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A NEW, APPARENTLY UNUSUAL DELTA SCUTI STAR, HD 18878

Small brightness variability of HD 18878 (F0) = BD+47°760 = SAO 38543 was first discovered by one of us (A.V.K.) during a short series of photoelectric observations (JD 2447501, 2447502). The observations were carried out at High Altitude Tian-Shan station (near Alma-Ata) of the Sternberg As-

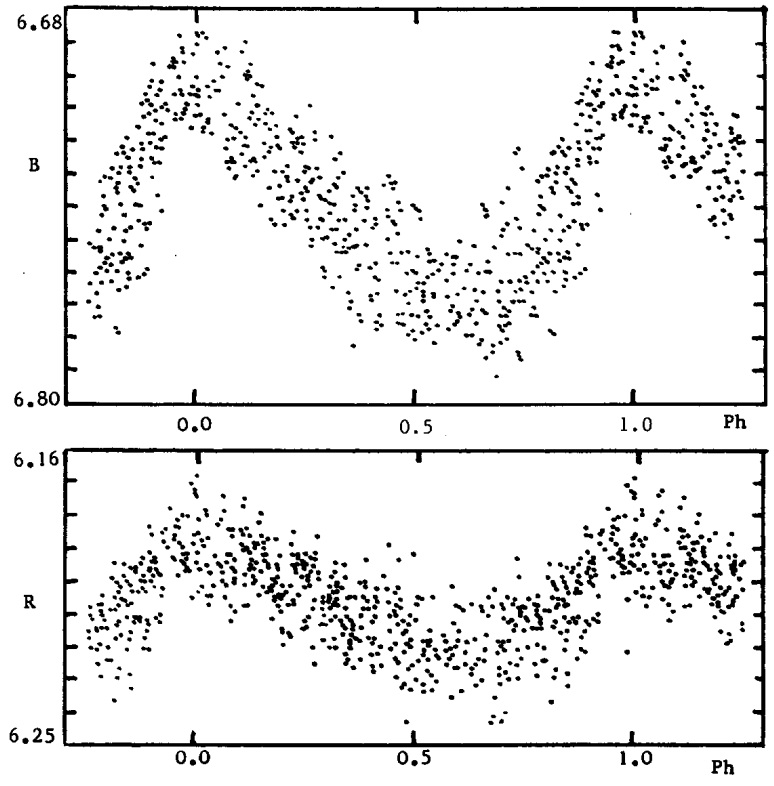

Figure 1

Fig. 1 B and V light curves of HD 18878. All 610 observations are plotted with P=0.^{d}145785. The star keeps its period during more than 2600 pulsation cycles: from JD 2447501 to JD 2447883.

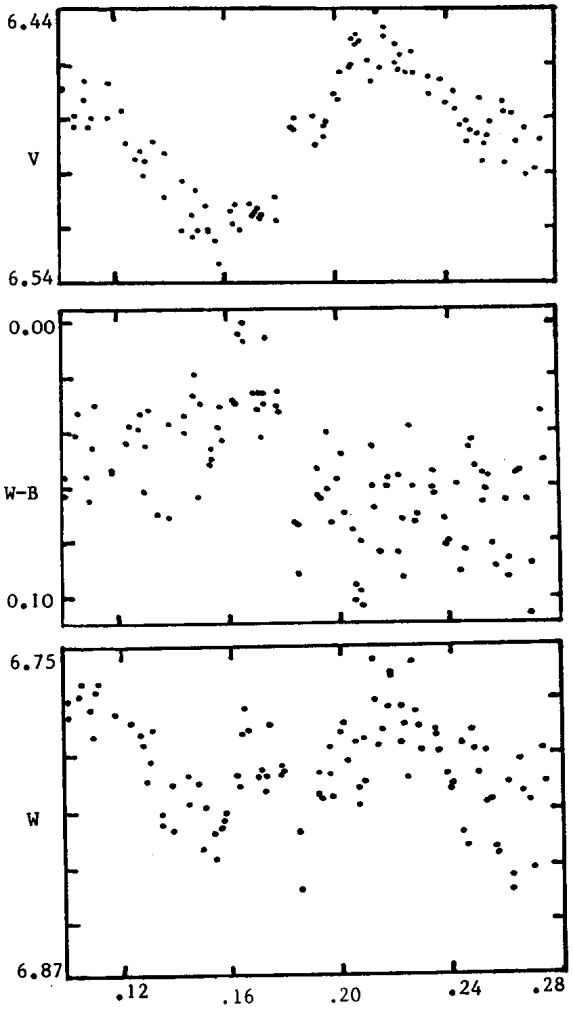

Figure 2

Fig. 2 V and W light curves and W-B colour curve of HD 18878 on JD 2447882. Sudden peaks in W and in W-B are seen near the time of light minimum of the V light curve.

tronomical Institute using a photoelectric photometer attached to the 19" reflector. The comparison star was HD 18411. Differential observations were transformed to the WBVR system (see Khaliullin et al., 1985), where W is similar (but not identical) to the standard U band.

During four nights JD 2447858, 2447873, 2447882 and 2447883 additional series of WBVR observations of the new variable star were carried out with

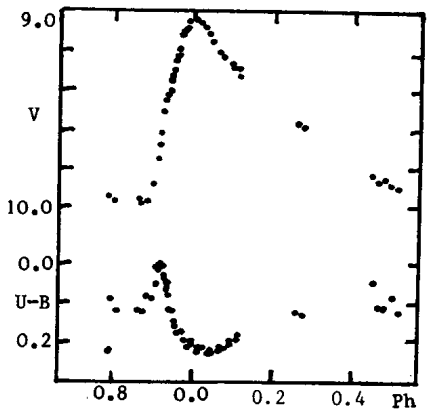

Figure 3

Fig. 3 V light curve and U-B colour curve of the RRab-type star X Ari (P= $0^d.651$, strong metal deficiency) from Preston (1961). Compare the behaviour of the U-B curve with the W-B curve of the new variable HD 18878 in Fig. 2.

Table I

Mean magnitudes of comparison star and standard stars

Star	W	B	V	R
HD 18411 (comp.)	4.864	4.737	4.694	4.604
HD 11335	6.407	6.310	6.288	6.225
HD 10307	5.482	5.559	4.966	4.435

the same equipment and with the same comparison star. Two standard stars HD 11335 and HD 10307 were also observed (Table I). The extreme limits of brightness and colour variations of HD 18878 are: 6.720-6.879 W, 6.687-6.798 B, 6.641-6.533 V, 6.168-6.249 R, 0.000-0.118 W-B, 0.227-0.275 B-V, 0.246-0.312 V-R.

HD 18878 shows periodic light and colour variations, more scattered in W and especially in W-B. Light and colour amplitudes differ from one cycle to another. Such a manner of variability at the spectral type F0 is typical for Delta Scuti stars. The analysis of all our 610 observations has revealed the presence of regular pulsations of the star with the following ephemeris:

$$\text{Max} = \text{JD } 2447883.2437 + 0^d.145785\ E.$$

HD 18878 keeps its period during all the time of our observations covering more than 2600 pulsation cycles (Fig. 1).

Nevertheless we want to pay attention to unusual for Delta Scuti stars features seen on JD 2447882 (Fig. 2). Along with smooth variations in V, B, R, sudden peaks were seen in the W light curve and also in the W-B colour curve on this night. These peculiarities were observed near the time of light minima on V, B, R light curves. The peak in W-B colour curve is similar to those well known among RRab-type stars. For example, Fig. 3 shows V and U-B curves of the RRab-type star X Ari ($P=0^d.651$, strong metal deficiency) from Preston (1961). Another peculiarity mentioned (peak in W light curve) has no analogies among pulsating stars at all.

One can of course speculate on the presence of the strong shock wave phenomenon in HD 18878 like in RRab-type stars, but first of all further observational confirmation is needed.

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