COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 2181

Konkoly Observatory
Budapest
1982 July 29

HU ISSN 0374-0676

NEW TIMES OF MINIMA AND THE PERIOD VARIATIONS OF THE W UMa-TYPE VARIABLE XY Leo

The short period eclipsing variable of W Ursae Majoris type, XY Leo (BD +18°2307) was observed with a photoelectric unrefrigerated photometer attached to the 60 cm Cassegrain telescope at the Ostrowik station of the Warsaw University Observatory. The observations were made through B,V filters and reduced to the Johnson system. BD +18°2306 was used as a comparison star. Five times of minimum were obtained from observations performed between March 1981 and April 1982, and they are given in Table I.

Table I

New times of minima of XY Leo

JD Hel. (244 0000+)	E	(O-C)
4694.3710(3)	32419.	0.0195
4702.4638(3)	32447.5	0.0154
5017.5286(5)	33556.5	0.0101
5056.4514(2)	33693.5	0.0106
5074.3486(5)	33756.5	0.0095

The (O-C) values were calculated from the light elements given by Gehlich et al. (1972):

$$\text{Min I} = \text{JD Hel. } 2435\,484.0222 + 0^{d}.28410282E \quad 1.$$

On the basis of our observations we have computed the new elements using the least-squares method, obtaining:

$$\text{Min I} = \text{JD Hel. } 2445\,074.4906 + 0^{d}.2840969E \quad 2.$$

A large difference (O-C) between primary and secondary minima was observed in 1981. All photoelectric times of minimum light available for us were collected, and the (O-C) values were calculated from the equation 1. Times of minima observed after

1972 are listed in Table II.

Table II

Times of minimum light of XY Leo observed after 1972

JD Hel. (244 0000+)	E	(O-C)	Ref.
2051.6196	23117.	-.0075	1
2099.4896	23285.5	-.0085	1
2841.4395	25897.	0.0066	2
3193.7325	27137.	0.0121	3
3193.876:	27137.5	0.014	3
3198.705:	27154.5	0.013	3
3198.8465	27155.	0.0123	3
3567.7564	28453.5	0.0146	4
3572.7288	28471.	0.0152	4
3606.396:	28589.5	0.016	5
3612.6462	28611.5	0.0161	4

References:

1-Burchi et al. (1975), 2-Pohl and Kizilirmak (1977), 3-Hilditch (1981), 4-Koch and Shanus (1978), 5-Pohl and Gülmen (1981)

References to earlier observations are collected by Gehlich et al. (1972). Period variations of XY Leo were interpreted by Gehlich et al. as due to presence of a third body in the system. The "third body" (O-C) sinusoid proposed by these authors is marked by dashed line in Figure 1.

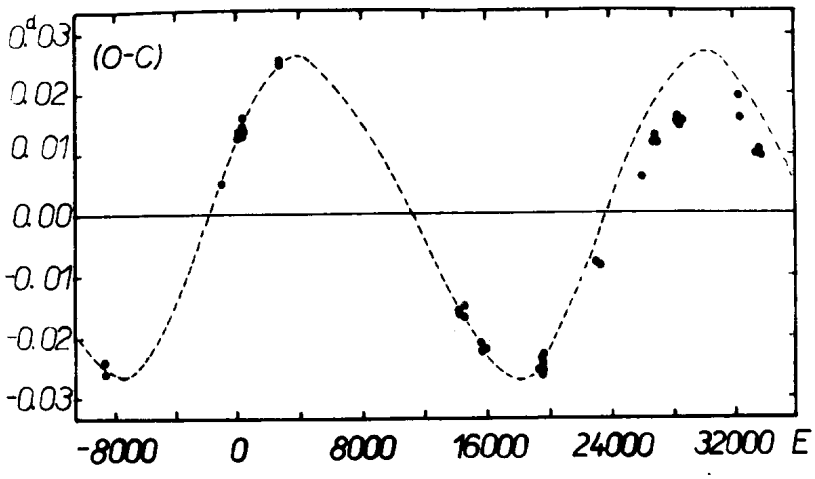

Figure 1

We can see that (O-C) residuals for 20 000<E<30 000 lie about $0^d.01$ under this line. This fact was observed by Pohl and Kizilirmak (1977), and by Koch and Shanus (1978).
The other possibility mentioned by Gehlich and his co-workers is that period variations of XY Leo demonstrate sudden changes. Assuming that the period between the jumps is constant they derived the least squares fit: $P1=0^d.28410714$ and $P2=0^d.28409807$, for 1949-1959 and 1959-1970 intervals, respectively. For 1970-1980 and 1980-1982 intervals, we obtained: $P3=0^d.28410734$ and $P4=0^d.2840969$, respectively. The (O-C) residuals calculated for afore mentioned periods are plotted in Figure 2.

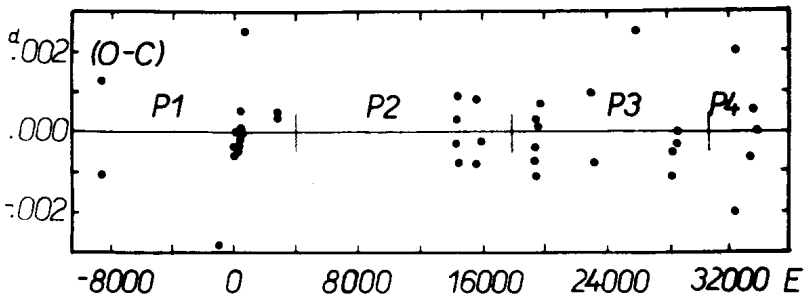

Figure 2

Full light curves of XY Leo in 1981 and 1982 seasons will be published in Acta Astronomica.

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