

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

Number 3302

Konkoly Observatory
 Budapest
 9 March 1989
 HU ISSN 0374 - 0676

PHOTOELECTRIC OBSERVATIONS OF AP LEONIS AND ITS PERIOD CHANGES

AP Leo is a W UMa-type binary system (Mauder, 1967; Cristescu, 1979). The system was observed photoelectrically in B and V bands with the 60 cm reflector and the single channel photometer at the Xinglong station of Beijing Observatory during the 1983-1985 and the 1988 seasons.

The stars BD+ 6^o2400 and BD+ 5^o2437 were used as comparison and check star, respectively. The observations covered a number of orbital cycles. A total of 9 primary and 7 secondary minimum times were obtained. They are given in Table I.

From Table I, together with the other 112 minima collected from the literature (since 1899), the average period of AP Leo is found to be 0^d.4303572. Figure 1 is the O-C diagram of the epochs of minimum light based on the average ephemeris:

$$\text{Min. I} = \text{JDhel.}2439536.542 + 0^{\text{d}}.4303572 \cdot E \quad (1)$$

m.e. ±2 ±5

Table I. New light minima for AP Leo

JD hel.	(V.)	m.e.	JD hel.	(B.)	m.e.	min.
2440000+						
5441.0544		0.0008	5441.0533		0.0007	I
5444.0668		0.0003	5444.0668		0.0003	I
5470.0991		0.0005	5470.1006		0.0005	II
5756.2888		0.0001	5756.2899		0.0001	II
5787.0595		0.0010	5787.0599		0.0011	I
5787.2734		0.0009	5787.2735		0.0001	II
6092.1801		0.0004	6092.1786		0.0003	I
6139.0901		0.0017	6139.0870		0.0005	I
6139.3034		0.0002	6139.3041		0.0003	II
6143.1766		0.0005	6143.1778		0.0004	II
6146.1883		0.0008	6146.1883		0.0006	II
6153.2895		0.0003	6153.2891		0.0003	I
7236.0636		0.0003	7236.0642		0.0002	I
7236.2760		0.0010	7236.2766		0.0006	II
7266.1869		0.0004	7266.1861		0.0006	I
7267.0478		0.0003	7267.0479		0.0004	I

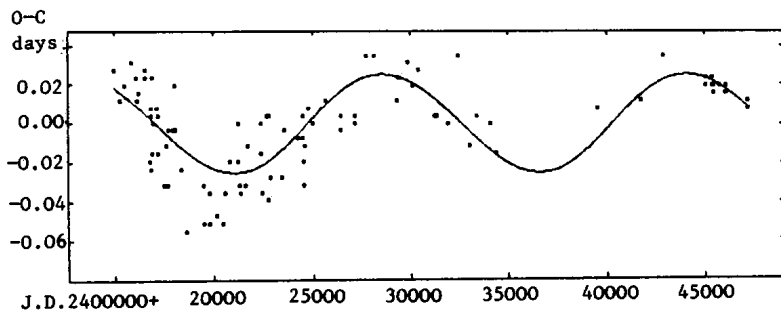


Figure 1. O-C diagram of minimum times

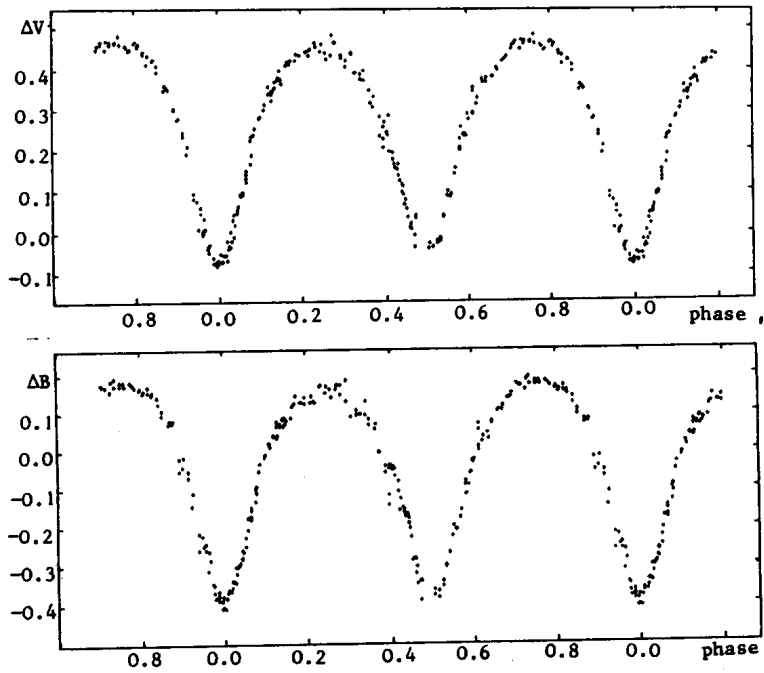


Figure 2. V,B light curves of AP Leo

Our analysis indicates that the period of AP Leo appears to exhibit sinusoidal changes. A new ephemeris of minimum times is derived as follows:

$$\text{Min. I} = \text{J.D. hel. } 2439536.535 \pm 4 + 0.4303570 \pm 1 \cdot E + 0.025 \pm 2 \cdot \sin(2\pi \cdot 0.000064 \pm 2 (0.4303570 \cdot E - 300.00)) \pm 2 \quad (2)$$

The period indicated by the sinusoidal term is about 43 years. It is suggested that there could be a third body in the system which may be responsible for such long term changes in the period of AP Leo. The ephemeris for the prediction of forthcoming minima can be derived from the observations in Table I, as follows:

$$\text{Min. I} = \text{J.D. hel. } 2447236.0621 \pm 3 + 0.4303546 \pm 1 \cdot E \quad (3)$$

Using the ephemeris (3), the observations in 1988 were combined into B and V normal light curves as shown in Figure 2.

The photometric solution of the light curves together with a more detailed analysis of the period changes will be published in a forthcoming paper.

ZHANG JI-TONG, ZHANG RONG-XIAN

ZHAI DI-SHENG, LI QI-SHENG

JIN TIE-LIN

Beijing Observatory

Academia Sinica

Beijing, China

References:

- Cristescu, C. 1979, Inf. Bull. Var. Stars, No.1688.
 Mauder, H. 1967, Veröff. Remeis-Sternw. Bamberg, 7, Nr.61, 1.