

LIGHTCURVE PERIODS FOR 1701 OKAVANGO, 689 ZITA, 981 MARTINA AND (14653) 1998 YV11

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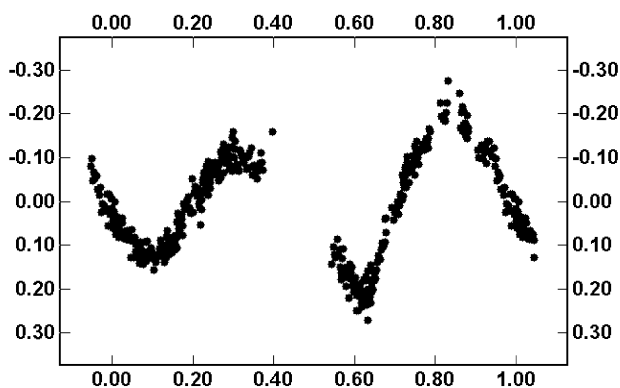
(Received: 30 July Revised: 16 September)

CCD photometry results from Hunters Hill Observatory during July-August 2004 are reported for four asteroids. The periods and amplitudes are: 1701 Okavango, 13.204 ± 0.004 h, 0.45 ± 0.02 mag; 689 Zita, 6.425 ± 0.001 h, 0.50 ± 0.02 mag; 981 Martina, 11.2675 ± 0.0028 h, 0.20 ± 0.02 mag; (14653) 1998 YV11 11.3894 ± 0.0017 h, 0.17 ± 0.04 mag

This lightcurve investigation was carried out at Hunters Hill Observatory located at Ngunnawal in Canberra, Australia. Targets were chosen from the list the CALL website (Warner 2004) and were observed using an 0.36m SCT at f/2.95 and Starlight Xpress MX716 CCD camera with Clear filter producing an image resolution of $1.69''/\text{pixel}$. During each session, a continuous flow of 120 second (Okavango and Martina) or 180 second (Zita) integrations with a break mid session to capture dark frame were taken. Images were calibrated with darks and artificial flats and measured using MPO Canopus version 7.6.2.0. Data from all imaging sessions spanning the observing period were used. However, those images that showed interference by a field star with the measuring aperture were dropped during the measuring process.

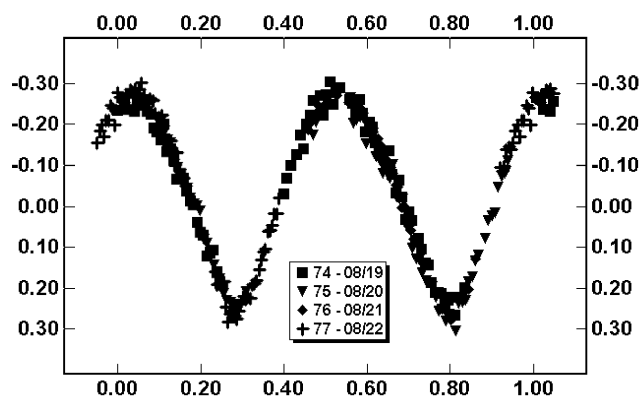
1701 Okavango. During the Okavango investigation, several hundred images were taken but due to the relatively crowded nature of the fields in which the object was located, approximately 60% of them had to be discarded due to interference with the measuring aperture by background field stars. According to the list of Minor Planet Lightcurves (Harris 2003), no previous attempts have been published for Okavango. It is a main-belt asteroid discovered on 06 July 1953 by J Churms at Johannesburg, South Africa. It has an absolute magnitude of 10.3, an albedo of 0.13 ± 0.10 and an estimated diameter of 29.7 ± 1.7 km. The results of the observing run conducted between July 8 and July 22 show a synodic rotation of 13.204 ± 0.004 hrs with amplitude of 0.45 ± 0.02 mag.

Phased Data Plot for: 1701
0% Phase JD: 2453194.971304 (Corrected for light-time)



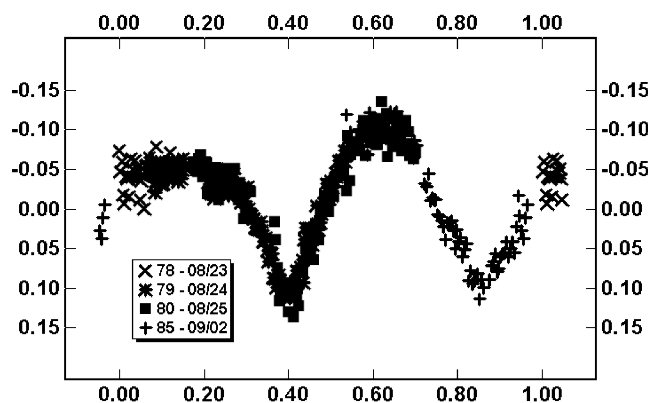
689 Zita. A previous attempt at a lightcurve was published (Robinson, 2003) providing only an estimate in the vicinity of 4 hours. Zita is a main-belt asteroid discovered on 12 September 1909 by J. Palisa at Vienna. It has an absolute magnitude of 12.15, an albedo of 0.10 ± 0.03 and an estimated diameter of 15.0 ± 2.6 km. The results of the observing run conducted between August 19 and August 22 show a synodic rotation of 6.425 ± 0.001 hrs with amplitude of 0.50 ± 0.02 mag. This was an interesting case as the software initially resolved a period of 7.4941 hrs. After consultation with Brian Warner, some issues became apparent. First the curve was very symmetrical, second the end points of the curve did not look like they would meet up in the original solution and third, my observations were taken 24hrs apart i.e. $24/7.5 = 3.2$ which equates to one-half the period of what turned out to be the actual synodic rotation. These issues strongly indicated an alias and probably meant that at least one of the nights had been phased to the wrong half of the curve. The solution was to try other periods, starting at $3.2\text{hr} \times 2$, for a more solid result.

Phased Data Plot for: Zita
0% Phase JD: 2453236.931224 (Corrected for light-time)

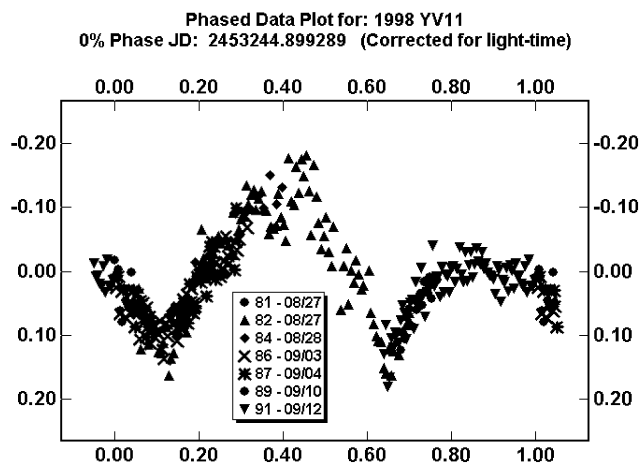


981 Martina. A previous attempt at a lightcurve has been attempted but not published (Harris, 2003) providing only an estimate in the vicinity of 8 hours. Martina is a main-belt asteroid discovered on 23 September 1917 by S. Beljavski at Simeis. It has an absolute magnitude of 10.57, an albedo of 0.083 ± 0.011 and an estimated diameter of 31.2 ± 2.0 km. The results of the observing run conducted between August 23 and September 02 show a synodic rotation of 11.2675 ± 0.0028 hrs with amplitude of 0.20 ± 0.02 mag.

Phased Data Plot for: Martina
0% Phase JD: 2453240.897584 (Corrected for light-time)



(14653) 1998 YV11. No previous attempt at a lightcurve has been published (Harris, 2003). 1998 YV11 is a main-belt asteroid discovered on 26 December 1998 by K. Kobayashi at Oizumi. It has an absolute magnitude of 13.7, and an estimated diameter of 12.0 km. The results of the observing run conducted between August 27 and September 12 show a synodic rotation of 11.3894 ± 0.0017 hrs with amplitude of 0.17 ± 0.04 mag.



PERIOD AND AMPLITUDE DETERMINATION OF ASTEROID 10142 SAKKA

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At Los Molinos Astronomical Observatory, we observed asteroid 10142 Sakka for period and amplitude determination, finding the result 3.35 ± 0.02 h and 0.4 mag.

Asteroid 10142 Sakka is a main-belt asteroid discovered in 1993 that was a candidate on the December 2002 CALL lightcurve target list. At the Astronomical Observatory of Los Molinos, (Montevideo – Uruguay; IAU code 844), we observed it during the night of 13 Nov and noticed a magnitude variation in less than an hour. From 14 Nov. to 01 Dec. we took 633 images in about 17 hours total observation time. Differential photometry was done using *MaxIm DL* software and pre-processed images (Dark, Flat and Bias frames using the median of 15 images).

After that, using *Spectra* software (following Gallardo & Ferraz-Mello, 1997), we adjusted each night to a sinusoidal curve and aligned the different nights using the central axes of each fitting as a zero point magnitude. Then we ran a new fitting for all nights together searching for periods from 50 min to 330 min, this time using PDM algorithm in *AVE* software as well as *Spectra* one. The resulting period was the same using both software packages. We have had already noticed, that there was an obvious periodicity of about 200 min in the lightcurve. Then we zoomed the period searching in the 160 – 240 minute interval obtaining the best fitted

Acknowledgements

Thanks go to Brian Warner for his mentoring support and for the development and improvements made to the MPO Canopus software and for maintaining the CALL web site which advises us on suitable targets to follow.

References

Harris, A.W. (2003). “Minor Planet Lightcurve Parameters”, on Minor Planet Centre Web Site.

Warner, B.W. (2004). CALL website:
<http://www.minorplanetobserver.com/astlc/default.htm>

Robinson, L.: (2003), <http://btboar.tripod.com/lightcurves/>.

period of 201 ± 1 min, or 3.35 ± 0.02 hours. From the PDM solution we had to select the right period by visual criteria. We could have considered the period of 187 min because its phase diagram looks nice, but in the 201 min period, the phase diagram reaches a more consistent shape than the 187 min one. Within the scatter of the measurements we estimate the overall amplitude to be 0.4 magnitude. The results are shown in Figure 1.

References

Gallardo & Ferraz-Mello (1997), *Astr.J.* **113**(2), 863

Spectra software:
<http://www.fisica.edu.uy/~gallardo/spectra1.html>

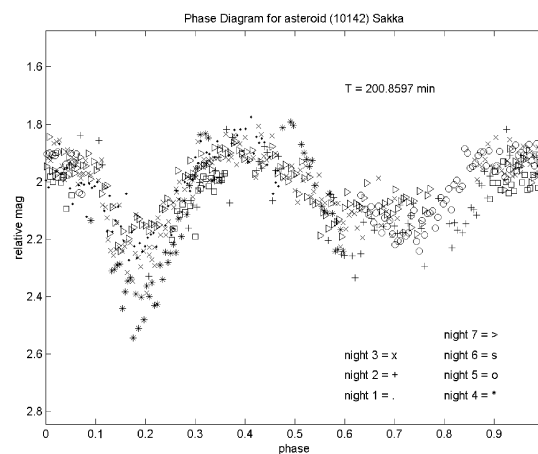


Figure 1. Lightcurve for 10142 Sakka based on a rotation period of 3.35 ± 0.02 h.