

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

Number 3396

Konkoly Observatory  
Budapest  
15 November 1989  
HU ISSN 0374 - 0676

ON THE VARIABILITY OF THE DUSTY CARBON STAR LP And

The infrared object IRC+40540 = AFGL 3116 = IRAS 23320+4316 = NSV 14623 (Schmitz, Mead and Gezari, 1987), a carbon star of spectral type C8,3.5 extremely reddened due to circumstellar dust shell (Cohen, 1979) was suspected to be variable in the course of the "Two-micron Sky Survey" (Neugebauer and Leighton, 1969), its infrared variations confirmed by Lockwood (1974) and time scale of variability 500-1000 days found by Strecker and Ney (1974). The object is named LP And in the General Catalogue of Variable Stars (1985).

To improve knowledge of the character of variability of LP And, the star was monitored photographically with the Schmidt telescope of the Radio-astrophysical Observatory at Baldone using Kodak IN plates and red filter KC 19. During 1984-1989 30 estimates of I(0.81) magnitudes were made and a mean cycle length of approximately 625 days was found. If early observations in K-passband published by Neugebauer and Leighton (1969), Strecker and Ney (1974), Grasdalen et al. (1983) and Cohen (1984) are also taken into consideration, a mean cycle length of 614 days is obtained.

In Figure 1 (bottom) a mean light curve in photographic infrared I(0.81) for LP And is given according to the elements:

$$\text{Max. J.D.} = 2446340 + 614 \cdot E \quad (1)$$

The amplitude of the mean light curve in I(0.81) is 1.5 mag. However the first observation made in 1978 shows the object 1 mag brighter than expected.

At the top of Figure 1 the K-magnitudes published by the authors cited are plotted versus phase based on elements (1). It seems that the range in K is nearly similar to that in I(0.81).

Thus the object LP And = AFGL 3116 belongs to the group of carbon stars with thick circumstellar shells and very long periods, whose other known members are CW Leo = IRC+10216 ( $P=635^d$ , Alksnis, 1989), RW LMi = CIT 6 ( $P=605^d$ , Alksnis and Khozov, 1987), as well as AFGL 971 ( $P \approx 610^d$ ) and AFGL 1235 ( $P \approx 590^d$ ) (Le Bertre, 1988).

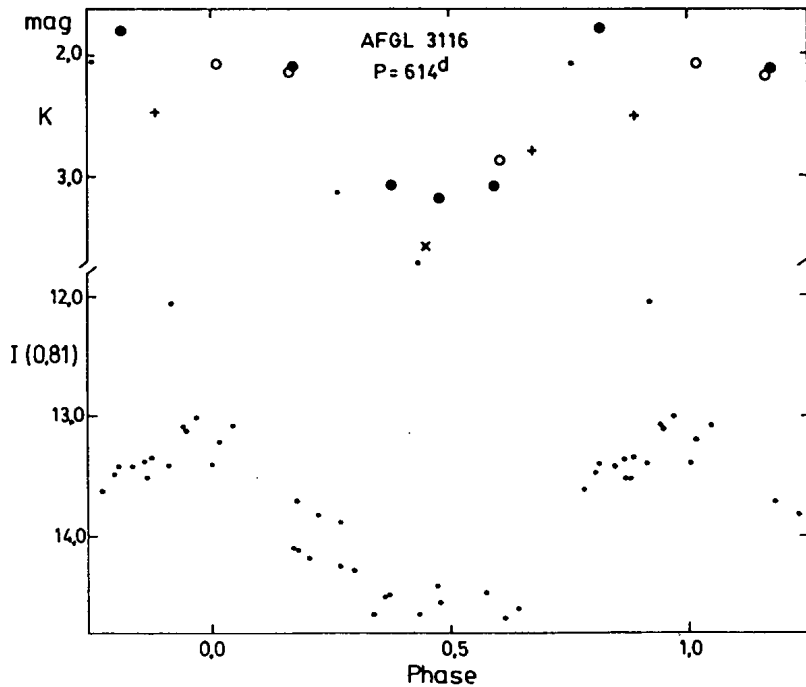


Figure 1. Mean light curves of LP And in K- (top) and in I(0.81)- (bottom) passbands: individual observed magnitudes plotted versus phase according to (1). K-magnitudes by authors cited are signed with different symbols: open circles - Neugebauer and Leighton; filled circles - Strecker and Ney; + signs - Grasdalen et al., x - Cohen (1984); dots are 104-magnitudes by Lockwood minus 6.1 mag.

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