

ROTATION PERIOD DETERMINATION FOR 467 LAURA

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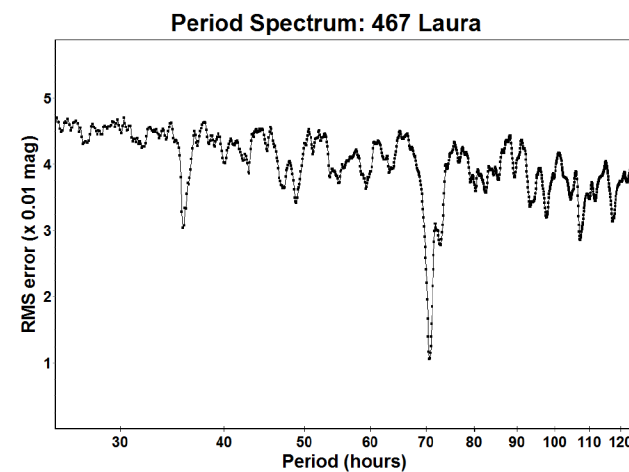
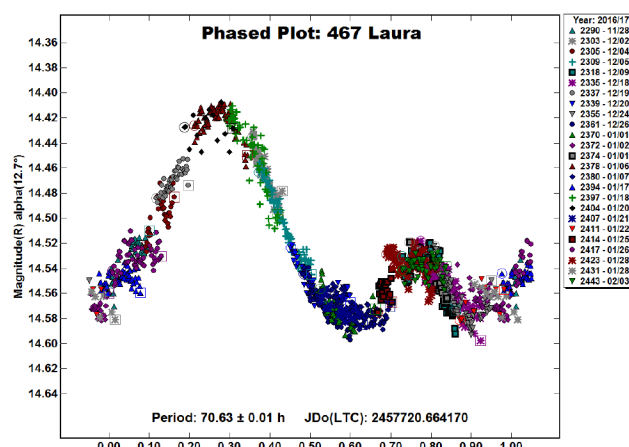
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(Received: 2017 February 16)

We find for 467 Laura a synodic rotation period of 70.63 ± 0.01 hours, amplitude 0.15 ± 0.02 magnitudes.

Previously published rotation periods for 467 Laura are by Behrend (2005), >12 hours, and by Ferrero (2012), 36.8 hours. Both are based on incomplete lightcurves and therefore of low reliability. The first few sessions of this investigation by first author Pilcher suggested a period that was nearly Earth commensurate and a small amplitude. He requested collaboration by V. Benishek, who kindly accepted, to enable observations from different longitudes to complete the lightcurve more readily. Pilcher at the Organ Mesa Observatory used a 0.35-meter f/10 Meade LX200 GPS Schmidt-Cassegrain (SCT) and SBIG STL-1001E CCD, clear filter and unguided. Benishek at Sopot Astronomical Observatory used a 0.35 m Meade LX200 GPS SCT operating at f/6.3, SBIG ST-8 XME CCD, unfiltered and unguided. Photometric measurement and lightcurve construction are with *MPO Canopus* software. To reduce the number of points on the lightcurve and make it easier to read, data points have been binned in sets of 3 with a maximum time difference of 5 minutes.

Observations of 467 Laura were made on 25 nights 2016 Nov. 28 – 2017 Feb. 3. All measurements were made using the Comparison Star Selector (CSS) of *MPO Canopus*. Solar colored stars were used for calibration. The Sloan r' magnitudes from the CMC15 catalog (VizieR web site) were converted to Cousins R magnitudes by $R=r'-0.22$. However, instrumental magnitude adjustments as large as 0.1 magnitude were required to make a good fit. Dymock and Miles (2009) state that in the crowded Milky Way star fields through which the target was moving reddening of starlight by interstellar dust reduces the accuracy of the usual conversion factors between r' , J, Ks of the CMC15 catalog and R and V. Reddening of starlight is the most likely explanation of the required large instrumental magnitude adjustments. With the adjustments there is a good fit to an asymmetrical bimodal lightcurve with rotation period 70.63 ± 0.01 hours, amplitude 0.15 ± 0.02 magnitudes. Both previously reported periods are now ruled out. A period spectrum between 20 hours and 120 hours is also presented.



References

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- Harris, A.W., Young, J.W., Scaltriti, F., Zappala, V. (1984). "Lightcurves and phase relations of the asteroids 82 Alkmene and 444 Gyptis." *Icarus* **57**, 251-258.
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Number	Name	yyyy/mm/dd	Pts	Phase	LPA	BPAB	Period(h)	P.E	Amp	A.E.
467	Laura	2016/11/28-2017/02/03	6270	12.5, 2.7, 14.4	96	6	70.63	0.01	0.15	0.02

Table I. Observing circumstances and results. Pts is the number of data points. The phase angle is given for the first date, minimum value, and last date. LPAB and BPAB are the approximate phase angle bisector longitude and latitude at mid-date range (see Harris *et al.*, 1984).