

CCD PHOTOMETRY OF ASTEROID 16 PSYCHE

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Photometric observations of the asteroid 16 Psyche were made during its 1992 apparition using a CCD detector at the NF/ Observatory. The synodic rotational period was 4.196 ± 0.005 hrs. The lightcurve amplitude was 0.19 ± 0.02 magnitudes. These results agree well with previous studies.

Introduction

Asteroid 16 Psyche is listed as an M-type asteroid (Tholen 1989). It has a diameter of about 264 km and an albedo of about 0.10 with an absolute H magnitude of 5.99 (Tedesco 1989). It has been studied previously (Lagerkvist et al. 1989). Switches between the primary and secondary extrema occurring in some solutions have been a matter of debate (Magnusson et al. 1989). Therefore, continued monitoring has been important. During February and March of 1992, Psyche was in a favorable position and phase angle for observation. The asteroid was listed as a desirable target by Harris and Zappalà (1992).

Observations

Exposures were obtained through a Johnson V-filter with a CRAF-Cassini charge-coupled-device (CCD) detector having 1024x1024 pixels, where the opposite quadrants are silvered to allow the frame transfer of a 512x512 pixel image. The image scale was 1.2 arcseconds per pixel. The chip and amplifier read-out noise is 25 electrons. Full well is 100,000 electrons. The telescope used was a 0.45-m Newtonian. Control of the observatory was by digital radio link and is described elsewhere (Neely 1989). The images were stored on tape and analyzed with PCVISTA, written by M. Richmond.

The comparison and check stars were within the same frame of the CCD image. This reduced the differential atmospheric extinction to negligible levels and allowed data collection on nights with marginal photometric conditions. The comparison star calibration was unsuccessful due to bad weather during the nights when this was attempted.

Integrations of 90 seconds were obtained for all data points. Dark fields were taken before each exposure and approximately 60 exposures were taken per night. The dark and bias frames were subtracted at the time of readout and the images were flat-field corrected before being stored on tape for later analysis. All of the flat fields were obtained on the twilight sky.

Results

CCD observations of 16 Psyche were made on UT dates (1992): February 17 and 22, March 6, 12, and 13. Observational circumstances for these dates are shown in Table I.

The synodic rotation period was calculated using a minimum phase error method similar to Stellingworf (1978). A constant was added to each night's data to obtain the best vertical fit. A period solution of 4.196 ± 0.005 hours was obtained, in excellent agreement with previous results (Lagerkvist et al. 1989). The lightcurve, shown plotted for the rotational phase occurring on UT 1992 February 22, appears to display two unequal minima and maxima per rotation. Within the noise of the observations, we estimate the peak-to-peak amplitude to be 0.19 ± 0.02 magnitudes.

Acknowledgments

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Table I. Observational circumstances
for 16 Psyche

Date	Long	RA(2000)	Dec	AU to Earth	α	VMag
2/17/92	158 42	10 59.1	7 11	2.236	4.8	10.6
2/22/92	159 20	10 56.2	7 33	2.226	2.2	10.5
3/06/92	161 36	10 45.3	8 50	2.229	1.8	10.5
3/12/92	162 24	10 41.5	9 17	2.244	4.1	10.6
3/13/92	162 34	10 40.8	9 22	2.248	4.4	10.6

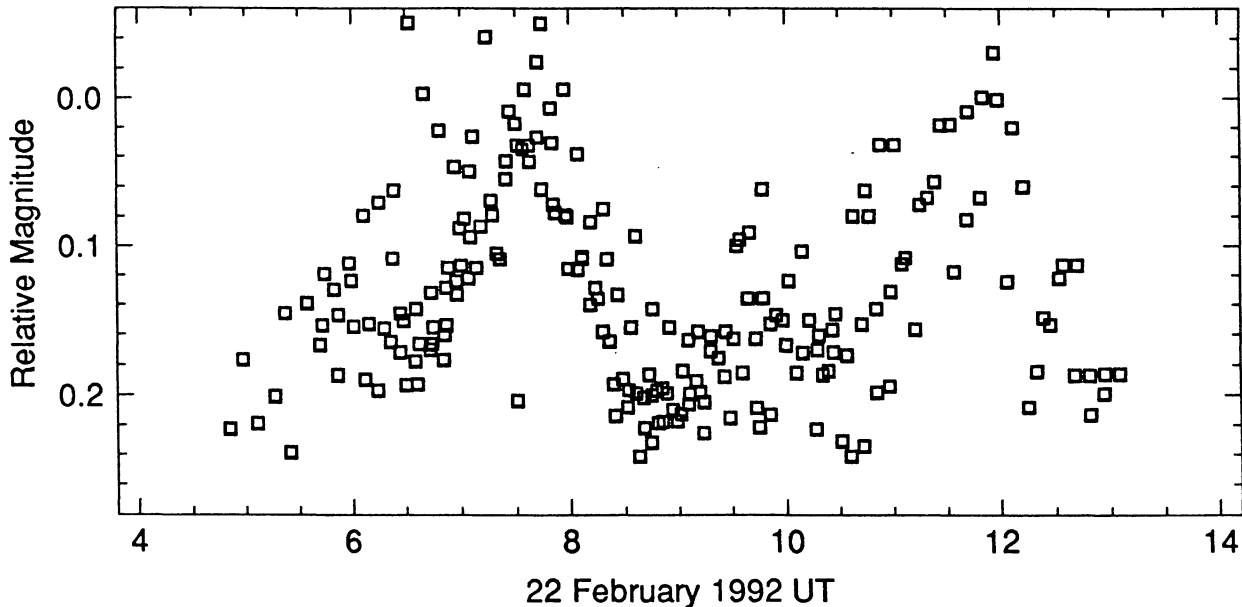


Figure 1. Lightcurve for asteroid 16 Psyche. Data from all nights have been placed into a single rotation cycle based on a period of 4.196 hours.

PHOTOELECTRIC PHOTOMETRY OF 10 HYGIEA

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UBV photometry was performed of 10 Hygiea during nine nights in October, November and December 1992. A composite lightcurve is presented favouring a rotation period of 27.62 hours.

Introduction

The asteroid 10 Hygiea has been observed very frequently (for references see Lagerkvist et al., 1992) but for quite a long time the period was not known. Michalowski et al. (1991) determined the rotation period to 27.66 hours and also made an estimate of the pole orientation. Since 10 Hygiea is the fourth largest asteroid it seemed appropriate to

make some additional observations to improve the rotation period and the pole determination.

Observations

The observations were made with the 60-cm Cassegrain telescope at La Palma during eight nights in 1991 (October 29, 30, 31; November 5, 10, 14, 15, 18). Some additional data on December 2 were obtained with the 40-cm telescope at Kvistaberg Observatory. The aspect data are given in Table I.

Table I. Aspect data.

Date	λ	β	r	Δ	α
1991 Oct 30.0	54.7	4.2	3.507	2.555	5.47
1991 Oct 31.0	54.5	4.2	3.507	2.551	5.16
1991 Nov 1.0	54.3	4.2	3.507	2.547	4.85
1991 Nov 6.0	53.4	4.2	3.508	2.531	3.29
1991 Nov 11.0	52.4	4.2	3.509	2.523	1.82
1991 Nov 15.0	51.6	4.2	3.509	2.522	1.18
1991 Nov 16.0	51.4	4.2	3.509	2.522	1.22
1991 Nov 19.0	50.8	4.1	3.510	2.526	1.77
1991 Dec 3.0	48.2	3.9	3.512	2.577	6.00

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