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A NOTE ON TWO Be STARS*

HD 30076

HD 30076 (= HR 1508 = 56 Eri) is known as a variable at least since Cousins (1963). It appears also in the Second Catalogue of Suspected Variable Stars (Kukarkin et al., 1965) under the number 6131. The spectral type given by Cousins was B5ne and the range of variation in V was 5.90 - 5.99. Later UBV observations by Feinstein (1968) pointed out variations of $0^m.12$ in V, $0^m.03$ in B-V and U-B (see Table III) in 35 months. However, HD 30076 is listed without indication of variability both by Crawford et al. (1971) and by Grønbech and Olsen (1976a).

We were unaware of this variability and HD 30076 was included in several occasions as a secondary reference or as a comparison star in our observing runs. uvby observations of this star have then been carried out at the ESO 1m telescope in September 1980 and August 1981, and at the Danish 50cm telescope at La Silla in January 1982. The 1m telescope was equipped with a standard one-channel photometer (Danks, 1981, Chap. II.C.1 and III.B.3) and the Danish 50cm telescope with a simultaneous four-channel photometer (Danks, 1981, Chap. II.H.1 and III.B.8). The integrations were repeated until reaching a satisfactory precision of the counts. For each run, the typical overall agreement of the observations with the international uvby standard system was for V, b-y, m_1 , c_1 respectively less than $0^m.011$, $0^m.006$, $0^m.008$ and $0^m.009$. The results are presented in Tables I and II.

*Based on observations collected at the European Southern Observatory, La Silla, Chile

Table I

uvby observations of HD 30076 at the ESO 1m
telescope (Sept. 1980 and Aug. 1981)

JD _⊙	v	b-y	m ₁	c ₁
2,440,000 +				
4487.8350	5.886	-0.013	0.066	0.078
4835.8886	5.842	-0.033	0.074	0.119
4839.8748	5.874	-0.032	0.075	0.130
4841.8664	5.893	-0.034	0.075	0.119

Table II

uvby observations of HD 30076 at the Danish 50cm
telescope (Jan. 1982)

JD _⊙	v	b-y	m ₁	c ₁
2,440,000+				
4972.6373	5.909	-0.031	0.064	0.148
4973.6607	5.906	-0.031	0.064	0.163
4974.6450	5.934	-0.016	0.059	0.128
4975.6371	5.879	-0.017	0.055	0.131
4978.5979	5.898	-0.027	0.064	0.144
4979.6252	5.979	-0.030	0.069	0.145
4980.5861	5.923	-0.030	0.070	0.145
4981.5899	5.898	-0.032	0.073	0.146
4982.6172	5.923	-0.035	0.072	0.161
4983.6289	5.939	-0.023	0.069	0.137
4984.6327	5.954	-0.021	0.067	0.146
4985.6248	5.948	-0.026	0.065	0.145

In Tables III and IV, we have gathered past observations of this star. The indices in the seven-colour (Geneva) system are the following (Rufener, 1981): $m_V = 5.890$, $U = 0.391$, $V = 1.065$, $B_1 = 0.797$, $B_2 = 1.585$, $V_1 = 1.758$ and $G = 2.261$. The star was pointed out as a suspected variable in Rufener and Bartholdi (1982) with $\sigma_V = 0.035$ and $\sigma(\text{colours}) = 0.007$. Feinstein (1968) found also $R = 6.69$ and $R-I = -0.06$ from two measurements in November 1965.

It is not easy to draw a light curve with all these data because the epochs are missing for most observations. But clearly, from our own observations and from the past data, variability appears to be present both on a short and long timescales with different amplitudes difficult to separate: daily fluctuations of a few hundredths of magnitude, while monthly or yearly effects are more important. The total variability seems to be fairly typical for a Be star and amounts to (from individual variations): $0^m.22$ in V , $0^m.07$ in $b-y$, $0^m.05$ in m_1 , $0^m.15$ in c_1 , $0^m.02$ in β , $0^m.06$ in $U-B$ and in $B-V$.

Table III

UBV observations of HD 30076

V	B-V	U-B	n	Ref.
5.92	-0.11	-0.83		Mendoza (1958)
5.90	-0.11	-0.81		Cousins (1963)
5.90	-0.13			Lake (1963)
5.91	-0.09	-0.77	4	Feinstein (1968) (Jan. 1963)
5.81	-0.10	-0.80	4	" (Dec. 1964)
5.79	-0.07	-0.77	4	" (Nov. 1965)
5.86	-0.09	-0.80	4	Crawford et al. (1971)
5.90	-0.11	-0.81		Nicolet (1978)

Table IV
 uvby β observations of HD 30076

V	b-y	m ₁	c ₁	n	β	n	Ref.
5.86	0.006	0.040	0.069	4	2.469	3	Crawford et al. (1971)
5.800	0.013						Grønbech (1974) (JJ _⊙ 42,000.79-83)
5.765	0.023						" 1.74-80)
5.794	0.024						" 2.67-82)
5.780	0.017						" 3.75)
5.760	0.023						" 4.67)
5.762	0.015						" 5.76)
					2.470	3	Feinstein (1974) (observ. in 1970)
					2.484	3	" 1972)
	0.006	0.040	0.069		2.469		Hauck & Mermilliod (1975)
5.836	0.034	0.021	0.015	2			Grønbech & Olsen (1976a)
± 0.009	± 0.002	± 0.009	± 0.005				
					2.463	3	Grønbech & Olsen (1976b)
					± 0.010		
5.886	-0.013	0.066	0.078	1			Table I (1980)
5.870	-0.032	0.074	0.123	3			Table I (1981)
± 0.026	± 0.001	± 0.001	± 0.006				
5.924	-0.027	0.066	0.145	12			Table II
± 0.028	± 0.006	± 0.005	± 0.010				

Table V

uvby observations of HD 172256

J.D. \oplus	v	b-y	m_1	c_1
2,440,000+				
4838.4851	8.667	0.120	-0.013	0.159
.5008	8.662	0.112	0.003	0.156
.5276	8.658	0.112	-0.005	0.167
.5371	8.661	0.119	-0.021	0.180
.5585	8.667	0.111	-0.007	0.180
.5675	8.671	0.113	-0.003	0.166
.5837	8.686	0.117	-0.013	0.166
.5939	8.690	0.113	-0.002	0.151
.6179	8.734	0.107	-0.011	0.149
.6285	8.740	0.101	0.004	0.129
.6455	8.743	0.110	-0.008	0.124
.6558	8.751	0.108	-0.006	0.124
.6733	8.742	0.106	0.001	0.111
.6826	8.733	0.108	-0.002	0.115
4839.4795	8.674	0.115	-0.007	0.147
.4903	8.673	0.109	0.005	0.140
.5808	8.740	0.112	0.000	0.162
.5955	8.740	0.121	-0.011	0.168
.6852	8.738	0.117	-0.003	0.131
.6971	8.729	0.124	-0.021	0.146
4840.5550	8.750	0.119	-0.007	0.173
.5660	8.755	0.121	-0.008	0.169
4841.5610	8.680	0.117	-0.005	0.153
.5726	8.678	0.122	-0.018	0.161
4842.5432	8.693	0.119	-0.011	0.144
.5531	8.701	0.117	-0.009	0.143
4843.6192	8.755	0.120	-0.008	0.154
.6291	8.761	0.121	-0.006	0.156
4844.6194	8.704	0.114	-0.006	0.154
.6281	8.696	0.117	-0.009	0.153

overall average (n = 30)

8.709 \pm 0.035 0.115 \pm 0.005 -0.008 \pm 0.006 0.151 \pm 0.017

Table V (cont.)

daily averages

2,400,000+

4838 (n = 14)	8.700+0.037	0.111+0.005	-0.006+0.007	0.148+0.024
4839 (n = 6)	8.716+0.033	0.116+0.005	-0.006+0.009	0.149+0.014
4840 (n = 2)	8.752+0.003	0.120+0.002	-0.008+0.001	0.171+0.003
4841 (n = 2)	8.679+0.002	0.119+0.003	-0.012+0.009	0.157+0.006
4842 (n = 2)	8.697+0.005	0.118+0.002	-0.010+0.001	0.143+0.001
4843 (n = 2)	8.758+0.004	0.120+0.001	-0.007+0.002	0.154+0.002
4844 (n = 2)	8.700+0.005	0.116+0.002	-0.007+0.003	0.153+0.001

mean of the daily averages (n = 7)

8.715+0.030	0.117+0.003	-0.008+0.002	0.154+0.009
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HD 172256

HD 172256 (=SAO 187112) was found variable when used as a comparison in our observations of V348 Sgr (Heck et al., 1982), which is not too surprising since it is listed as a Be star under # 606 in Wackerling's catalogue (1970). Its radial velocity is $+3.3 \text{ km sec}^{-1}$ (Wilson, 1953).

Our detailed observations are gathered in Table V. They were carried out in August 1981 at the ESO 1m telescope and the characteristics are the same as for HD 30076. The daily averages are also given in Table V. We have been unable to extract any periodicity out of the variations.

Here the amplitudes are relatively small, especially in b-y and m_1 . It would be interesting to check the variability on a longer timescale.

A. HECK¹ AND J. MANFROID^{2**}

¹IUE Observatory, Astronomy Division, ESTEC, European Space Agency, Villafranca Satellite Tracking Station, Apartado 54065, Madrid, Spain

²Département d'Astrophysique de l'Université de Liege, avenue de Coïnte 5, B-4200 Coïnte-Ougrée, Belgium

** Chercheur Qualifié F.N.R.S.

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