

PHOTOMETRIC OBSERVATIONS OF ASTEROIDS 31 EUPHROSYNE, 118 PEITHO,
13 EGERIA, 196 PHILOMENA AND 471 PAPAGENA

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RESUMEN. Mediante fotometría fotoeléctrica BV fueron estudiados los asteroides 31 EUPHROSYNE, 118 PEITHO en su oposición de 1988, y 13 EGERIA, 196 PHILOMENA y 471 PAPAGENA en su oposición de 1989, con el fin de determinar su período de rotación, la orientación del polo y la forma de los asteroides. Se presentan las curvas de luz de 118 PEITHO y 13 EGERIA.

ABSTRACT. The asteroids 31 EUPHROSYNE and 118 PEITHO at their opposition of 1988, and 13 EGERIA, 196 PHILOMENA and 471 PAPAGENA at their opposition of 1989, have been studied by means of photoelectric photometry BV with the purpose of determining their rotation periods, pole orientation and shapes. The lightcurves of 118 PEITHO and 13 EGERIA are shown.

Key words: ASTEROIDS — PHOTOMETRY

INTRODUCTION:

The study of asteroid lightcurves allows us to determine their rotation periods, pole orientation and shapes. For pole and shape determination at least 3 lightcurves in different oppositions are necessary, so for our photoelectric observations program we have selected some asteroids having less than 3 observed oppositions.

OBSERVATIONS:

The observing conditions are shown in table 1 and the comparison stars are shown in table 2. The ephemeris have been calculated from the orbital elements of the "Ephemeris of Minor Planets (1988) and (1989)".

Asteroids 31 EUPHROSYNE and 118 PEITHO have been observed with the 60 cm cassegrain "Lowell Telescope" of the CTIO and 13 EGERIA, 196 PHILOMENA and 471 PAPAGENA with the 76cm cassegrain telescope of the El Leoncito station of the Felix Aguilar Observatory, San Juan, Argentina. In both cases digital photoelectric photometers with an RCA 31034 photomultiplier and a pulse counter system were used. In all the measurements the diaphragm was 30" and the integration time was 10 sec. We have applied differential photometry in V and B filters of the Johnson standard system.

The magnitudes were corrected for distance

$$dV = dV_{\text{obs}} - 5 \log(r \cdot D); \quad (r \text{ distance Sun-asteroid; } D \text{ distance Earth-asteroid})$$

where $dV_{\text{obs}} = V_{\text{ast}} - V_{\text{comp}}$ corrected for differential extinction and phase angle. Light-time corrections were applied.

RESULTS

31 EUPHROSYNE: listed as a C type asteroid with a diameter of 248 km and a period of 5.531 hs. (Lagerkvist et al. 1988)

We have obtained a complete lightcurve on October 7, 1988 and a piece of lightcurve on October 6. The data obtained agree with the period listed. The observed lightcurve amplitude is 0.09 ± 0.02 mag.

TABLE 1 :OBSERVING CONDITIONS

ASTEROID	YEAR	MONTH	D	H	q	r (AU)	D (AU)	PHASE	RA (1950.0)	DECL.
0hs UT										
31 EUPHROSYNE	1988	oct.	6,2	2,7	9	3,217	2,4059	12,06	23 18,726	-31 54,454
	1988	oct.	7,2	6	11	3,2148	2,4112	12,25	23 17,866	-31 49,560
118 PEITHO	1988	oct.	9,2	7,2	13	2,2885	1,3316	9,41	23 57,518	-10 16,694
	1988	oct.	11,0	1,4	14	2,285	1,3373	10,29	22 55,720	-10 18,350
13 EGERIA	1989	may	3,3	2	11	2,6217	1,63	5 15	27,207	-22 24,114
	1989	may	6,1	6,4	11	2,6243	1,6247	3,94	15 23,886	-22 32,649
196 PHILOMENA	1989	may	7,0	2	9	3,1164	2,2937	12,55	12 29,277	5 41,405
	1989	may	8,2	3	8	3,1161	2,3034	12,85	12 28,886	5 40,716
	1989	may	9,1	5,7	9	3,1159	2,312	13,07	12 28,514	5 39,878
471 PAPAGENA	1989	mayo	6,4	1,5	9	3,4963	2,528	5,47	16 9,281	-11 22,021
	1989	mayo	7,2	7,6	13	3,4955	2,5238	5,24	16 7,506	-11 21,360

D: mean time of the observation period (days and frations from 0hs. UT)

H: number of observing hours

q: number of observations per hour

TABLE 2: COMPARISON STARS

ASTEROID	STAR (SAO)
31 EUPHROSYNE	214477
118 PEITHO	147030
13 EGERIA	103515
196 PHILOMENA	119434
471 PAPAGENA	159749

18 PEITHO: listed as a S type asteroid with a diameter of 45 km and a period of 7.78 hs.

We have obtained a complete lighthcurve on October 9, 1988 and a piece of lightcurve on ctober 11. The data obtained agree with the period listed. The lightcurve shows two similar axima and two similar minima, with a lightcurve amplitude of 0.08 ± 0.01 mag. (fig.1)

3 EGERIA: listed as a C type asteroid with a diameter of 245 km and a period of 7.045 hs.

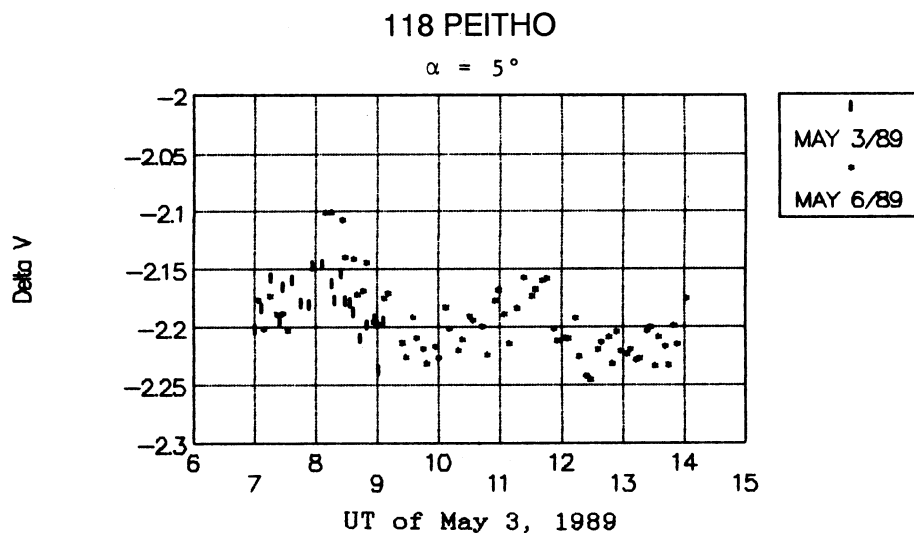
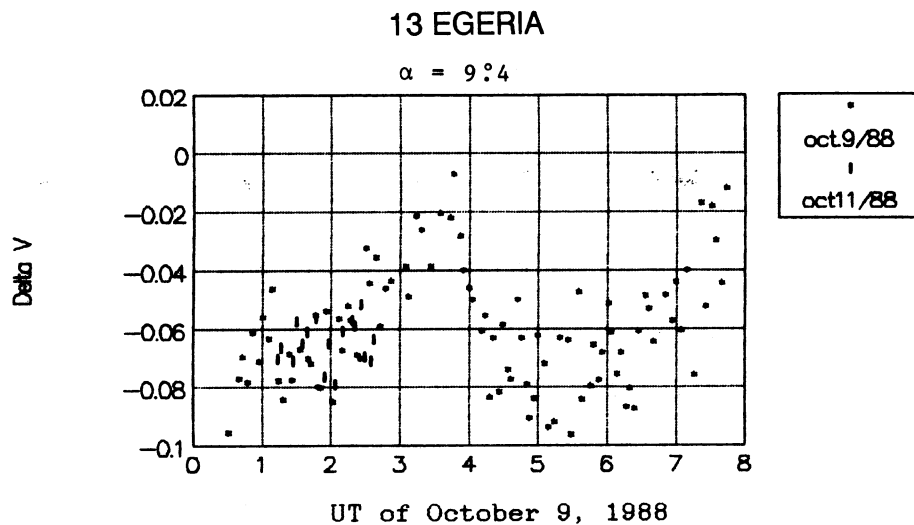
We have obtained two pieces of lightcurves on May 3 and 6, 1989 (fig.2). The ightcurve amplitude is 0.12 ± 0.02 mag.

96 PHILOMENA: listed as a S type asteroid with a diameter of 162 km and a period of 8.333 hs.

We have obtained three pieces of lightcurve on May 7, 8 and 9, 1989. The data obtained gree with the period listed but the observations of October 8 have poor quality. The ightcurve of 196 PHILOMENA shows two maxima and minima with an amplitude of 0.40 ± 0.02 mag.

71 PAPAGENA: listed as a S type asteroid with a diameter of 145 km and a period of 7.105 hs.

We have obtained a complete lightcurve on May 7, 1989 and a piece of lightcurve on May . The data agree with the listed period. The lightcurve amplitude is 0.14 ± 0.02 mag.



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