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

Number 2545

Konkoly Observatory
Budapest
5 July 1984

HU ISSN 0374-0676

TIMES OF MINIMA OF ECLIPSING VARIABLES - III

This bulletin lists times of minima determined at this observatory in 1980, 1981 and 1983, as a continuation of the program for which results were previously published in I.B.V.S. No. 844 (1973) and I.B.V.S. No. 1379 (1978). The present observations were obtained with a larger telescope of 0.5 m aperture and with a new photometer designed and constructed by J.R. Stilburn. This photometer provides automatic sky subtraction by means of a rocking mirror, and by advancing the filter wheel several (normally 10) full cycles for each integration, permits essentially simultaneous observations in several colours. For the present observations a set of Johnson UBV filters was used, and times of minima determined independently for each of the three filters. As before, these were obtained by the method of Kwee and van Woerden

Table I

Observed Times of Minima

Star	HJD [2,440,000+]	E	O-C (days)	Observer
KO Aql	4450.7980 ± .0006	1430	.0308	F
	5524.8317 ± .0008	1805	.0558	F
OO Aql	4460.8016 ± .0010	7108.5	.0166	D
	4476.7681 ± .0009	7140	.0193	B
	4832.7879 ∓ .0006	7842.5	.0214	F
44i Boo	4366.7971 ± .0010	21856	.0318	D
	4390.9032 ± .0022	21946	.0346	D
	4409.7855 ± .0015	22016.5	.0360	B
	4811.7794 ± .0035	23517.5	.0406	S
	5473.8187 ± .0008	25989.5	.0430	G
	5476.9019 ± .0006	26001	.0463	G
	5477.8383 ± .0006	26004.5	.0453	G
	5478.7745 ± .0009	26008	.0442	F
	5488.8162 ± .0011	26045.5	.0429	G
ZZ Boo	4363.8527 ± .0016	1161.5	.0228	S
RZ Cas	4470.8530 ± .0008	12211	-.0020	F
	4831.8169 ∓ .0001	12513	-.0028	S
VW Cep	4427.7968 ± .0008	18192.5	.0165	D
	4455.7641 ± .0020	18293	.0132	S
	4455.9072 ± .0025	18293.5	.0172	S
	4457.8538 ± .0028	18300.5	.0156	F
	4470.7931 ± .0005	18347	.0133	F

Table I (cont.)

Star	HJD [2,440,000+]	E	O-C (days)	Observer
VW Cep	4788.7666 ± .0007	19489.5	.0134	F
	4812.8423 ± .0005	19576	.0149	F
	4822.8616 ± .0005	19612	.0149	F
	4824.8097 ± .0006	19619	.0148	F
	4834.8279 ± .0010	19655	.0137	F
	5507.7873 ± .0011	22073	.0105	S
	5562.7544 ± .0005	22270.5	.0107	F
	5562.8940 ± .0013	22271	.0111	F
MR Cyg	4480.7613 ± .0012	6609.5	.0007	D
	4833.7777 ± .0012	6820	.0015	S
V1073 Cyg	5568.8845 ± .0010	8775.5	-.0028	G
AI Dra	4371.7552 ± .0011	5695	-.0069	F
	4769.7619 ± .0006	6027	-.0068	F
	5478.8653 ± .0061	6618.5	-.0026	F
	5481.8597 ± .0006	6621	-.0052	F
TW Dra	4360.8447 ± .0012	2074	.0228	F
S Equ	5544.9246 ± .0009	2205	.0420	F
Z Her	4413.8677 ± .0008	7846	.0015	D
	4433.8286 ± .0008	7851	-.0016	D
RX Her	4813.8251 ± .0014	6990.5	.0030	F
	4821.8271 ± .0006	6995	.0015	S
	4829.8294 ± .0008	6999.5	.0002	S
TX Her	4362.8122 ± .0009	6815	.0122	F
	4809.7966 ± .0007	7032	.0181	S
	5499.8294 ± .0023	7367	.0148	G
	5532.7877 ± .0019	7383	.0161	G
AK Her	5480.8681 ± .0011	16486.5	-.0041	G
CM Lac	4446.8435 ± .0003	10856	-.0022	F
	4458.8775 ± .0012	10863.5	-.0034	F
	4828.7630 ± .0003	11094	.0007	F
	5571.7352 ± .0004	11557	.0008	G
FL Lyr	4459.7830 ± .0011	2482	.0067	S
	5572.8218 ± .0010	2993	.0104	G
U Oph	4371.9307 ± .0008	21517.5	-.0049	F
	4408.8336 ± .0007	21539.5	-.0036	B
	4429.8037 ± .0010	21552	-.0003	D
	4793.7895 ± .0008	21769	.0014	S
	5479.8250 ± .0009	22178	.0024	S
V502 Oph	4370.8684 ± .0007	10434.5	-.0044	F
V566 Oph	4406.8073 ± .0007	6276	.0092	D
	4448.7922 ± .0013	6378.5	.0055	F
	4780.8121 ± .0005	7189	.0075	S
	4781.8357 ± .0005	7191.5	.0070	F
	5512.8463 ± .0006	8976	.0049	F
	5513.8700 ± .0007	8978.5	.0045	G
EE Peg	4475.8140 ± .0014	1960	.0173	D
	5546.8202 ± .0025	2367.5	.0288	G
	5563.8916 ± .0016	2374	.0168	G
	5567.8399 ± .0039	2375.5	.0228	G
U Sge	4827.8181 ± .0002	8193	-.0036	F

Observers: B = D.J. Barlow D = P.A. Delaney F = D.W. Forbes
G = J. Gagné S = C.D. Scarfe

(BAN 12, 327, 1956), the program was modified in 1983 for interactive use by one of us (D.W.F.). The results listed in Table I are averages of the minima from each colour (excluding U if it was strongly discordant), and the uncertainties are the larger of

a. the root-mean-square value of the errors determined by the program for each colour
b. the standard error of one determination from the interagreement between the times of minimum in each colour.

The ephemerides used to calculate O-C were the same as those used in I.B.V.S. No. 844 and No. 1379. For stars not previously observed ephemerides are given in Table II. For TX Her the ephemeris in I.B.V.S. No. 1379 is incorrect, it should read P.Min. = 2430325.2006 + 2.05980915 E. Remarks on individual stars follow the table.

Table II Ephemerides

Star	HJD [2,400,000+]	Period	References
KO Aql	40355.2140	2.8640232	Hayasaka, PASJ 31, 271, 1979
V1073 Cyg	38672.5816	0.7858597	Kondo, AJ 71, 54, 1966
TW Dra	38539.4457	2.8068352	Pohl, IBVS 443, 1970
S Equ	37968.3438	3.436072	Plavec, BAC 15, 25, 1964
FL Lyr	39053.6060	2.17815081	Monske, IBVS 119, 1965
V502 Oph	39639.9431	0.45339304	Binnendijk, AJ 74, 222, 1969

Notes on individual systems:

1. KO Aql

Our observations and those of Olson (I.B.V.S. No. 1938, 1981) and Margrave (I.B.V.S. No. 1869, 1980; I.B.V.S. No. 1930, 1981; I.B.V.S. No.2086, 1982; I.B.V.S. No. 2292, 1983) all indicate that since 1979 the rate of increase in the period has been less than found from earlier data by Hayasaka (1979), whose ephemeris includes the term + 2.00 x 10^{-8} E^2.

2. OO Aql

Our observations show increasing positive residuals from the ephemeris of Herczeg (I.B.V.S. No. 699, 1972). This trend may be accelerating, according to the recent observation of Pohl et al., (I.B.V.S. No. 2385, 1983).

3. 44i Boo

The residuals from the ephemeris of Pohl (I.B.V.S. No. 209, 1967) continue to increase, possibly at an accelerating rate.

4. VW Cep

Our results, together with others in the literature, indicate little departure from the period of Scarfe and Brimacombe (AJ 76, 50, 1971) that cannot be interpreted as a light-time effect in the triple system (Hershey, AJ 80, 662, 1975). The most recent observations, however, do suggest a new decrease in the period. The observations of Mahdy and Soliman (I.B.V.S. No. 2153, 1982) are anomalous, giving large positive residuals.

5. TX Her

The most recent minima favour the quadratic ephemeris of van Hamme (A. and Ap. 107, 409, 1982) over his linear and periodic ephemerides.

6. V566 Oph

The last entry in Table I of I.B.V.S. No. 1379 should have E = 2812. Our observations and those of Pohl and Gülmer (I.B.V.S. No. 1924, 1981) and Pohl et al., (I.B.V.S. No. 2385, 1983) disagree with those of Mahdy and Soliman (I.B.V.S. No. 2154, 1982) and Niarchos (I.B.V.S. No. 2451, 1983) in showing positive residuals from the ephemeris given in I.B.V.S. No. 1379.

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