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

Number 1770

Konkoly Observatory
Budapest
1980 April 9

HD 17576AB: A VARIABLE G DWARF WITH A VERY HOT SUBDWARF COMPANION

HD 17576 ($7^m.29$, GO) was identified by Darius and Whitelock (1978) as the optical counterpart to the ultraviolet object UV0246-37 found in an UV sky survey made by the TD-1 satellite. They suspected duplicity and obtained spectra and uvbyβ photometry confirming the unusual nature of the object. The luminosity class of the GO primary was found to be V or IV-V. Several independent estimates of m_v for the secondary led to approximately $10^m.1$. They concluded that the secondary is more luminous than any white dwarf, but markedly subluminous for an early-type star. Darius and Whitelock do <u>not</u> mention that HD 17576 is a known <u>visual</u> double star (DAW 35).

Independently, Olsen (1979) also found HD 17576 to be a very interesting object. This was based on uvby photometry, and some speculations concerning the nature of the visual companion were published. The latest of two astrometric measures is by Finsen in 1934, and he estimated the visual magnitude difference at $3^m.2$ (Worley, private communication). The agreement with the estimate by Darius and Whitelock is fair, and it seems reasonable to suppose that the visual companion is the source of the ultraviolet flux from the system.

At the suggestion of the author, Hidayat et al. (Nature, preprint) observed the double star in July 1979 with the Bosscha double-refractor. Their preliminary results are a separation of $1''.6$ and a position angle of about 170°. This is nearly the same as the two astrometric measures from 1919 ($1''.8$, 173°) and 1934 ($1''.8$, 171°) indicating little or no projected orbital motion in the intervening six decades. The projected separation may be

estimated at less than 100 A.U., and therefore orbital motion may be detectable in the coming decades, assuming the pair to form a physical system. A mass determination for the secondary would be very valuable.

During two observing periods in 1979 HD 17576 was observed occasionally with a simultaneous four-channel photometer in the Strömgren four-colour system. The reductions show that the double star is variable, and the variations must be ascribed to the primary component. In Table I the mean values in the standard system are given together with the individual deviations from

Table I

HJD 2440000+	u	v	b	y=V	u-v	v-b	b-y	u-b
3932^{d}.5282	45	50	48	35	-5	2	13	-3
3933.5279	19	19	24	29	0	-5	-5	-5
3934.5283	25	37	28	26	-12	9	2	-3
3935.5229	8	22	28	34	-14	-6	-6	-20
3936.5209	14	9	8	8	5	1	0	6
3937.5147	1	2	-2	4	-1	4	-6	3
3938.5163	-3	-13	-6	2	10	-7	-8	3
3940.5172	-7	-14	-11	-21	7	-3	10	4
3941.5205	-15	-25	-34	-26	10	9	-8	19
4127.8752	-19	-34	-32	-30	15	-2	-2	13
4129.8223	-37	-40	-35	-37	3	-5	2	-2
4134.8072	-22	-9	-15	-24	-13	6	9	-7
Mean values	9305	8718	8216	7840	587	502	376	1089

these means (unit $0^{m}.001$). Over a period of nine days in March 1979 the double star gradually brightened by about $0^{m}.06$ in all colours and in September 1979 it was still at the bright level around $V=7^{m}.81$. One observation more than two years before (HJD=$2443013^{d}.866$) gave $V=7^{m}.79$, i.e. also relatively bright. It is tempting to speculate that this slow light variation of the primary may be due to an earlier interaction between the components at an epoch when the present secondary evolved through a violent phase towards the hot subdwarf stage. It is suggested that photometrists with frequent access to a southern telescope monitor this system to throw additional light on the nature of the variations. The 1980.0 coordinates of HD 17576 are

R.A. = $2^{h}47^{m}19^{s}.7$, Dec.=$-37^{o}03'.8$

Finally, it is instructive to compare the properties of this binary with those of HD 149499AB, which was recently discussed in detail by Wray et al. (1979) (cf. Table II). Their conclusion

Table II

	HD 149499	HD 17576
Separation	2".4	1".8
V(AB)	$8^m.69$	$7^m.79$-$7^m.87$
m_V(B)	$11^m.7$	$11^m.1$
S_p(A)	KOV	GOV or IV-V
M_V(A)	$5^m.9$	$4^m.4$
M_V(B)	$8^m.9$	$7^m.6$
Distance	35 pc	50 pc
m(1550Å)-m(2740Å)	$-2^m.0$	$-2^m.0$
T_{eff}(B)	85.000:K	42.000:K

is that HD 149499B may be the hottest white dwarf known with a temperature in the range 70000-100000 K. The steep gradient in the ultraviolet spectrum is shown by the magnitude difference, m(1550Å)-m(2740Å)=$-2^m.0$, which is equal to the one derived for HD 17576B by Darius and Whitelock form somewhat less detailed data. The identical gradients suggest that HD 17576B may be quite as hot as HD 149499B.

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