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TIME OF LIGHT MINIMUM OF BW VULPECULAE[1]

BW Vul (HD 199140 = HR 8007, B2III, V = 6.55) has the largest known amplitude of light variation and radial velocity variation among the β Cephei stars. The period of the variation is approximately 5^h, and is now increasing at a rate of about 2 seconds/century.

We report photometric observations obtained on September 26, 1992 at Jungfraujoch Observatory with a 76-cm reflector telescope and the Geneva P1 photoelectric photometer. A Lallemand S-11 photomultiplier, refrigerated at about -23°C, was used as detector. The system was equipped with a DC amplifier and a strip-chart recorder. All measurements were taken through the V_1 filter of the Geneva system.

Comparison stars were the same as C_1 and C_2 used by Sterken et al. (1986), viz. HD 198820 = HR 7996 (B3III, V = 6.44) and HD 198527 = SAO 089185 (B9.5V, V = 7.0).

The observations were carried out according to the scheme $C_1, BW\,Vul, C_1, BW\,Vul, C_1, BW\,Vul$, ... and, in addition, a measurement of C_2 was taken at the beginning and at the end of the complete observing sequence. Each datapoint consisted of a measurement of about 1 minute duration. Sky background was measured about once every two cycles.

The data were corrected for sky background contribution, and for the effect of atmospheric extinction; the extinction coefficient $k_{V_1} = 0.569$ was derived by application of the classical Bouguer method on the measurements of C_1. The mean magnitude difference between C_1 and C_2 (in the sense C_1 *minus* C_2) was $-0^m.754 \pm 0^m.003$. Considering the rather large value for the extinction coefficient, and also the fact that the measurements had to be stopped for cirrus clouds, we assess the quality of our data as of weight 2–3 on the scale given by Sterken et al. (1993). Table 1 gives the differential V_1 magnitudes BW Vul *minus* C_1.

The time of minimum light $T_{min} = HJD2448892.3949$ was derived using the method outlined by Sterken et al. (1987). The residual to the linear ephemeris given by Sterken et al. (1993) equals $-0^d.0038$. Figure 1 shows all T_{min} values obtained since June 15, 1988 (that is, our new T_{min} and also those taken from Table 1 of Sterken 1993).

Our result indicates that probably no abrupt change in the period of BW Vul has occurred in the last year. However, more photometric data are needed to elucidate how much of the forthcoming changes of the period of BW Vul can be ascribed to the light-time effect in a binary system. For a detailed discussion on the interpretation of the period changes in BW Vul, we refer to Sterken (1993).

[1]BASED ON OBSERVATIONS COLLECTED AT THE HOCHALPINE FORSCHUNGSSTATION JUNGFRAUJOCH (SWITZERLAND)

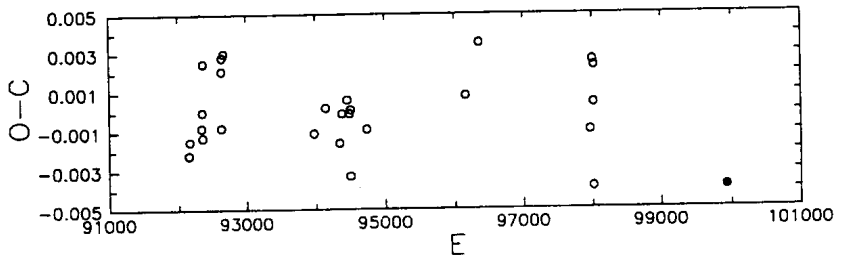

Figure 1: $O-C$ diagram for all available times of minimum since June 15, 1988 (the solid circle represents the new time of minimum reported in this paper) according to the cycle-count scheme given by Sterken(1993) and with $P = 0^d.2010443$ and $T_0 = 2447328^d.4751$.

Table 1. Differential V_1 magnitudes of BW Vul *minus* HD 198820. HJD is heliocentric julian date *minus* 2,440,000.

HJD	ΔV_1	HJD	ΔV_1
8892.3482	0.130	8892.3602	0.169
8892.3644	0.201	8892.3686	0.209
8892.3779	0.228	8892.3818	0.221
8892.3866	0.233	8892.3906	0.229
8892.3946	0.234	8892.3984	0.232
8892.4028	0.225	8892.4087	0.222
8892.4130	0.218	8892.4182	0.216
8892.4224	0.198	8892.4262	0.192
8892.4302	0.189	8892.4339	0.160
8892.4375	0.153	8892.4412	0.133

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