PHOTOELECTRIC LIGHT CURVES AND MINIMUM TIMES OF XY UMa

XY UMa(BD+55°1317) is a binary system of RS CVn type with a period of $0.^d479$. The star has been known to exhibit large and long-term changes of its light curve and brightness and this was interpreted by Geyer(1980) and Jassur(1986).

In order to monitor its light curve variations, we observed the system photoelectrically with the 60 cm reflector and a single channel photometer at the Xinglong Station of Beijing Observatory. The observations were made in two sets, during three nights from 7 to 9 March and again during four nights from 30 March to 2 April,1989. The stars BD+54°1278 and BD+54°1275 were used as the comparison and check star, respectively.

The first and second light curves sets and (B-V) color index curves are shown in Fig.1 and Fig.2, respectively. Five primary minimum times were obtained. They are given in Table 1.

Table 1.　Times of minima of XY UMa

J.D.Hel.	Filter	m.e.
2447593.2492	B	0.0001
593.2489	V	0.0002
2447594.2069	B	0.0002
594.2067	V	0.0001
2447616.2404	B	0.0002
616.2398	V	0.0005
2447617.1979	B	0.0001
617.1978	V	0.0003
2447618.1553	B	0.0002
618.1556	V	0.0003

Comparing Fig.1 with Fig.2, we find the light curve in Fig.1 to be symmetrical, but that in Fig.2 is asymmetrical. There is a brightening of 0.04 mag around phase 0.25 within a month, which may be caused by asymmetric brightness distributions on the disk of the primary component.
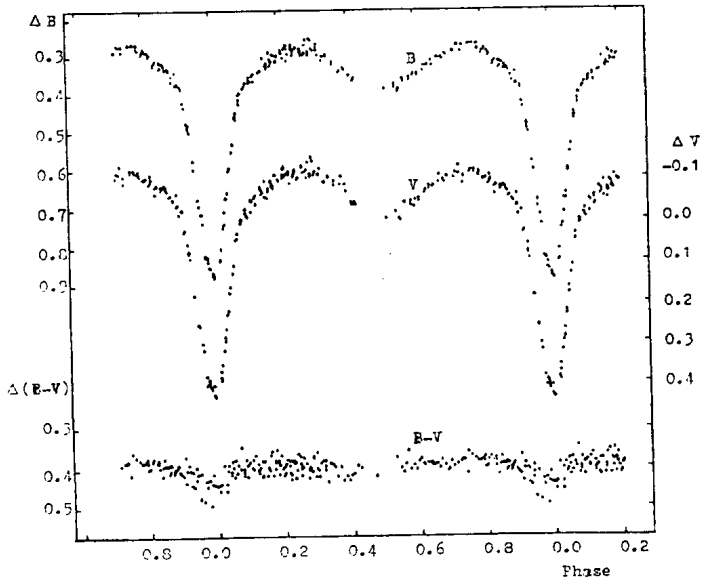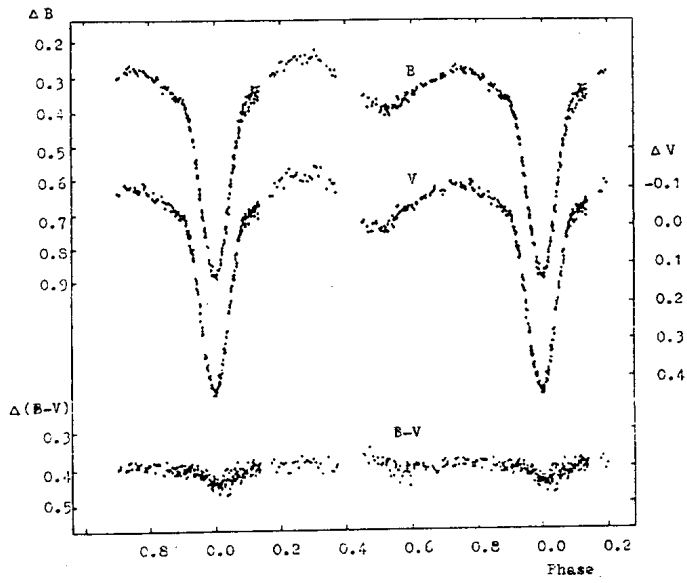
Figure 1

Figure 2

Combining Table 1 with the other 33 minima given by Hall and Kreiner (1980), we have derived the following linear and quadratic ephemerides:

$$Min.I(Hel.) = 2439913.5245 + 0.^{d}47899468E \qquad (1)$$
$$ \pm 7 \qquad\quad \pm 5$$

$$Min.I(Hel.) = 2439913.5216 + 0.^{d}47899478E + 1.4 \times 10^{-11}E^2 \qquad (2)$$
$$ \pm 10 \qquad\quad \pm 5 \quad \pm 3$$

It is shown that the new average period of XY UMa is $0.^{d}47899468$ in ephemeris (1). However, the (O-C) residuals of the ephemeris (1) show a long-term change. Fitting with the quadratic ephemeris (2) we find that the period of XY UMa seems to be increasing at a rate of $\Delta P/P \sim 1.8 \times 10^{-3}$ sec/yr from 1931 up to the present.

The photometric analysis will be presented in another paper.

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References:
Geyer, Edward H., 1980, in Close Binary Stars:Observations and Interpretation,
        IAU symp.No.88, 423.
Jassur, D.M.Z., 1986, Astrophys. Space Sci.,128, 369.
Hall,D.S.and Kreiner,J.M., 1980, Acta Astron., 30,387.