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LIGHTCURVES AND ROTATION PERIODS OF 691 LEHIGH, 795 FINI, AND 1302 WERRA

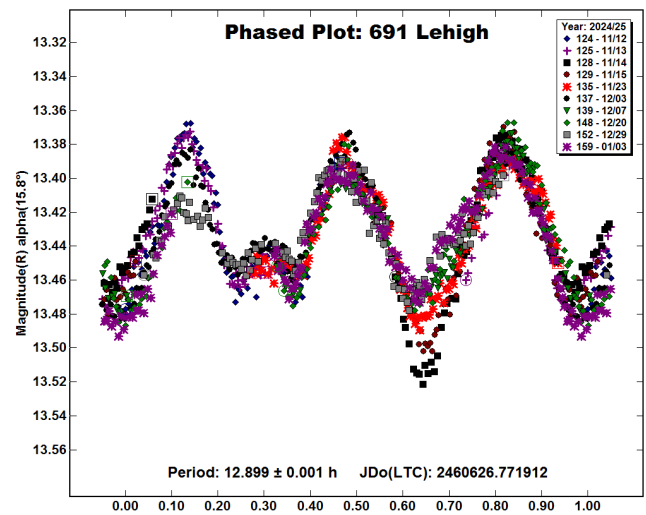
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(Received: 2025 January 6)

Synodic rotation periods and amplitudes are found for 691 Lehigh 12.899 ± 0.001 hours, 0.13 ± 0.02 magnitudes with an irregular trimodal lightcurve; 795 Fini 51.71 ± 0.01 hours, 0.06 ± 0.01 magnitudes.; and 1302 Werra 13.957 ± 0.002 hours, 0.15 ± 0.02 magnitudes with an irregular trimodal lightcurve.

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 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.

691 Lehigh. Previously reported periods are by Stephens (2000), 5.08 hours; Behrend (2005web), 12.88 hours; Menke (2005), 10.482 hours; Behrend (2009web), 12.86 hours; Warner (2009), 12.891 hours; Behrend (2011web), 12.88 hours; and Pál et al. (2020), 12.9023 hours; with amplitudes ranging from 0.09 to 0.16 magnitudes. New observations on ten nights 2024 Nov. 12 - 2025 Jan. 3 provide a good fit to a lightcurve with period 12.899 ± 0.001 hours, amplitude 0.13 ± 0.02 magnitudes with three unsymmetrical maxima and minima per rotational cycle. The amplitudes of the several extrema, but not their phases in the lightcurve, varied considerably through the range of phase angles from 15.8° to a minimum of 1.8° and then back to 4.4° encountered in these sessions. The 12.899-hour period found in this study is very close to five of the seven previously reported periods. Periods near 5.08 and 10.482 hours are now ruled out.

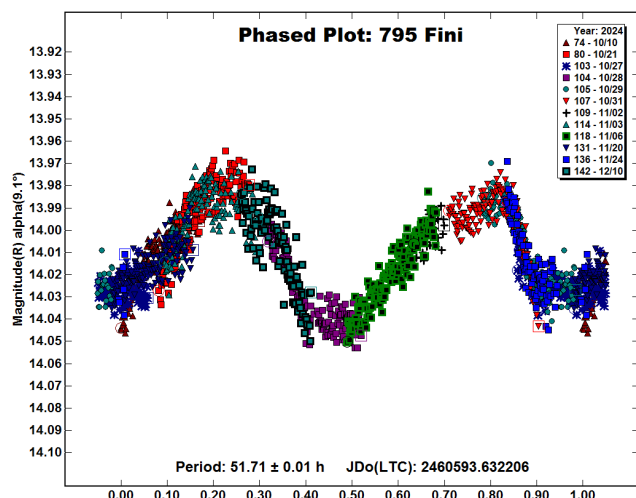


795 Fini. Seven previously published lightcurves of this asteroid all have different periods and low amplitudes from 0.02 to 0.11 magnitudes. The earliest results were by Warner (2003), 8.641 hours from observations in 2003 January - March, revised in Warner (2011) to 9.292 hours when remeasured with improved calibrations. A period of 7.59 hours based on additional observations made in 2010 October - November was also reported by Warner (2011). Other periods were published by Pravec et al. (2012web), 4.65 hours; Waszczak et al. (2015), 26.971 hours; Polakis (2022), 51.4 hours; and Colazo et al. (2023), 30.526 hours.

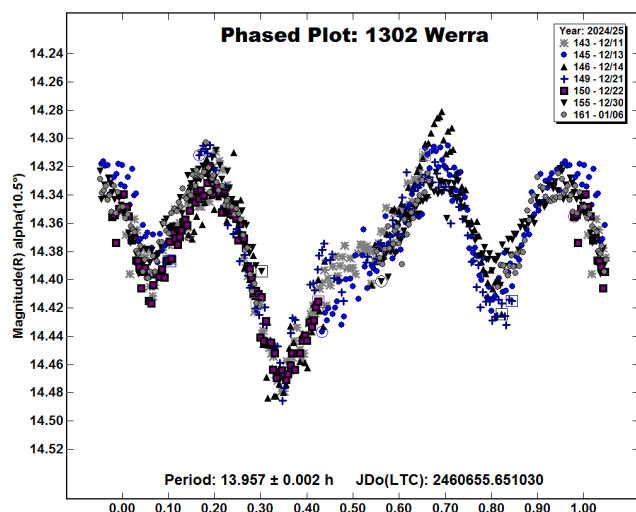
New observations on 12 nights 2024 Oct. 10 - Dec. 10 obtained a data set far more dense than any previously published. A good fit is provided to a lightcurve with period 51.71 ± 0.01 hours, amplitude 0.06 ± 0.01 magnitudes with two unsymmetrical maxima and minima per rotational cycle. This new result is consistent with and improves upon Polakis (2022) and rules out all other previously published values.

Number	Name	yyyy/mm/dd	Phase	L _{PAB}	B _{PAB}	Period(h)	P.E	Amp	A.E.
691	Lehigh	2024/11/12-2025/01/03	*15.8 - 4.4	92	1	12.899	0.001	0.13	0.02
795	Fini	2024/10/10-2024/12/10	*5.6 - 13.9	40	7	51.71	0.01	0.06	0.01
1302	Werra	2024/12/11-2025/01/06	10.5 - 1.2	103	1	13.957	0.002	0.15	0.02

Table I. Observing circumstances and results. The phase angle is given for the first and last date, unless a minimum (second value) was reached. L_{PAB} and B_{PAB} are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris et al., 1984).



1302 Werra. Previously reported periods are by Behrend (2009web), 8.19 hours; Polakis and Skiff (2019), 14.013 hours; Behrend (2020web), 8.185 hours; and Polakis (2020), 13.94 hours. New observations on seven nights 2024 Dec. 11 - Jan. 6 provide a good fit to an irregular trimodal lightcurve with period 13.957 ± 0.002 hours, amplitude 0.15 ± 0.02 magnitudes. This result is compatible with Polakis and Skiff (2019) and Polakis (2020). Periods near 8.19 hours are now definitively ruled out.



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