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HR 8851=HD 219586 IS A δ SCUTI STAR

Here we announce that HR 8851 is possibly a δ Scuti star which is newly discovered during the two night observation on December 23 and 25, 1992 at Xinglong Station, Beijing Astronomical Observatory. The observation was performed with the 60cm reflector in V band. HR 8918=HD 220974 and HD 220841 were chosen as the comparison star and check star, respectively. Some information on these three stars resorted from the newest version of the Bright Star Catalogue is given in Table 1. The weather conditions on these two nights were quite good and the observational log is listed in Table 2. The V band data of HR 8851 observed on Dec. 23 and 25 are listed in Table 3 and the lightcurves of HR 8851 with those of HD 220841 are plotted in Fig.1. The lightcurves suggest that the full amplitude of the light variation exceeds 0.05 mag. and the periodicity is complex.

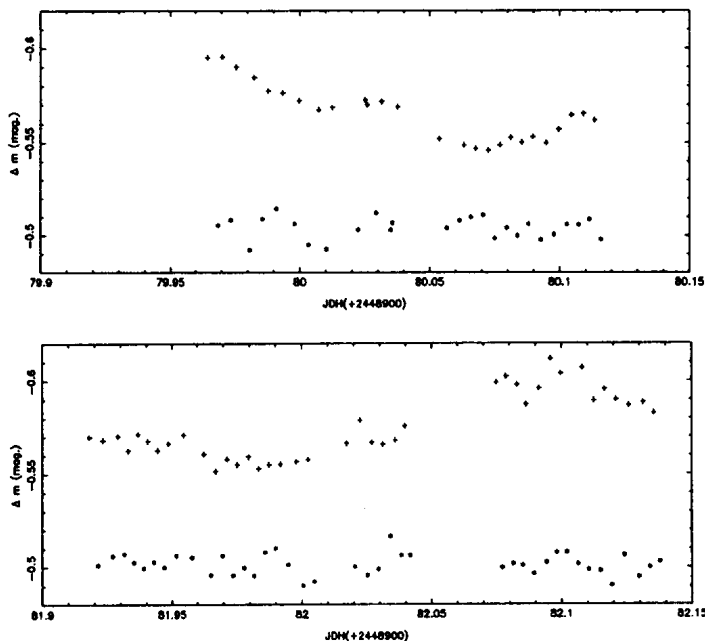


Figure 1. The lightcurves of HR 8851(+) and those of the check star HD 220841 for comparison(*)

Table 1. Information from The Bright Star Catalogue

	V	B-V	U-B	spectral type	$v \sin i$ (rotational)	radial velocity
HR 8851	5.56	0.24	0.12	F0IV	140 km/s	+12 km/s
HR 8918	5.6	0.19?		A6IV	115 km/s	-3 km/s
HD 220841	6.7			A2		

Table 2. Observation log

	weather	begin (UT)	end (UT)	time span (hour)	number of obs.	accuracy (mag)
Dec. 23	Excellent	11:05:09	14:44:58	3.66	26	0.0059
Dec. 25	Good	9:58:11	15:16:35	5.31	39	0.0055

Table 3. Observational data of HR 8851

JDH	V	JDH	V	JDH	V	JDH	V
+2448900		+2448900		+2448900		+2448900	
79.96457	-595	80.07706	-549	81.95451	-571	82.07487	-599
79.97026	-596	80.08121	-553	81.96244	-561	82.07866	-602
79.97554	-590	80.08543	-550	81.96692	-552	82.08284	-598
79.98239	-585	80.08971	-553	81.97136	-558	82.08636	-587
79.98781	-578	80.09484	-550	81.97523	-555	82.09131	-596
79.99339	-576	80.09965	-557	81.97952	-559	82.09577	-612
79.99962	-572	80.10448	-565	81.98348	-553	82.09962	-604
80.00722	-567	80.10912	-565	81.98738	-555	82.10790	-607
80.01243	-569	80.11341	-562	81.99180	-555	82.11236	-589
80.02519	-573	81.91796	-570	81.99793	-557	82.11646	-595
80.02591	-570	81.92313	-568	82.00230	-558	82.12102	-590
80.03146	-572	81.92894	-571	82.01723	-567	82.12596	-587
80.03768	-569	81.93287	-563	82.02237	-579	82.13137	-588
80.05375	-552	81.93672	-572	82.02698	-567	82.13547	-583
80.06328	-549	81.94047	-568	82.03130	-566		
80.06763	-547	81.94428	-563	82.03595	-568		
80.07256	-546	81.94849	-567	82.03966	-576		

*Note: The V band values are those of VAR-0.5×(comparison+check)

We used the periodogram method to estimate the variation and get two periods of $P_1=0^d2717\pm0.0007$ and $P_2=0^d0734\pm0.0002$ with amplitudes of 0^m021 and $0^m006\pm0.001$, respectively. The phase diagram of P_1 is shown in Fig. 2. We can see that the variation trend is fitted well by P_1 , but some parts are not good enough because of the existence of P_2 . Considering the limit of the data quantity (only two night observation), we cannot confirm the second period P_2 but the first one is undoubted. Further observations are needed to improve the accuracy of the period determination and find the small amplitude periods so that we can identify the pulsation mode of the δ Scuti star HR 8851.

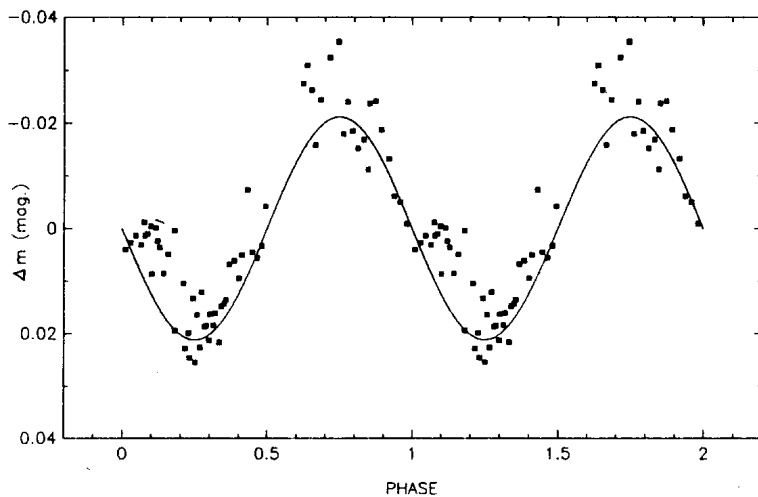


Figure 2. The phase diagram of the variation in HR 8851 for the period of $0^d.2717$

We searched the newest edition of General Catalogue of Variable Stars and the catalogue of δ Scuti stars (Lopez de Coca et al., 1990). We also searched Abstracts of A&A until 1991 and Astronomical Abstracts Database until October, 1992 in Astronomical Data Center of Beijing Astronomical Observatory. No reports about the photometric variation of HR 8851 were found, even a piece of information on this star. So we conclude that this is the first time the pulsation was found in HR 8851.

Finally we note that HR 8851 is announced to be a spectroscopic binary system by the Bright Star Catalogue, but no elements of the orbit are given. So the possibility of the shallow eclipse between the primary star and the secondary star should be taken into account. Anyway, we tend to think that the variation is caused by the pulsation of the star instead of the eclipse because the spectral type, the time scale and the amplitude of the photometric variation for HR 8851 indicate that this star is a δ Scuti star candidate.

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Reference:

Lopez de Coca, P., Rolland, A., Rodriguez, E. and Garrido, R., 1990, *Astron. Astrophys. Suppl. Ser.*, **83**, 51