

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

Number 2100

Konkoly Observatory
Budapest
1982 March 4

HU ISSN 0374-0676

PHOTOELECTRIC MINIMA AND LIGHT CURVES OF V 478 CYGNI

V 478 Cygni (BD + 37°3890 = HD 193611) was discovered to be a binary by J.A. Pearce from a spectrogram obtained on September 29, 1947 (McDonald, 1948). McDonald (1948) investigated the system spectroscopically and determined the orbital elements from the radial velocity curve, and he also suggested that the system may be an eclipsing binary with the following light elements:

$$\text{Min I JD Hel} = 24\ 32\ 458.777 + 2^{\text{d}}.8815.E. \\ +878$$

From the spectroscopic and photometric elements Gaposchkin (1949) found that the system consists of two spherical, or very nearly spherical components which are identical in their physical characteristics and gave the light elements as,

$$\text{Min: JD } 24\ 18\ 552.648 + 2^{\text{d}}.880921.E.$$

Popper and Dumont (1977) observed the system photoelectrically at Palomar and Kitt Peak Observatories and obtained its light curves. A neighbouring star to V 478 Cyg was apparently included in the Palomar observations because of the larger diaphragm used there than for the Kitt Peak observations. Thus the light curves were systematically different from each other. Koch et al. (1979) announced the system as a photometrically neglected eclipsing binary.

The system was observed photoelectrically at the Ege University Observatory on 31 nights in the period of the observational season in 1981. The observations were made in yellow and blue

colours with the 48 cm Cassegrain telescope equipped with an unrefrigerated EMI 9781 A photomultiplier tube and Johnson's standard B,V filters. A total of 1093 and 1084 individual points were obtained in B and V colours, respectively. BD + 37^o3873 was used as comparison and BD + 37^o3874 as check star. No evidence for the variability of the comparison star was found. All the observations were corrected for atmospheric extinction using the extinction coefficients determined from observations of the comparison star for each night. During all the observations the smallest diaphragm was used to eliminate the light of the neighbouring star to V 478 Cygni. Seven primary and three secondary minima were obtained in the observational season and are given in Table I.

Table I
Times of minima of V 478 Cygni

Hel Min JD	Min	Filter	O-C
24 44 777.4777	I	B,V	-0.0002
800.5236	I	"	-0.0006
813.5094	II	"	+0.0216
816.3893	II	"	+0.0207
826.4533	I	"	+0.0019
829.3318	I	"	-0.0004
849.4970	I	"	-0.0009
852.3781	I	"	-0.0005
862.481	II	V	+0.020
878.3065	I	B,V	+0.0008

New light elements are determined using the above photoelectric primary minima by the method of weighted least squares as,

$$\text{Hel Min I JD} = 24\ 44\ 777.4779 + 2^{\text{d}}.880795.E.$$

+6
+29

The light and colour curves are presented in Figure 1 where the magnitude differences between the comparison and variable stars have been plotted against the phases. The phases in Figure 1 and the O-C values in Table I were calculated with the above new light elements. The light curves show that the system is an Algol type eclipsing binary.

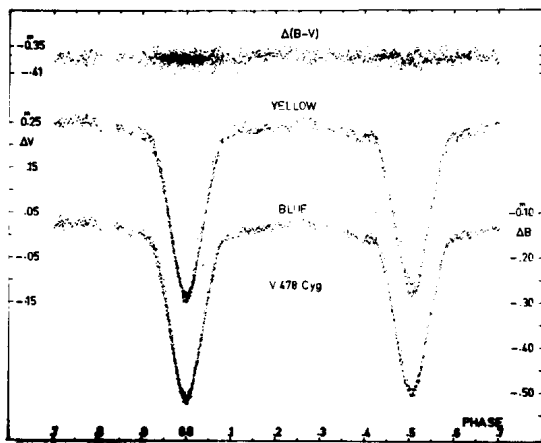


Figure 1

The phase of mid-secondary does not coincide with 0.5 phase. The phase shift of the secondary minima is about 0.0072ϕ . Since there is no shift in the mid-primary, it clearly shows that the relative orbit is not circular but eccentric. The system varies about $0^m.395$ and $0^m.385$ at the primary, $0^m.380$ and $0^m.365$ at the secondary minimum in blue and yellow light, respectively. There is no variability in the colour curve. The shape of light curve confirms the results of Gaposchkin (1949). The solutions are in progress.

This project is partly supported by the Turkish Scientific and Technical Research Council.

C. SEZER, N. GÜDÜR and Ö. GÜLMEN
Ege University Observatory
Bornova-Izmir-Turkey

References:

- Gaposchkin, S.: 1949, *Astron.J.* **54**, 128.
Koch, R.H., Wood, F.B., Florkowski, D.R. and Oliver, J.P.: 1979
IBVS No. 1709.
McDonald, J.K.: 1948, *Astron.J.* **54**, 43.
Popper, D.M. and Dumont, P.J.: 1977, *Astron.J.* **82**, 216.