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1991 PHOTOMETRY OF THE W UMa-TYPE BINARY CK Boo

Variability of the W UMa-type eclipsing binary CK Boo was discovered by Bond (1975). Aslan and Derman (1986) observed photoelectrically and gave the improved ephemeris,

$$\text{Min (I)} = \text{J.D.(hel.) } 2442897.3759 + 0^{d}.3551501 \times E$$

Demircan (1987) made BV photoelectric observations in April 1985, Pajdosz and Zola (1988) observed CK Boo in BV system in 1988.

We have put the system in our program in order to determine accurate ephemeris and to study its short time-scale light variation and the change in its orbital period. Photoelectric observations of CK Boo in UBV and Strömgren's Hβ(w), Hβ(n) systems were made on six nights between April and May in 1991 at Xinlong Station of Beijing Observatory. We used HD 128128 as the comparison star which was adopted by Bond (1975).

The light curves in U, B, V, Hβ(w) and Hβ(n) are shown in Figure 1 and 3 respectively. The B−V and U−B colour indices are plotted in Figure 2. The light minimum times are listed in Table II which includes other determinations known to us. The O−C residuals of the minimum time were calculated using the elements given by Aslan and Derman (1986). The O−C curve was made using the data of minima times from 1975 to 1991 (see Figure 4). It had been fitted well by a parabolic curve, indicating that the orbital period of CK Boo is increasing continuously by 0.149 s/century, and its orbital period was $0^{d}.35520$ in 1991.

Table I. The amplitudes of the light curve and the average magnitude of colour index

Filter	Average Amplitude	Colour Index	Average Magnitude
U	0.30±0.02	U−B	−0.09±0.05
B	0.27±0.01	B−V	+0.02±0.04
V	0.26±0.01		
Hβ(w)	0.25±0.02	β	−0.02±0.04
Hβ(n)	0.28±0.02		

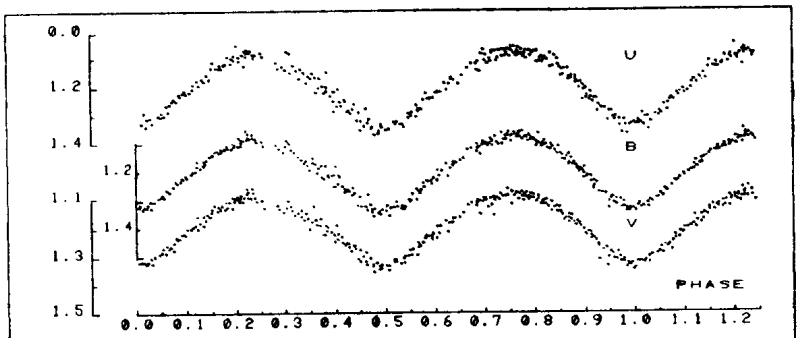

Figure 1 THE UBV LIGHT CURVES OF CK Boo

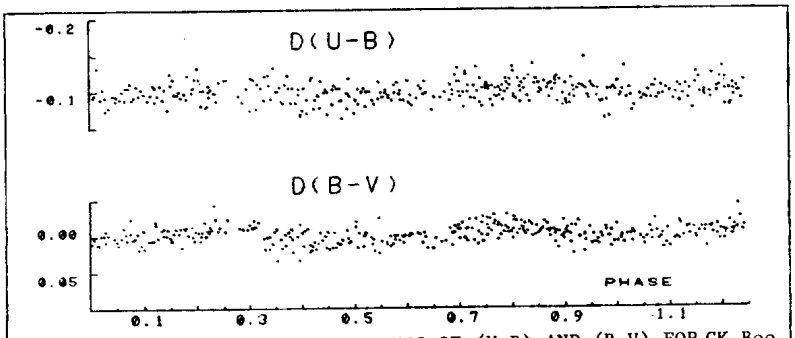

Figure 2 THE COLOUR INDEXES OF (U-B) AND (B-V) FOR CK Boo

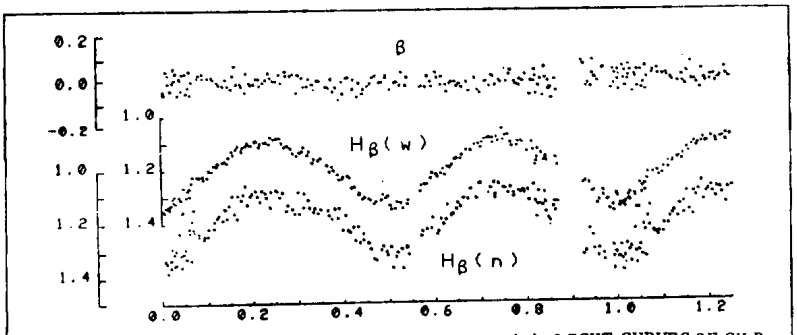

Figure 3 THE β INDEX CURVE, Hβ (w) AND Hβ (n) LIGHT CURVES OF CK Boo

Table 2. The minimum times of CK Boo

JD(hel) 2440000.0+	E	O-C (days)	Ref.	JD(hel) 2440000.0+	E	O-C (days)	Ref.
2537.4330	1013.5	0.0170	(1)	7291.4796	12372.5	0.0091	(5)
2897.3759	0.0	0.0000	(2)	7292.3699	12375.0	0.0115	(5)
2898.4418	3.0	0.0004	(2)	7298.4072	12392.0	0.0113	(5)
3225.5334	924.0	-0.0012	(2)	8362.0907	15387.0	0.0202	U*
3229.4409	935.0	-0.0003	(2)	8362.0913	15387.0	0.0208	B*
3230.5069	938.0	0.0002	(2)	8362.0908	15387.0	0.0203	V*
3341.3122	1250.0	-0.0013	(2)	8385.1797	15452.0	0.0244	U*
3573.5846	1904.0	0.0029	(2)	8385.1814	15452.0	0.0261	B*
3667.3400	2168.0	-0.0013	(2)	8385.1806	15452.0	0.0235	V*
3670.3610	2167.5	0.0009	(2)	8386.0668	15454.5	0.0237	U*
4753.3929	5226.0	0.0026	(3)	8386.0695	15454.5	0.0264	B*
4756.4161	5234.5	0.0070	(3)	8386.0664	15454.5	0.0233	V*
4790.3294	5330.0	0.0035	(3)	8386.2429	15455.0	0.0222	U*
5054.5625	6074.0	0.0049	(3)	8386.2434	15455.0	0.0227	B*
5057.5829	6082.5	0.0065	(3)	8386.2439	15455.0	0.0232	V*
5132.3408	6293.0	0.0053	(3)	8387.1319	15457.5	0.0273	U*
5140.3339	6315.5	0.0075	(3)	8387.1322	15457.5	0.0236	B*
6183.4110	9252.5	0.0088	(4)	8387.1321	15457.5	0.0235	V*
6183.4100	9252.5	0.0078	(4)	8388.1971	15460.5	0.0231	W*
7290.4153	12369.5	0.0102	(5)	8388.2002	15460.5	0.0262	N*
7290.4148	12369.5	0.0095	(5)				

(1) Bond (1975)
(2) Aslan (1978)
(3) Aslan and Derman (1986)
(4) Demircan (1987)
(5) Pajdosz and Zola (1988)
* this paper

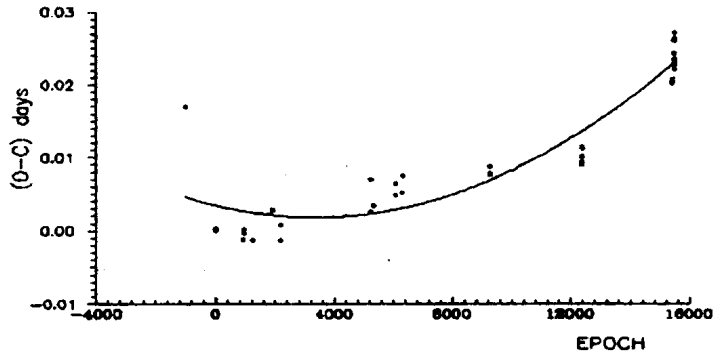

Figure 4 The (O-C) values of minimum times for CK Boo

The short time-scale light variations were analysed by auto-regression (AR) power spectral and Fourier method. There are no other significant short-term variations except the 4.3 hours period which is probably half the orbital period.

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