COMMISSIONS 27 AND 42 OF THE IAU
INFORMATION BULLETIN ON VARIABLE STARS
Number 4643

Konkoly Observatory
Budapest
27 October 1998
HU ISSN 0374 – 0676

V842 Sco: PHOTOELECTRIC TIMES OF MINIMA AND A PERIOD STUDY

MIGUEL ANGEL CERRUTI

IAFE, CC 67 - Suc 28, 1428 Buenos Aires, Argentina, e-mail: miguelan@iafe.uba.ar

We present here the first photoelectric determinations of minima of the eclipsing binary V842 Sco = GSC 7898:1918 = CoD $-43°12132$. The other minima are photographic (Kooreman 1966). The observations were made during two runs both from Cerro Tololo Inter-American Observatory[1] in Chile and with the Lowell telescope and single-channel photon counting techniques and standard UBV filters. In 1982 a refrigerated phototube EMI 2070 was used while in 1995 a refrigerated phototube RCA 31034A was utilised. GSC 7898:1728 served as the comparison and GSC 7898:1382 = HD 163046(A0V) as the check. Although the light curve is not complete, eclipses are of almost equal depth viz. $A_{V_{MinI}}$=0.20–0.66 while $A_{V_{MinII}}$=0.20–0.64 so the system displays a W UMa light curve. This can be inferred from the partial light curves displayed into Figure 1.

The resulting times of minima were determined by the polynomial line method (Guarnieri et al. 1975, Ghedini 1982) and are the last entries in Table 1. Also, included in this table are the photographically determined times of minima. The dispersion for each minimum is in brackets following the minimum itself; for the photographic minima, the dispersion was estimated from a linear solution with equal weights, we assign a dispersion of 0.015 to all these minima. The Table also contains the associated cycle number, E, and in the last column the corresponding residual, O−C. We made a least square weighted linear solution taking into account all available minima to derive an improved ephemeris and a possible period variation.

$$\begin{aligned} \text{Min I} = \text{HJD } 2431233.5446 + 0^{\text{d}}.498284426 \times E \\ \pm\, 0^{\text{d}}.0031 \pm 0^{\text{d}}.000000098 \text{ m.e.} \end{aligned} \qquad (1)$$

We conclude that the period has not changed significantly over the 40000 revolutions (cycles) covered by the available observations, a fact that is very scarce in systems displaying a W UMa light curve. The behaviour of the O−C residuals are depicted in Figure 2.

The author would like to thank the staff and Director of CTIO for their hospitality.

[1] Operated by AURA Inc. under cooperative agreement with the NSF

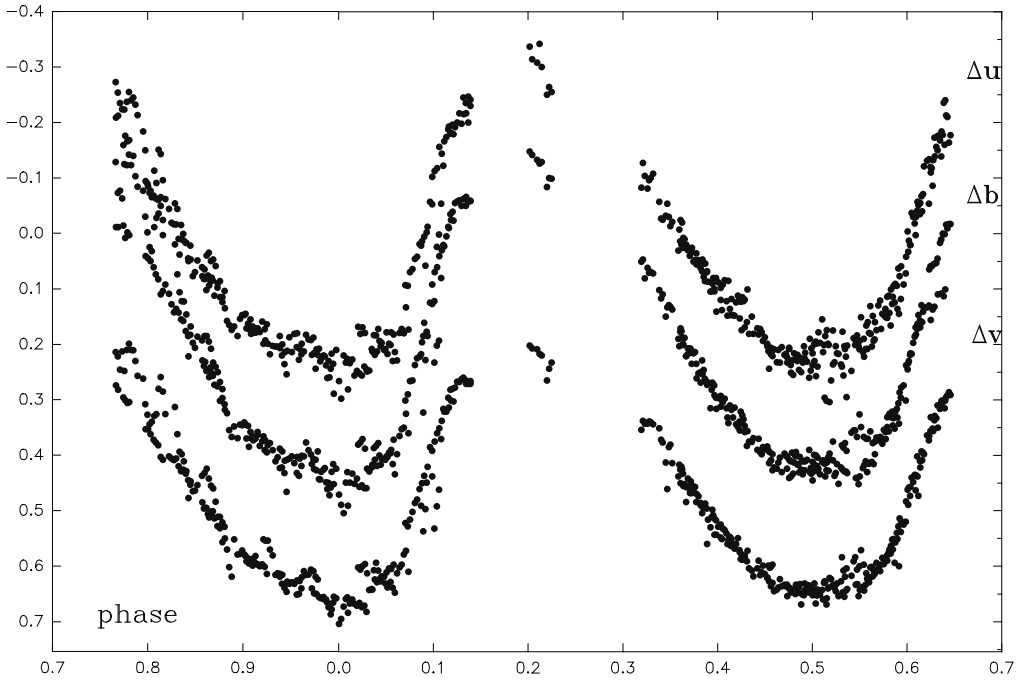

Figure 1. The partial light curves for V842 Sco. The vertical scale is for the visual differential magnitude.

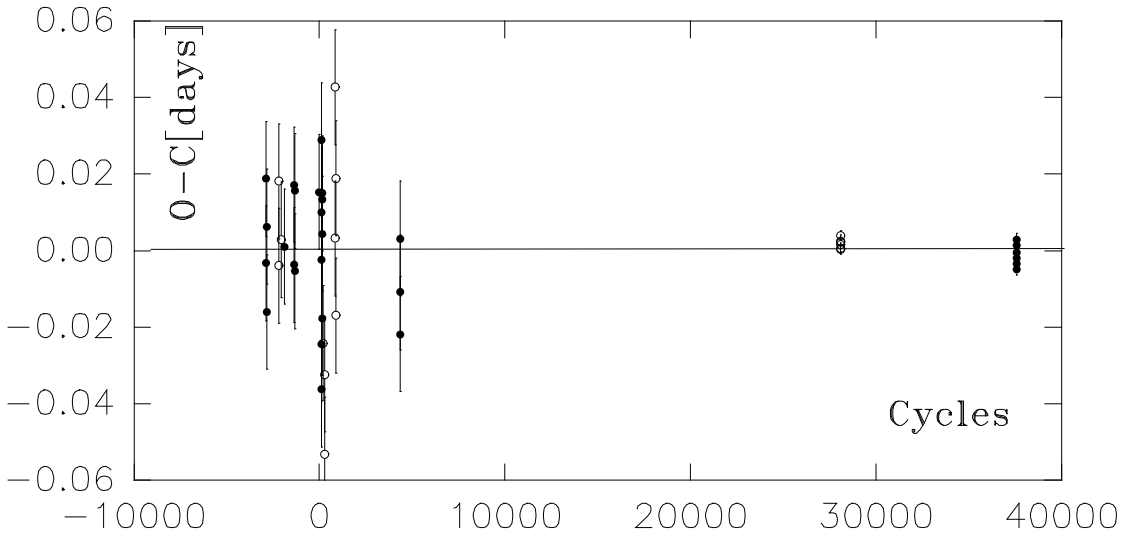

Figure 2. Behavior of the O−C residuals for V842 Sco from Eq. (1). Hollow circles stand for primary minima, vertical bars are for errors

Table 1: Times of minima and residuals for V842 Sco

Ref.	Min.	Band	HJD 2400000+ (sigma)	E	O−C
1	I	pg.	29794.4960(0.0150)	−2888.0	−0.0032
1	I	pg.	29794.5180(0.0150)	−2888.0	0.0188
1	I	pg.	29813.4180(0.0150)	−2850.0	−0.0160
1	I	pg.	29816.4300(0.0150)	−2844.0	0.0063
1	II	pg.	30149.5230(0.0150)	−2175.5	−0.0039
1	II	pg.	30149.5450(0.0150)	−2175.5	0.0181
1	II	pg.	30218.2930(0.0150)	−2037.5	0.0029
1	I	pg.	30286.3070(0.0150)	−1901.0	0.0011
1	I	pg.	30557.3690(0.0150)	−1357.0	−0.0037
1	I	pg.	30559.3830(0.0150)	−1353.0	0.0172
1	I	pg.	30574.3090(0.0150)	−1323.0	−0.0053
1	I	pg.	30574.3300(0.0150)	−1323.0	0.0157
1	I	pg.	31233.5600(0.0150)	0.0	0.0154
1	I	pg.	31287.3350(0.0150)	108.0	−0.0243
1	I	pg.	31287.3570(0.0150)	108.0	−0.0023
1	I	pg.	31288.3660(0.0150)	110.0	0.0101
1	I	pg.	31292.3060(0.0150)	118.0	−0.0362
1	I	pg.	31292.3710(0.0150)	118.0	0.0288
1	I	pg.	31312.2560(0.0150)	158.0	−0.0176
1	I	pg.	31312.2780(0.0150)	158.0	0.0044
1	I	pg.	31318.2680(0.0150)	170.0	0.0150
1	I	pg.	31321.2560(0.0150)	176.0	0.0133
1	II	pg.	31325.4540(0.0150)	184.5	−0.0241
1	II	pg.	31371.2670(0.0150)	276.5	−0.0533
1	II	pg.	31371.2880(0.0150)	276.5	−0.0323
1	II	pg.	31668.3010(0.0150)	872.5	0.0032
1	II	pg.	31669.3370(0.0150)	874.5	0.0426
1	II	pg.	31670.2740(0.0150)	876.5	−0.0169
1	II	pg.	31672.3030(0.0150)	880.5	0.0189
1	I	pg.	33411.5240(0.0150)	4371.0	−0.0219
1	I	pg.	33411.5350(0.0150)	4371.0	−0.0109
1	I	pg.	33411.5490(0.0150)	4371.0	0.0031
2	II	U	45222.6313(0.0014)	28074.5	0.0006
2	II	B	45222.6331(0.0018)	28074.5	0.0024
2	II	V	45222.6330(0.0011)	28074.5	0.0023
2	II	U	45232.5968(0.0010)	28094.5	0.0004
2	II	B	45232.6004(0.0012)	28094.5	0.0040
2	II	V	45232.5981(0.0019)	28094.5	0.0017
3	I	U	49947.6142(0.0005)	37557.0	0.0014
3	I	B	49947.6124(0.0009)	37557.0	−0.0004
3	I	V	49947.6079(0.0014)	37557.0	−0.0049
3	I	U	49949.6026(0.0007)	37561.0	−0.0033
3	I	B	49949.6088(0.0018)	37561.0	0.0029
3	I	V	49949.6040(0.0013)	37561.0	−0.0019

References: 1) Kooreman; 2) Cerruti 1982 present paper;
3) Cerruti 1995 present paper.

References:

Ghedini S. 1982, *Software for Photometric Astronomy*, Willman-Bell Inc. Press, Richmond, p. 59.

Guarnieri A., Bonifazi A., Battistini P. 1975, *Astron. Astrophys. Suppl.*, **20**, 199.

Kooreman C.J. 1966, *Leiden Ann.*, **XXII**, No 5, 159.