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PHOTOELECTRIC PHOTOMETRY OF UV LYNCIS IN 1994

UV Lyn (=BD +38°1992) was discovered to be an eclipsing binary by Kippenhahn (Geyer, Kippenhahn and Strohmeier, 1955). Kuklin (1961) gave several times of minima. Strohmeier, Knigge and Ott (1964) found that the star is of the EB type with a period of about 1.2 days. Strohmeier (1968, see Bossen, 1973) suspected the period to be incorrect and Bossen (1973) found that the star is a W UMa type binary with a period of 0.415 days but the two maxima present unequal brightness. He gave a total of 70 times of minima. Markworth and Michaels (1982) indicated that UV Lyn is an over-contact system, and they suggested that it may be an excellent object in studying mass exchange in contact systems.

Since the additional times of minima were given by Lichtenknecker (1979, 1981, 1982, 1983), Braune (1982), Hübscher (1982), Zimmermann (1982, 1983), Grzelczyk (1983), Vielmetter (1983), Quester (1985) and Pietz (1989) from visual or photographic observations. Fernandes (1983) and Agerer (1990, 1991, 1993) published some photoelectric minima.

In 1994 we observed UV Lyn with the 60-cm reflector at the Xinglong Station of Beijing Observatory. On December 12, 13 and 14, the observations were carried out in B and V with a single channel photon counting photometer. BD +38°1990 was adopted as a comparison star.

A total of 176 photometric observational points in each B and V obtained, covering a complete orbital cycle. The measurements have been corrected for differential atmospheric extinction and transferred into the UBV standard system.

By using the K-W method, two new times of minima were determined as listed in Table 1.

Table 1. New times of minima of UV Lyn

JD(hel) 2440000+	filter	m. e	Min.
9699.2752	V	±0.0004	II
9699.2751	B	.0004	II
9700.3088	V	.0003	I
9700.3088	B	.0003	I

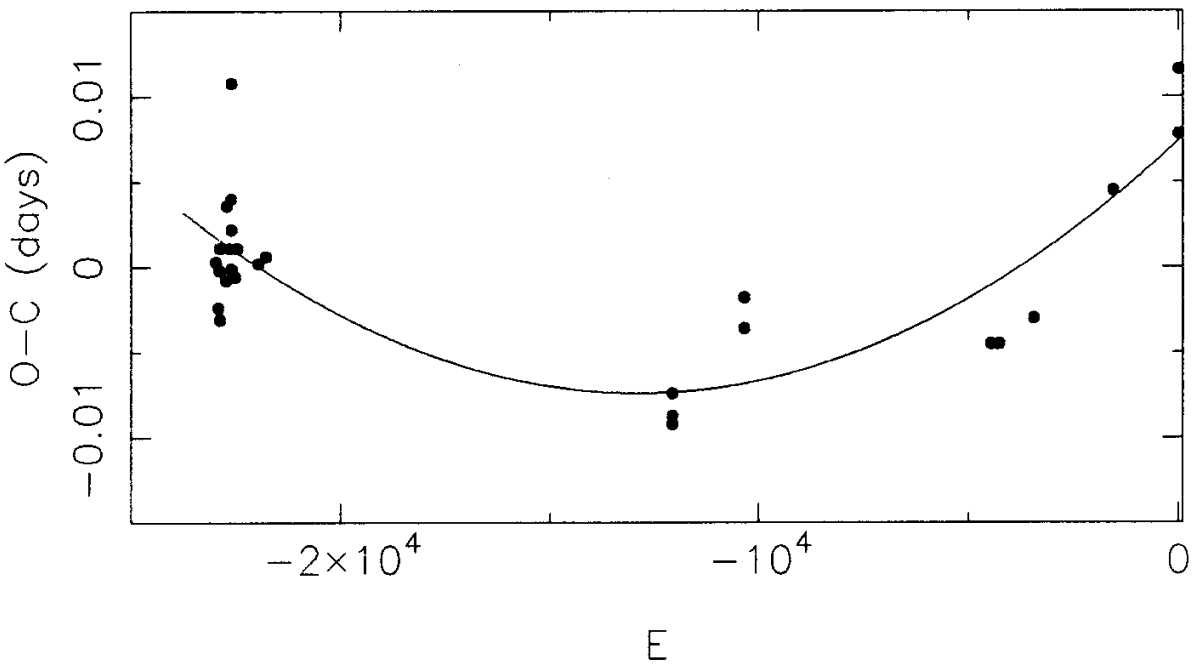

Figure 1. The O−C diagram of the minimum times of UV Lyn.

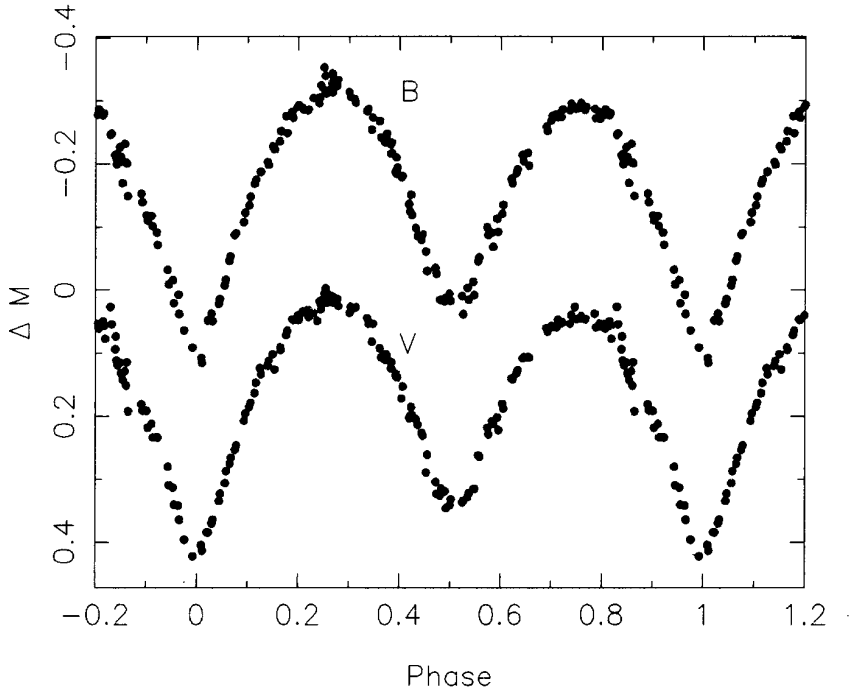

Figure 2. The light curves of UV Lyn in 1994.

Table 2. Photoelectric times of minima of UV Lyn

T_0 JD(hel) 2440000+	E	O−C	Source
165.6815	−22976.0	.0003	Bossen (1973)
187.4654	−22923.5	−.0024	Bossen (1973)
199.7095	−22894.0	−.0002	Bossen (1973)
203.6531	−22884.5	.0011	Bossen (1973)
205.7238	−22879.5	−.0031	Bossen (1973)
265.4835	−22735.5	−.0008	Bossen (1973)
271.5051	−22721.0	.0036	Bossen (1973)
303.4562	−22644.0	.0011	Bossen (1973)
314.4562	−22617.5	.0040	Bossen (1973)
318.4053	−22608.0	.0108	Bossen (1973)
319.4341	−22605.5	.0022	Bossen (1973)
320.4693	−22603.0	−.0001	Bossen (1973)
357.4022	−22514.0	−.0006	Bossen (1973)
377.3230	−22466.0	.0011	Bossen (1973)
586.6804	−21961.5	.0002	Bossen (1973)
657.4351	−21791.0	.0006	Bossen (1973)
4693.7449	−12064.5	−.0092	Markworth, Michaels (1982)
4694.7842	−12062.0	−.0074	Markworth, Michaels (1982)
4696.6503	−12057.5	−.0087	Markworth, Michaels (1982)
5406.4816	−10347.0	−.0036	Fernandes (1983)
5407.3134	−10345.0	−.0018	Fernandes (1983)
7849.4781	−4460.0	−.0045	Agerer (1990, 1991, 1993)
7929.5706	−4267.0	−.0045	Agerer (1990, 1991, 1993)
8272.3459	−3441.0	−.0030	Agerer (1990, 1991, 1993)
9055.4239	−1554.0	.0045	Agerer (1990, 1991, 1993)
9699.2751	−2.5	.0116	This paper
9700.3088	0.0	.0078	This paper

Because of the relatively low accuracy of the times of minima from visual and photographic observations, we use only the photoelectric minima published (see Table 2) and derived a new linear and quadratic ephemeris by the least squares method as follows:

$$\text{Min I.=JD (hel)}\ 2449700.3010 \pm 14 + 0^{\text{d}}.41498171 \pm 8 \times \text{E}$$

and

$$\text{Min I.=JD (hel)}\ 2449700.3084 \pm 12 + 0^{\text{d}}.41498401 \pm 25 \times \text{E} + 8.94 \pm 97 \times 10^{-11} \times \text{E}^2.$$

The O−C diagram of the minimum times is shown in Figure 1, from which it seems that the period of UV Lyn is increasing distinctly but slowly. This is different from the result given by Bossen.

By using the linear ephemeris, the observations were combined into complete light curves as given in Figure 2. The light curves show obvious asymmetry with Max I brighter than Max II by about 0.03 mag in V and 0.05 mag in B, respectively. In view of the period changes in UV Lyn, it is suggested that a mass transfer from the secondary to the primary may exist in UV Lyn, and the asymmetry of light curves could be caused by the mass stream between the two components.

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