

THE MINOR PLANET BULLETIN

BULLETIN OF THE MINOR PLANETS SECTION OF THE ASSOCIATION
OF LUNAR AND PLANETARY OBSERVERS

VOLUME 27, NUMBER 4, A.D. 2000 OCTOBER-DECEMBER

45.

CCD PHOTOMETRY OF MINOR PLANET 729 WATSONIA

Glenn Malcolm
7430 Lippizan Dr.
Riverside CA 92509
gmalcolm@pe.net

(Received: 21 July)

Lightcurve measurements of minor Planet 729 Watsonia obtained at Roach Motel Observatory reveal a lightcurve period of 16.71 ± 0.01 hours with an amplitude of 0.22 magnitude.

Photometry of 729 Watsonia was a collaborative effort between Roach Motel Observatory and Santana Observatory (Minor Planet Observatory Code 646). Roach Motel Observatory (Minor Planet Code 856) is located at $33^{\circ}59.83$ North $117^{\circ}26.73'$ West in Riverside CA. Roach Motel Observatory is so named because of the uninvited guests that check in but do not check out. The 200 square foot roll off roof observatory houses a Meade 12" LX-200 SCT combined with an F/6.3 focal reducer. Three Pentium computers are used for minor planet location and data reduction with telescope and CCD control. The instrument used is a SBIG ST-8 CCD camera with the JMI electronic focuser.

All images at Roach Motel Observatory were acquired using pixels binned to 18-micron size (medium resolution) using the scripting part of the Connections program developed by Brian Warner. Scripting is a feature of Connections that gives the telescope and CCD camera a pre-written set of commands in sequential order. This allows the telescope and camera to be operated without the observer present. Connections has unique scripting capabilities. Not only does it perform the usual scripting functions of slewing to an object and taking an image, it will also internally synchronize on a bright star, as well as automatically focus the telescope periodically during the night. This compensates for focusing shift due to dropping temperatures and contraction of the telescope tube. Therefore, all of the telescope operation and CCD imaging at Roach Motel Observatory were automated while the observer was resting for the next day of work. Photometry was completed using the Canopus Program, also developed by Brian Warner.

J.H. Metcalf discovered Watsonia on February 9, 1912. It is a main belt Minor Planet with a semi major Axis of 2.76 AU, eccentricity of 0.096 and inclination of 18.07 degrees.

Robert Stephens initially selected the target Watsonia. When Stephens had to unexpectedly leave town on business, he made a request of the author to take images of Watsonia. In a collaborative effort between Roach Motel and Santana observatories, Watsonia was observed on seven nights from June 3rd to 10th of 2000. A total of 349 images were taken of which 319 were used for data reduction. Images were rejected due to slight star trailing or poor signal to noise ratio from possible cloud cover. Images taken at Santana Observatory were 30 seconds in length, while images taken at Roach Motel Observatory were 120 seconds in length. All images were flat fielded and dark subtracted. Over 90% of the lightcurve was covered and several portions of the lightcurve overlapped reducing the probable error of the period of rotation. The derived period for the data shown in Figure 1 is 16.71 ± 0.01 hours with an amplitude of 0.22 magnitude. This is the first photometry completed of a Minor Planet at Roach Motel Observatory.

Acknowledgments

Many thanks to Brian Warner for his continuing help and guidance, and for the development of the software programs "Connections" and "Canopus". Also, a very special thanks to Robert Stephens for his contribution to the construction and evolution of Roach Motel Observatory.

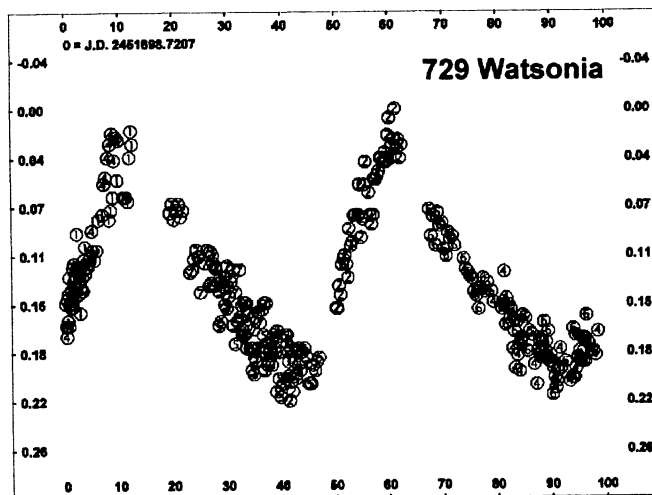


Figure 1. Lightcurve of 729 Watsonia based on a period of 16.71 hours.

CCD PHOTOMETRY OF THE MARS-CROSSER ASTEROID 2099 OPIK

Vittorio Goretti
Pianoro Observatory - IAU code 610
Via Resistenza 93
I-40065 Pianoro BO
Italy
bgorett@tin.it

(Received: 18 July)

Photometric observations of the small Mars-crossing asteroid 2099 Opik were made in 1998, on November 7 and 9, at Pianoro Observatory (Italy). The lightcurves display a most likely period of 9.3 h. This solution, however, is not unambiguous. There is also another possible period of 10.3 h. The amplitude is about 0.7 magnitudes.

Taking advantage of its almost best possible conditions, some photometric observations of 2099 Opik were made at Pianoro. The Observatory (MPC Code 610) is located at 180 metres above sea level, seventeen kilometres from the town of Bologna (Italy). The purpose of this investigation was to search for the rotational period of the asteroid. Unfortunately the unfavourable meteorological situation made it impossible to get further data for greater precision.

The Observatory uses a 25 cm MEADE LX 200 Schmidt-Cassegrain f/6.3 with a focal reducer which yields a focal ratio of f/4.4. It is equipped with a 14-bit CCD Camera HiSIS22, Chip Kodak Kaf 0400 of 768x512 pixels, each pixel measuring 9x9 microns. For this investigation it was binned to produce 384x256 pixels, each 18x18 microns. The resulting image scale is about 3.4 arcsec/pixel.

On November 7, 1998 13 observations were made for the duration of one minute each, at ten-minute intervals. The range of instrumental magnitudes was from 14.6 to 15.1. On November 9, 1998 17 observations were taken using the same procedure. The range of instrumental magnitudes was from 14.9 to 15.4. All the images were shot with a yellow Wratten 8 filter and dark frames and a flat fields were used. The Win-MiPS program by C. Buil (version 1.50 1994-95) was used for photometry reduction. This program uses aperture photometry.

On November 7, the asteroid's magnitude was calculated using the average of five reference stars with a magnitude similar to the asteroid's. In the second night of observation it was not possible to use the same stars, owing to the fast movement of the target. However, it was verified that the magnitude of one of the reference stars of the first night's field – calculated with the five reference stars of the second night's – had the same range of magnitude (within ± 0.05) as resulting from the USNO Catalog. So the data from both nights are reliably on the same magnitude scale, even if relative. The reference stars were taken from the USNO A2.0 Catalog, and they were chosen among those with lower measured residuals. The lightcurves were corrected for light-time travel, the magnitudes reduced to unit geo, heliocentric distances and the same phase angle. The plots (see Figures 1 and 2, AVE program by R. Barbera) show that it is possible to obtain two slightly different rotational periods.

The most likely period is 9.3 h, but this solution, alas, is not unambiguous: there is also another possible period of 10.3 h. Unfortunately the result of this photometric research on 2099 Opik is thus dubious, however the data obtained constrain the period to a relatively narrow interval and they might be useful in case of further investigation.

Dr. Petr Pravec of the Ondrejov Observatory, Asteroid Photometry Coordinator for the ALPO Minor Planet Section, was involved in this project and gave his assistance to the author in the checking and reading of the results. Many thanks to him for his encouragement and suggestions in the treatment of this analysis.

References

- Barbera, R. "AVE" Analisis de Variabilidad Estelar Version 2.5 Grup d' Estudis Astronomicos. <http://www.gea.cesca.es>
- Buil, C. (1991). "CCD Astronomy". Willmann-Bell, Inc.
- Harris, Alan W. (1997). "Minor Planet Lightcurve Parameters". On Minor Planet Center web site: <http://cfa-www.harvard.edu/iau/lists/LightcurveDat.html>

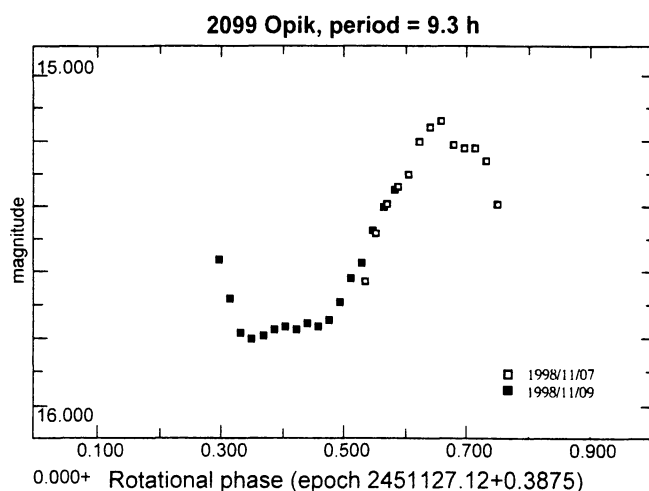


Figure 1

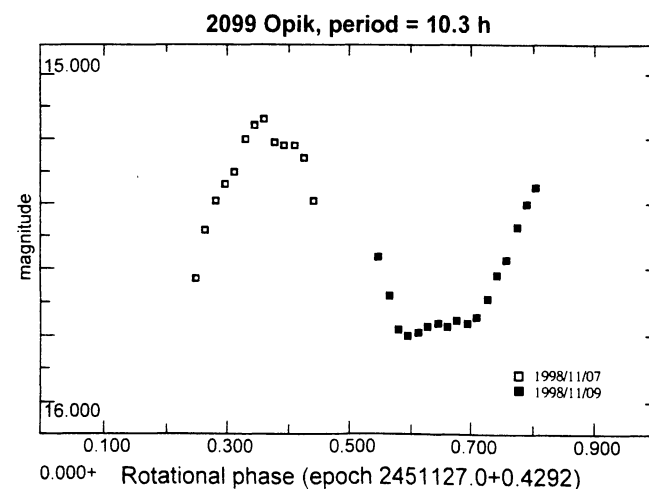


Figure 2