COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS
Number 2613

Konkoly Observatory
Budapest
25 October 1984

HU ISSN 0374 - 0676

V566 OPHIUCHI - PERIOD UPDATE

The variability of V566 Ophiuchi which is classified as an A-type W Ursae Majoris system, was discovered in 1935 by Hoffmeister (1935). The system undergoes complete eclipses, secondary being total. The primary component which is the larger and brighter star, overflows its Roche lobe but no material exits the system through the outer Lagrangian surface (Mochnacki and Doughty, 1972).

Fresa (1954) obtained the first photoelectric observations (partial eclipses) in unfiltered light. Binnendijk (1959) used B and V filters and obtained complete light curves. Bookmyer (1969) made a further study of the system, incorporating observations by Purgathofer, Widorn (1959) and Schnell, Widorn (1965). Her study confirmed the unusual 14-year long period constancy of the system, earlier detected by Kwee (1958) and Binnendijk (1959). Additional light curves were obtained by Bookmyer (1976) based on some 2000 photoelectric observations. By this time it had become evident that a period increase of the order of $0^{s}.26$, suspected earlier by Kaitchuck and Sprague (1974), had occurred around 1969. Maddox and Bookmyer (1981) presented the most extensive update of the system, incorporating its period behaviour, covering about 45 years and listing some 100 minima obtained between JDH 2,434,179 and 2,443,677. The observational history of the system is fully documented in their paper.

Mahdy and Soliman (1982) observed V566 in 1981 while the author did so during six nights in the time interval between 15 July and 20 August 1982, using photoelectric equipment attached to the 38-cm reflector of Midway Observatory. Additional photoelectric observations were made on campus with the 36-cm reflector of Webb Observatory, Toowoomba. The equipment and observational procedures have been described previously (Kennedy, Wisniewski, 1980; Kennedy 1982). Our observations yielded two primary eclipses and one secondary. Enough data were obtained to present a complete light curve (ΔV), Fig. 1. Maximum light (V) has been normalised to zero. Recorded times of minima (ΔV) obtained by Mahdy and Soliman (1982) and those obtained by us are listed in Table I.

Phases and residuals were computed from the ephemeris given by Bookmyer (1969):

$$\text{J.D. Hel. Min. I} = 2436744.4200 + 0^{d}.40964091\ E$$

and are plotted versus heliocentric Julian Date in Fig. 2, together with all minima (I and II) after J.D. Hel. 2,440,400 as tabulated by Maddox and Bookmyer (1981).

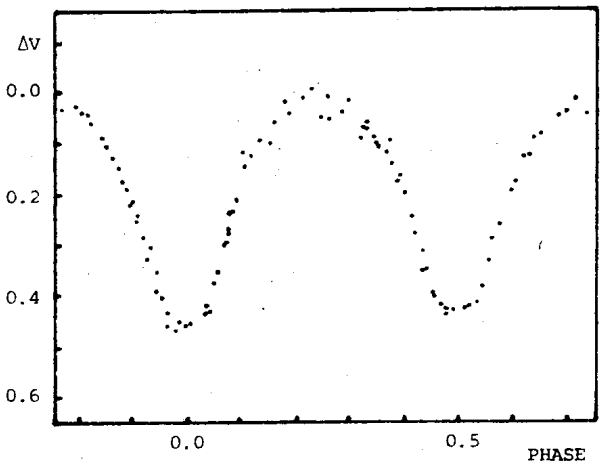

Figure 1: Lightcurve of V566 Oph

Table I

J.D. Hel. 2440000+	Min.	Phase	(O - C)	Ref.
4750.4901	I	.1175	+ $0^d.0481$	Mahdy, Soliman (1982)
4751.5162	II	.6224	+ $0^d.0501$	Mahdy, Soliman (1982)
4825.2510	II	.6210	+ $0^d.0495$	Mahdy, Soliman (1982)
4826.2739	I	.1181	+ $0^d.0483$	Mahdy, Soliman (1982)
4827.2992	II	.6210	+ $0^d.0495$	Mahdy, Soliman (1982)
5169.9749	I	.1480	+ $0^d.0606$	Kennedy
5170.9988	II	.6475	+ $0^d.0604$	Kennedy
5197.0117	I	.1493	+ $0^d.0611$	Kennedy

Fig. 2 shows the period behaviour after the 1969 period change. In order to compare the period change of V566 Oph with a number of other photometric binaries displaying similar behaviour (Kennedy, 1982), the period diagram has been rectified, i.e. the branch of steadily increasing residuals has been plotted horizontally. Fig. 3 shows the rectified period diagram which includes all primary minima as listed by Maddox and Bookmyer (1981) as well as those listed in Table I. This diagram is based on the ephemeris:

J.D. Hel. Min. I = 2,441,119.8016 + $0^d.40964579$ E.

The largest residual (for the horizontal branch) is $0^d.0055$. The accuracy of the determination of the period after the 1969 change improves as additional observational data becomes available. Table II lists the new

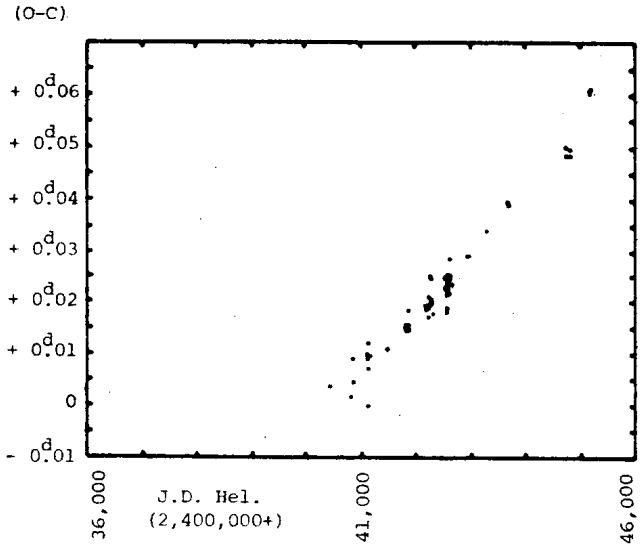

Figure 2: Period Behaviour of V566 Oph after J.D. 2,440,400

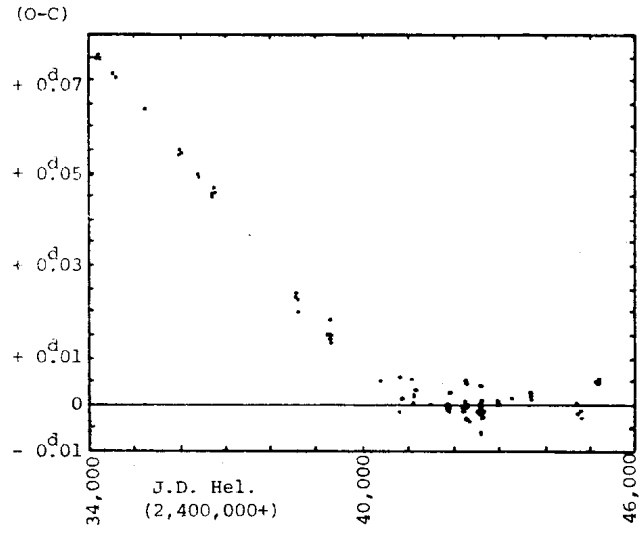

Figure 3: Rectified Period Behaviour of V566 Oph

Table II

Period	Incr.	Ref.
$0^d.40964101$		Binnendijk (1959)
$0^d.40964091$		Bookmyer (1969)
$0^d.40964387$	$0^s.26$	Bookmyer (1976)
$0^d.40964399$	$0^s.26$	Bookmyer (1976)
$0^d.40964431$	$0^s.29$	Dawson *et al.* (1977)
$0^d.40964660$	$0^s.49$	Maddox *et al.* (1981)
$0^d.40964504$	$0^s.36$	Maddox *et al.* (1981)
$0^d.40964579$	$0^s.42$	Kennedy

periods and period increases published so far, indicating an average value of $0^s.36$. Insignificance of the quadratic term does not appear to warrant a quadratic solution.

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