

ROTATION PERIOD AND LIGHTCURVE OF ASTEROID 137 MELIBOEA

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Photoelectric observations in V and B filters of the asteroid 137 Meliboea were made from Estación de Altura "Dr. Carlos U. Cesco" of Félix Aguilar Observatory during the 1990 apparition. The synodic rotational period, lightcurve amplitude and average B-V color found for 137 Meliboea are: $P=15.13\pm0.01$ hr, $\Delta m=0.204\pm0.010$, $B-V=0.700\pm0.014$. This is the first complete lightcurve and secure period reported.

Introduction

137 Meliboea was discovered on March 18, 1874 by J. Palisa and is listed by Bowell et al. (1979) as a C-type asteroid with a diameter of 153 km. Zappalà et al. (1983) observed this minor planet during September 1980 but no period could be deduced and proposed it should be longer than 16 hours with an amplitude higher than 0.04 magnitude.

Observations

During May 1990 the asteroid 137 Meliboea was favorably placed for photoelectric study. Observations of this asteroid were conducted by the authors as part of a program directed toward the study and determination of the synodic rotation periods of minor planets. The photometric studies described were conducted from Estación de Altura "Dr. Carlos U. Cesco" (ex El Leoncito Station) of Félix Aguilar Observatory (San Juan, Argentina).

The photometric measurements were made using the V and B filters of a cooled photon-counting

photometer equipped with an RCA 31034A photomultiplier tube attached to a 0.76-m Cassegrain telescope. The photometric data were recorded using a microcomputer which was interfaced with the photometer. The data were stored in a computer disk file and a hard copy was produced during each observing night.

A nearby comparison star was selected within one degree of the asteroid, thus reducing the correction of differences in atmospheric extinction to less than 0.01 magnitude. The comparison star was calibrated using standard stars of the nearby Selected Area 106 Landolt (1973, 1983).

For both colors, 20 second photometric integrations were used on the asteroid and comparison star, and 10 seconds on the sky. The standard observing procedure followed was the same used by the authors for other asteroids (for example, Gil Hutton, 1990) and the integration time and number of integrations were selected according to the method proposed by Fitzgerald and Sheldon (1982) to obtain an average uncertainty of 0.01 magnitude in both colors. Typically 5 to 6 photometric measurements of the asteroid were obtained in each color during each hour of the observing run.

Photoelectric observations of this asteroid were conducted at Estación de Altura "Dr. Carlos U. Cesco" of Félix Aguilar Observatory on the night of May 24, 27 and 28, 1990 UT, on which 24, 26, and 25 photometric measurements were made in each color, respectively. Observational circumstances for asteroid 137 Meliboea are shown in Table I.

Results

On the basis of the photometric data obtained during three nights of observation, corrected by differential phase angle and distance, the synodic rotational period was determined using a method proposed by Stellingwerf (1978), a generalization of the technique used by Lafler and Kinman (1965), which allows an arbitrary degree of smoothing and provides complete statistical information. This method determined that a period of 15.13 ± 0.01 hours best conformed to the observations. This period has an excellent agreement with the observations of Zappalà et al. (1983). Lightcurves

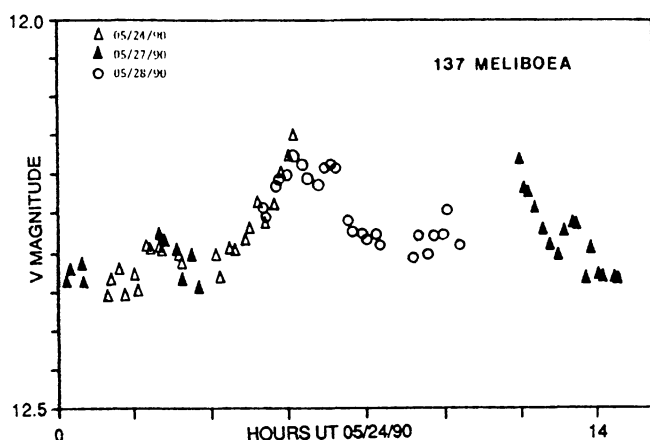


Figure 1. V lightcurve for 137 Meliboea.

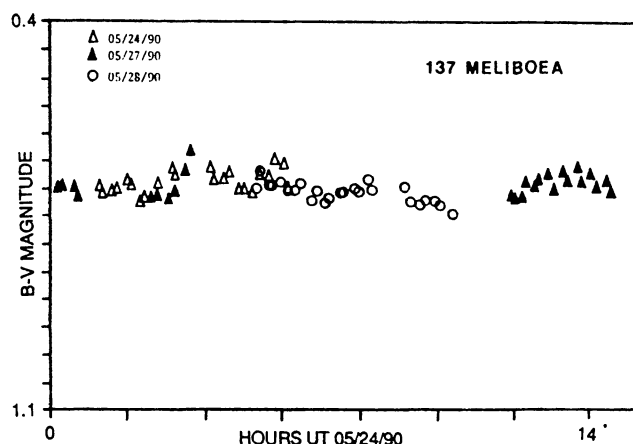


Figure 2. (B-V) lightcurve for 137 Meliboea.

Table I. Observational circumstances for 137 Meliboea. The comparison star has coordinates RA(1950): 14^h55^m, DEC(1950): -06°22'.

AST	DATE	RA (1950)	DEC	LON(1950)	LAT	PHASE
137	May 24	14 ^h 56 ^m	-06° 32'	223.5°	09.8°	7.30°
137	May 27	14 54	-06 14	222.9	09.9	8.37
137	May 28	14 53	-06 08	222.8	10.0	8.72

for V and B-V based upon this rotational period are shown in Figures 1 and 2, respectively. In preparing this composite, the magnitude levels for each night were adjusted using H and G values of 8.04 and 0.098, respectively. The gap observed in the May 27 data is due to a close appulse between the asteroid and a background star. The lightcurve of 137 Meliboea shows a lightcurve amplitude of 0.204 ± 0.010 magnitude, with two unequal maxima and two unequal minima per rotational cycle. The average B-V color of 137 Meliboea is 0.700 ± 0.014 which is consistent with the value reported by Bowell et al. (1979). The smooth variations in the B-V lightcurve could represent true variations but the lack of redundant coverage make this point hard to confirm.

Acknowledgment

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THE MINOR PLANETS SECTION OBSERVER'S MANUAL

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We are pleased to announce the publication of the Minor Planets Section Observer's Manual by the first author.

The manual is designed to assist members with the techniques for obtaining and reporting observations of minor planets to the Minor Planets Section. It contains tips on visual observing programs, photoelectric photometry, astrometric reduction of photographic positions, and occultations. It is hoped that members will use the information and resources contained within the manual to get involved with a regular program of observing asteroids.

An initial mailing of one copy of the manual to every member of the Minor Planets Section accompanies this issue of the *Minor Planet Bulletin*. Additional copies, and other orders, should be placed with Mr.

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A THREE-HOUR CLOSE APPROACH EPHEMERIS OF (3103) 1982 BB

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Apollo asteroid (3103) 1982 BB reaches a speed of 4° per day across the morning sky late in July and early August. The orbit of 1982 BB is in a 3:5 resonance with the Earth's orbit causing these bright close approaches to occur at a cyclic interval of five years. The ephemeris generated here, for Western Hemisphere observers, is to assist in the interpolation of positions. Other ephemerides are available on request.