

CCD PHOTOMETRIC OBSERVATIONS OF THE MINOR PLANET 4979 OTAWARA

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The minor planet 4979 Otawara was observed during its 2001-2002 opposition. Unfiltered photometric CCD observations have revealed a 0.28 ± 0.03 mag peak-to-peak amplitude and a rotation period consistent with the 2.707 h value already known.

Introduction

Until the January 2003 delay in the launching of the Rosetta space probe, the main-belt asteroid 4979 had been targeted by the European Space Agency (ESA) to be visited by the Rosetta mission. To optimize the flight parameters, international campaigns of observations were carried out during the oppositions of 1998-1999 (Doressoundiram et al., 1999), 2000 (Le Bras et al., 2001) and 2001-2002 (Fornassier et al., 2003). It has been established that, in particular, this small (~ 2 km circular effective diameter) S-type object presents (i) a sidereal rotation period of 2.707 ± 0.005 hours, probably retrograde; (ii) a ratio of the triaxial ellipsoid shape $a/b = 1.21 \pm 0.05$; (iii) ecliptic coordinates of the its north pole (λ, β) = (50 or 230 ± 5 deg, -30 ± 16 deg).

The data presented in this paper are the results of observations performed during the 2001-2002 opposition of 4979 Otawara.

Observations

Observations were carried out from the astronomical station of Chateau-Renard (Saint-Veran, French Alps; longitude: $6^\circ 54' 24''$ E; latitude: $44^\circ 41' 52''$ N; altitude: 2930 m), a facility operated by professionals of Meudon Observatory and by Astroqueyras, an amateur association. Measurements were obtained during the night of January 6-7, 2002 for about 5 hours. At this moment, Otawara was at a 2.4 deg solar phase angle with a 17.4 V magnitude. CCD images were taken with a 14 bit Hi-SIS 22 camera attached to a 0.62 m Cassegrain telescope. A focal reducer was used to obtain a final ratio $F/D = 3$. This camera uses Kodak's KAF 0400 front-side illuminated chip with a 768-by-512 array of 9 micron-square pixels. No filter was used, and the effective wavelength of the observations matched approximately the V+R band. Images were taken in binning 2x2 mode. The pixel size was 2 arcseconds and the integration time of each image was 200 seconds.

Reductions

CCD images have been corrected for bias, dark and flat-field effects. Measurements were performed by synthetic aperture photometry, i.e., by integrating the counts inside a circular diaphragm of 10 to 15 arcseconds radius; a concentric annulus was

used for computing and subtracting the median mean of the sky background. Some images were taken with a V Cousins filter. This permitted having an estimate of the color indices of the field stars, and to select the comparison stars which had a color similar to that of Otawara. Therefore, as the extinction effects were neglected, differential colors do not affect the lightcurve.

Results

The phased lightcurve of 4979 Otawara, obtained in January 6-7, 2002, is presented in Figure 1. The composite lightcurve is based on and is consistent with the previous rotational period that has been found to be 2.707 hours. The peak-to-peak unfiltered amplitude is 0.28 ± 0.03 mag. One-sigma uncertainties in brightness are represented by error bars, estimated to be ± 0.03 mag, in agreement with the dispersion of the measurements of the local comparison stars.

The present results as well as the original data may be asked for at our e-mail address.

Acknowledgments

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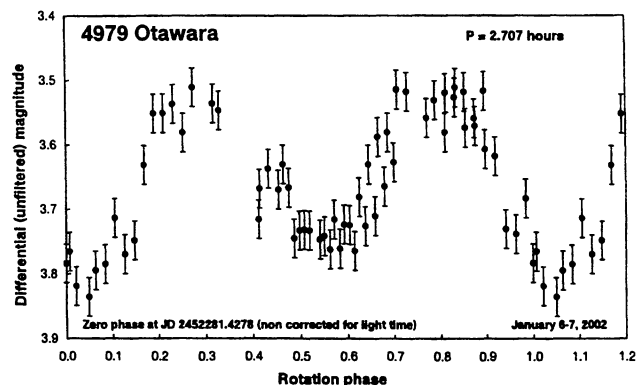


Figure 1. CCD photometric lightcurve of 4979 Otawara based on a period of 2.707 hours. Error bars are the one-sigma uncertainty of the measurements.

THE MINOR PLANET OBSERVER: MEETINGS OF MINDS

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As promised in the last issue, I thought I would give a summary of the IAPPP-West and MPAPW 2003 meetings. For those not familiar with the acronyms, IAPPP-West is the Western Wing of the International Amateur-Professional Photoelectric Photometry group and MPAPW is the Minor Planet Amateur-Professional Workshop. As the titles convey, one of the guiding philosophies for both groups is to develop and maintain working relations between amateur and professional astronomers.

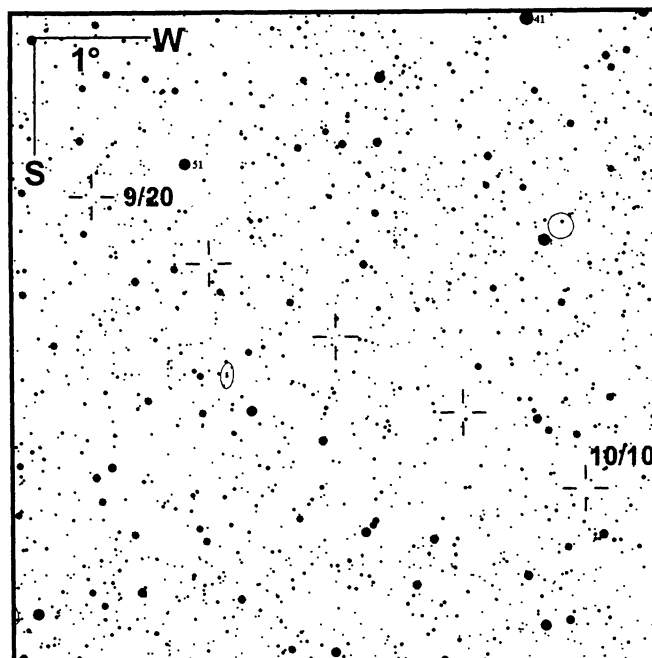
The IAPPP-WW conference has been held annually at Big Bear, CA, for the past few years, though the organization has been around for many more. This year's meeting was another success with about 100 people attending. Arne Henden of USNO-Flagstaff gave a talk on improving photometry precision and accuracy while Dirk Terrell of Southwest Research Institute talked about eclipsing binaries and using a program to model systems from lightcurve data. Both were very well received and would have gone on much longer if the audience had allowed. This brings out the point that "amateurs" are very motivated to do not only high quality work but to work on more complex projects.

That was proved by additional talks this year on spectroscopy at both the IAPPP and MPAPW meetings. At the latter (attended by about 65 people on the first day), Jim Roe and Art Lucas presented an intriguing talk on a technique that would allow BVRI photometry on asteroids using diffraction gratings. What precision they can eventually achieve is not certain but there seems at least some promise of doing general large-scale surveys of asteroids. Of particular note is that they can get reasonable data on 14-15m targets in 10 minutes using a 20-25cm telescope. That's much more efficient than the longer exposures required with slit spectroscopy only to reach much brighter targets.

Of concern to any researcher is whether or not his results will benefit science. In astrometry, turning in a position can help refine an orbit. However, where does lightcurve data go? I've mentioned before Mikko Kaasalainen's proposed web site where researchers can submit their raw data for use by researchers. There is also the program being developed by Richard Kowalski to coordinate efforts with Mikko's program to determine asteroid shapes from lightcurves. There, observers will have specific targets and know their efforts will have immediate impact but what of lightcurve work of a more general nature?

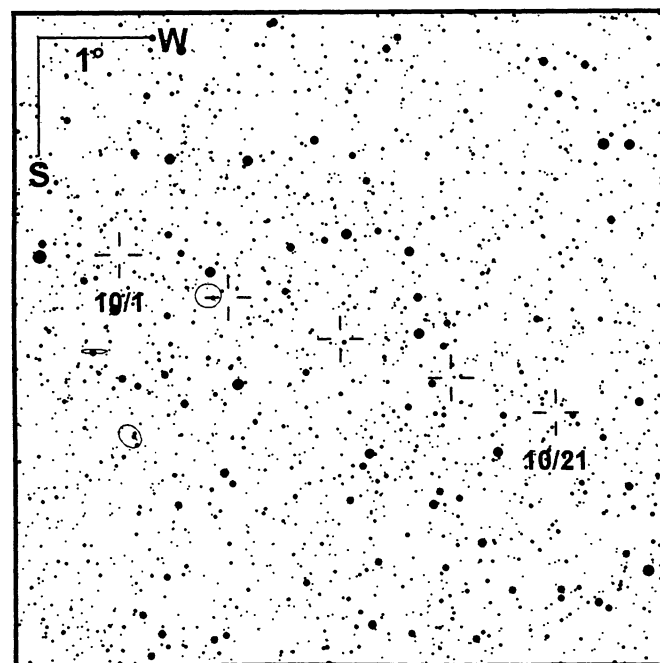
In short, one can't win the lottery unless he buys tickets. There may not be a guarantee that one's data will be used immediately but it is certain that if there is no data, it will never be used. Until Mikko's site is ready, I encourage every lightcurve worker to develop a web page where he posts his results and the raw data as well. If you want to wait until your results are published in the *Minor Planet Bulletin* or elsewhere, that's fine, but do post the data eventually. The CALL site allows you to include notes and a URL for letting people know about your data. It also allows you to upload that data for eventual inclusion on Mikko's site. The responsibility of making sure the data we collect is eventually used is as much ours as anyone's. Make your data available and then make its availability known. Clear Skies.

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703 Noemi Named after a Biblical heroine in the chapter of Ruth, Noemi was discovered in 1910 October by J. Palisa. It's an unclassified asteroid of about 9km diameter. The field is in Pisces. Maybe the nearby galaxies are worth a quick look or image?

Date	RA2000	Dec2000	RA1950	Dec1950	M	PA	E
09/20	0 35.63	+ 6 40.9	0 33.05	+ 6 24.4	13.8	7.6	166
09/25	0 31.58	+ 6 06.7	0 29.01	+ 5 50.1	13.6	4.5	171
09/30	0 27.27	+ 5 29.3	0 24.70	+ 5 12.7	13.4	1.6	177
10/05	0 22.92	+ 4 50.3	0 20.35	+ 4 33.7	13.5	2.5	175
10/10	0 18.74	+ 4 11.4	0 16.17	+ 3 54.7	13.7	5.5	170



2525 O'Steen O'Steen was discovered in 1981 November by Brian Skiff of Lowell Observatory, who named the asteroid after his mother. The IRAS survey gives an approximate diameter of 24km. The field covers the Pisces-Cetus border. The galaxy near the 10/6 position is IC 1613.

Date	RA2000	Dec2000	RA1950	Dec1950	M	PA	E
10/01	1 07.81	+ 2 28.0	1 05.24	+ 2 12.0	13.8	4.0	170
10/06	1 04.12	+ 2 06.1	1 01.55	+ 1 50.0	13.7	2.1	175
10/11	1 00.34	+ 1 44.9	0 57.77	+ 1 28.7	13.7	2.0	175
10/16	0 56.60	+ 1 25.1	0 54.03	+ 1 08.9	13.8	3.7	170
10/21	0 53.03	+ 1 07.5	0 50.46	+ 0 51.2	14.0	5.8	165