ROTATION PERIOD AND AMPLITUDE CHANGE OF MINOR PLANET 3868 MENDOZA

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A cumulative data obtained from different observatories over a period of close to 3 months resulted in the determination for the minor planet 3868 Mendoza of a synodic period of 2.77103h ± 0.00003h with amplitude variation from 0.07 mag ± 0.05 mag to 0.20 mag ± 0.05 mag.

Leura observatory and the instruments used has been described previously in Oey (2006).

Minor planet 3868 Mendoza was discovered on 24th September 1960 by PLS at Palomar. Its previous designation was 4975 P-L and it is an S type Main Belt Asteroid with an estimated diameter of 7.9 km based of an absolute magnitude (H) of 13. There have been no previous studies done on this object before.

3868 Mendoza was selected for light curve studies from a list of targets provided by Pravec (2006) for Photometric Survey of Asynchronous Binary Asteroids (PSABA). All light curve data once obtained and reduced by observers were sent to Pravec for further analysis for signs of binarity. This target was started by Higgins. Soon after, Durkee, Masi et al., Miles and Oey join in the search during July and August after an initial light curve deviation detected that indicated the possibility of the object being binary. However during that time 3868 Mendoza had moved further south, making it favourable only to observers in the southern hemisphere. Consequently most observations in August and September were done from Leura observatory and linked nights with northern hemisphere observers were therefore unobtainable. While both Higgins and Oey were working on this target in the beginning, it was decided that Oey were to continue on with this target due to the closeness of their geographical locations. Leura Observatory setups were also more suited to pursue objects as faint as 3868 Mendoza during that apparition.

The quality of the data was moderate at best due to observational difficulty. The trajectory of the asteroid brought it close to the Milky Way star field making accurate observation rather challenging. Most of the data fit well into the predicted light curve. When deviations from this trend occur, the data is checked for observational problems such as faint star encroaching within the measuring aperture. For the data obtained from Leura Observatory, Canopus V9.2.0.0 Star-B-Gone feature has been used with care to eliminate most of these faint field stars. The result of this reduction may completely neutralize the value assuming that there are no artifacts introduced especially when it involves low amplitude light curves. Sessions 34 has been left out of fig. 5 light curve due to excessive back ground stars contamination rendering the curves unusable. The attenuation observed by Oey in sessions 8, 35 and Durkee in session 22 have been carefully analyzed for possible observational errors mentioned above.

A summary of all observers were provided in table 1. The details are self explanatory. The mid values in each captions of fig. 2 to fig. 7 correlate to the mid-date of the range of dates shown in the labels.

The total combined light curve has been split up into 6 demonstrating the well known amplitude-phase effect. All data points were accurate to <0.03 mag. A total of about 2400 data points were obtained arriving at the derived synodic period of 2.77103h ± 0.00003h with amplitude ranging from 0.07mag ± 0.05mag to 0.20mag ± 0.05mag.

Acknowledgement

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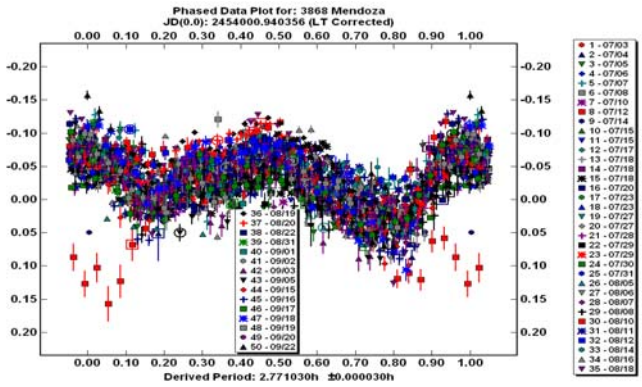
References

Oey, J. (2006). " Light Curves Analysis of 10 Asteroids from Leura Observatory". *Minor Planet Bulletin* **33,** 96-97.

Pravec, P. (2006). Photometric Survey of Asynchronous Binary Asteroids. http://www.asu.cas.cz/~asteroid/binastphotsurvey.htm.



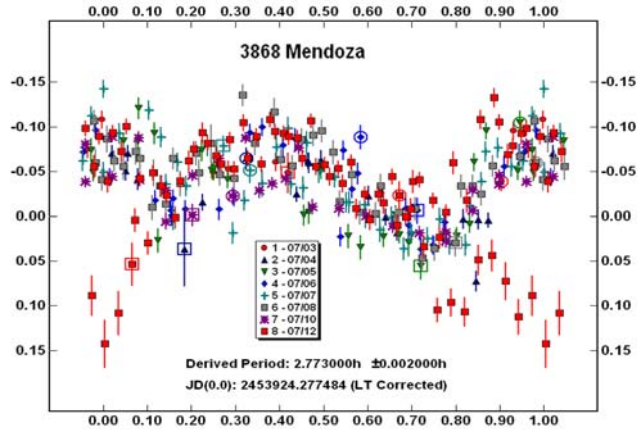


Fig.2 Mid value PA 9.9, LPAB 299.0, BPAB 9.5

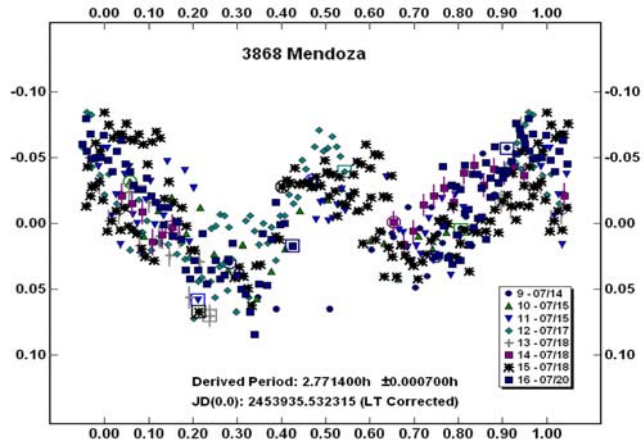


Fig.3 Mid value PA 6.0, LPAB 299.5, BPAB 9.2

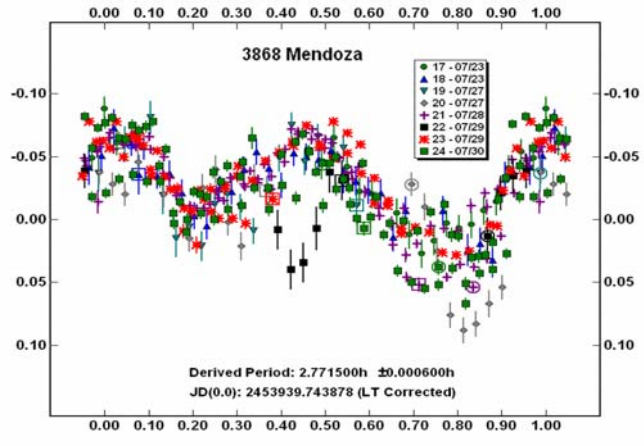


Fig.4 Mid value PA 6.0, LPAB 299.8, BPAB 8.9

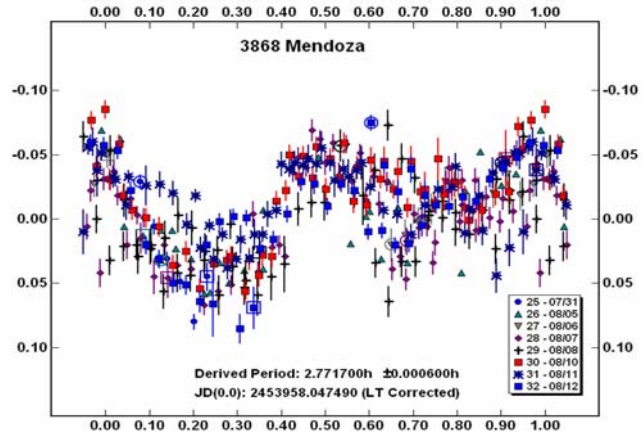


Fig.5 Mid value PA 10.0, LPAB 300.3, BPAB 8.3

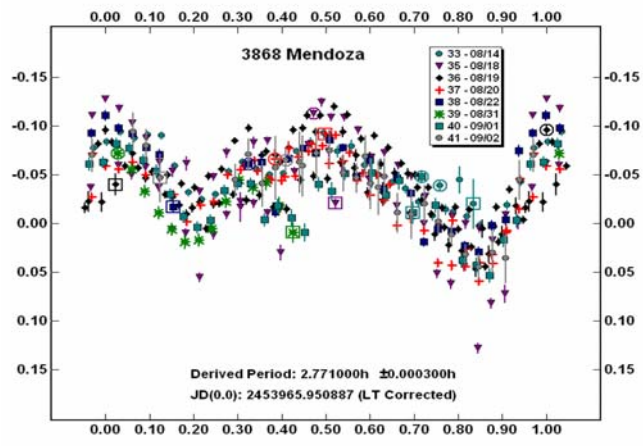


Fig.6 Mid value PA 15.9, LPAB 301.4, BPAB 7.5

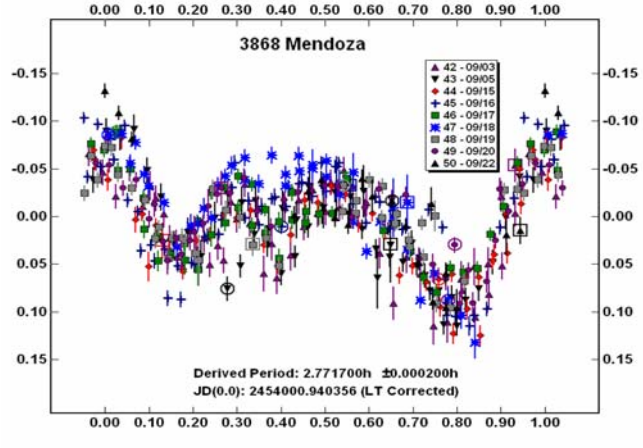


Fig.7 Mid value PA 24.0, LPAB 305.5, BPAB 5.7

Observer	**Location**	**Telescope**	**Imaging camera**	**Other specifics**	**Observed sessions**
Julian Oey	E17	0.35m SCT f/11	SBIG ST9XE	Bin 1x1, unfiltered. 300sec integration. 1.07”/pixel.	7,8,21,23,24,25, 27 - 50
Gianluca Masi et al.	468	0.80m RC f/8	SBIG STL-1001E	Unfiltered, 90sec integration	11,12,15,16
David Higgins	E14	0.35m SCT f/4	SBIG ST8E	Bin 1x1, 240sec integration, unfiltered	1 - 6, 26
Russell Durkee	H39	0.35m SCT f/8.6	SBIG ST10XE	Bin 3x3, 1.4”/pixel.	17,18,19,20,22 13,14
Richard Miles	J77	0.28m SCT f/10	Starlight SXV-H9	Bin 2x2, unfiltered, 0.975"/pixel, 240-300sec integration	9,10

Table 1. Observers detail with corresponding instruments used.