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PX Cep: A NEW LARGE AMPLITUDE ECLIPSING BINARY

PX Cep (=GR 31) was discovered as an eclipsing binary by Romano (1958). Later Romano (1962) published a list of times corresponding to a brightness fainter than normal on photographic plates. The star was named as PX Cep (Kholopov et al., 1978). The fourth edition of the General Catalogue of Variable Stars (Khopolov et al., 1985) refers only to one time of minimum from Romano's list.

Visual observations made by the author from 1983 to 1985 confirmed the eclipsing nature of PX Cep and provided a first preliminary ephemeris for this large amplitude (visually about 2.7 magnitude) EA star.

During 5 nights in 1985 and 4 nights in 1986, PX Cep was measured photoelectrically, jointly with other stars from GEOS and Hipparcos programmes. Results on one of these stars (NSV 12040) were already published by the author (1986). The measures were made with a cooled photometer equipped with filters of the Geneva photometric system, attached to the Jungfraujoch Observatory's 76 cm telescope. 24 BV measurements of PX Cep were obtained (see Table I) by the GEOS members H.Boithias, M. Dumont, E.Joffrin, P.Louis, P.Rousselot and the author. Reductions of the observations were made using the method described by Dumont (1983). Transformation of the B-V values from Geneva system into Johnson and Morgan's system was made using Meylan and Hauck formulae (1981).

A photoelectric time of minimum in 1985 along with a descending branch recorded in 1986, enables us to confirm the first visual ephemeris. Also using 7 visual times of minimum and Romano's photographic one, I obtained, by means of a leastsquares procedure, more accurate light-elements for PX Cep:

$$\text{Min I} = \text{Hel. J.D. } 2446270.440 + 3^{d}.126993 \cdot E$$
$$\pm\ 6 \quad \pm\ 6$$

V and B-V light curves are constructed using the ephemeris above (see Fig.1). Only the measures between phases 0.8 - 1.2 are plotted.

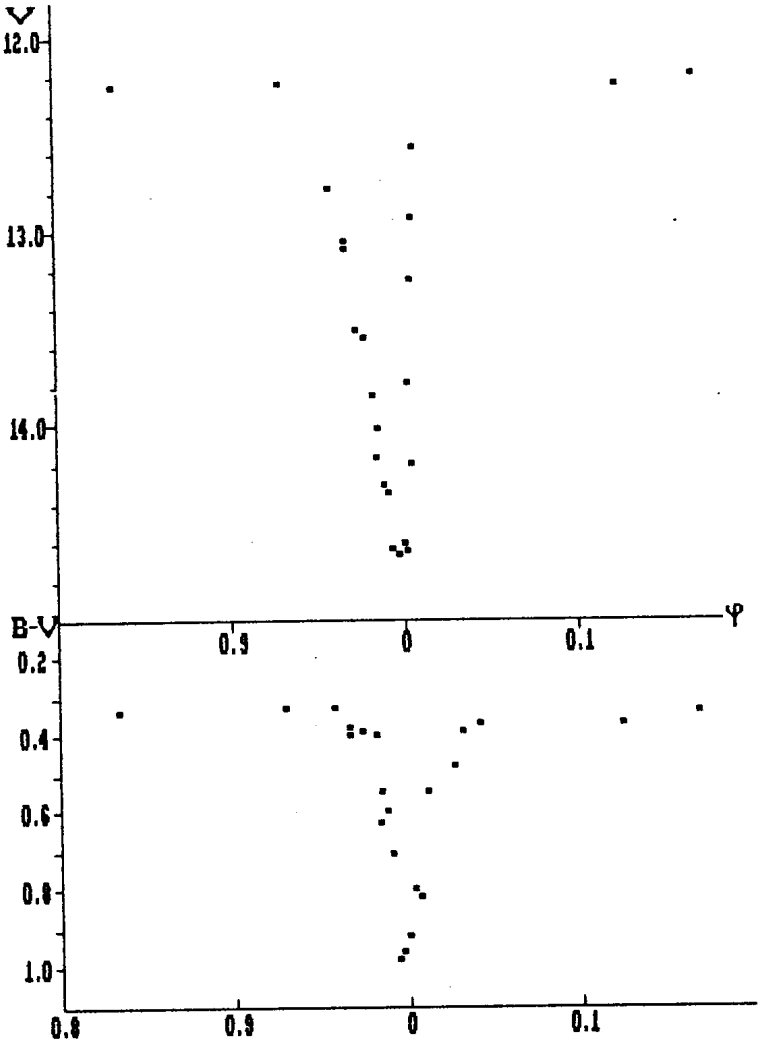

Figure 1: V and B-V light curves of PX Cep, between phases 0.8-1.2 according to the ephemeris of this paper.

Table I : V and B-V measures of PX Cep with phase according to the ephemeris of this paper.

hel.J.D 24 46000+	V	B-V	φ
259.4812	12.31	0.32	0.495
260.5361	12.24	0.33	0.833
264.5751	12.24	0.36	0.124
270.3670	13.52	--	0.976
.3815	13.82	0.38	0.981
.3913	14.02	0.54	0.984
.4010	14.29	0.59	0.987
.4093	14.33	0.70	0.990
.4288	14.64	0.95	0.996
.4378	14.60	0.91	0.999
.4656	14.18	0.81	0.008
.4885	13.77	0.54	0.015
.5142	13.24	0.47	0.024
.5378	12.92	0.38	0.031
.5670	12.56	0.37	0.040
271.5850	12.28	0.34	0.366
642.4179	12.77	0.32	0.957
.4471	13.08	0.37	0.966
.4672	13.50	0.38	0.973
.5005	14.15	0.62	0.983
.5318	14.63	0.97	0.993
.5561	14.63	0.79	0.001
645.5728	13.05	0.39	0.966
648.5841	12.23	0.32	0.929
655.5864	12.19	0.33	0.168

The star varies from 12.25 to 14.65 in V-light. The B-amplitude is 3.0 magnitude. From an inspection of the light curve, I estimate: D ≃ 8 hours and d ≤ 0.5 hours. No secondary minimum could surely be detected, because the photoelectric measures are very scanty outside primary eclipse and visual estimates do not show variation greater than 0.2 magnitude around phase 0.5.

The 2.4 V amplitude of the light variation and the B-V curve suggest a system composed of a main sequence A star with a giant K star. The limb-darkening effect is also visible. These parameters are somewhat inaccurate due to the paucity of measurements all along the period and due to the low signal/noise ratio during primary eclipse.

Further investigations will be published in a future GEOS Circular on Eclipsing Binaries.

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