3	11.877	0.001	0.25	0.02

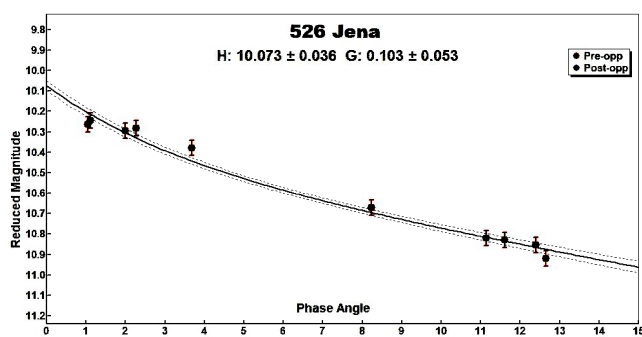
Table I. Observing circumstances and results. The phase angle is given for the first and last date, except that a * denotes a minimum was reached between these dates. LPAB and BPAB are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris et al., 1984).

Observatory (MPC code)	Telescope	CCD	Filter
Organ Mesa Observatory (G50)	0.35-m SCT f/10	SBIG STL-1001E	C
Seveso Observatory (C24)	0.30-m SCT f/10	QSI KAF 8300 (bin 3×3)	V, R _c
M57 (K38)	0.35-m RCT f/5.5	SBIG STT1603ME	R _c
Astronomical Observatory, University of Siena (K54)	0.30-m MCT f/5.6	SBIG STL-6303e (bin 2×2)	C

Table II. Observing Instrumentations. MCT: Maksutov-Cassegrain, RCT: Ritchey-Chretien, SCT: Schmidt-Cassegrain.



We also present an $H - G$ plot in the V magnitude system for phase angles from 12.7° down to 1.1° . We find $H = 10.07 \pm 0.04$ and $G = 0.10 \pm 0.05$. For this plot the R band magnitudes were converted to V band, adding the color index $V - R$ and evaluating, for each lightcurve, the half peak-to-peak magnitudes.



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LIGHTCURVES AND ROTATION PERIODS OF 738 ALAGASTA AND 1011 LAODAMIA, AND A NOTE ON 991 MCDONALDA

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(Received: 2024 January 11)

Synodic rotation periods and amplitudes are found for 738 Alagasta 17.882 ± 0.002 hours, 0.06 ± 0.01 magnitudes; 1011 Laodamia 5.1722 ± 0.0001 hours, 0.43 ± 0.02 magnitudes. The period of 991 McDonaldia was not found and may be long.

The new observations to produce the results reported in this paper were made at the Organ Mesa Observatory with a Meade 35 cm LX200 GPS Schmidt-Cassegrain, SBIG STL-1001E CCD, 60 to 120 second exposures, unguided, clear filter. Image measurement and lightcurve construction were with *MPO Canopus* software with calibration star magnitudes for solar colored stars from the CMC15 catalog reduced to the Cousins R band. Zero-point adjustments of a few $\times 0.01$ magnitude were made for best fit. To reduce the number of data points on the lightcurves and make them easier to read, data points have been binned in sets of 3 with maximum time difference 5 minutes.

738 Alagasta. Previously published rotation periods for 738 Alagasta are by Sada et al. (2005), 17.83 hours; Behrend (2009web), >12 hours; Garcerán et al. (2016), 18.86 hours; Polakis (2020), 17.89 hours. New observations on 9 nights 2023 Dec. 6 to 2024 Jan. 11 provide a good fit to an irregular lightcurve with period 17.882 ± 0.002 hours, amplitude 0.06 ± 0.01 magnitudes. The split halves plot of the double period 35.763 hours shows close overlap of both halves of the plot and rules out the double period. The period found by this study is consistent with Sada et al. (2005) and Polakis. (2020), but not with Garcerán et al. (2016).

