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INVESTIGATION OF THE PULSATONAL PECULIARITIES OF THE HOTTER  
COMPONENT IN THE ECLIPSING BINARY SYSTEM AB Cas

Already five eclipsing binary systems containing Delta Scuti pulsating component are known today: AB Cas, Y Cam, RS Cha, AI Hya and UX Mon (ZZ Cyg is not such a system as was recently shown by Frolov et al., 1982). The places of the pulsating components of these systems on the HR diagramme are shown in Figure 1.

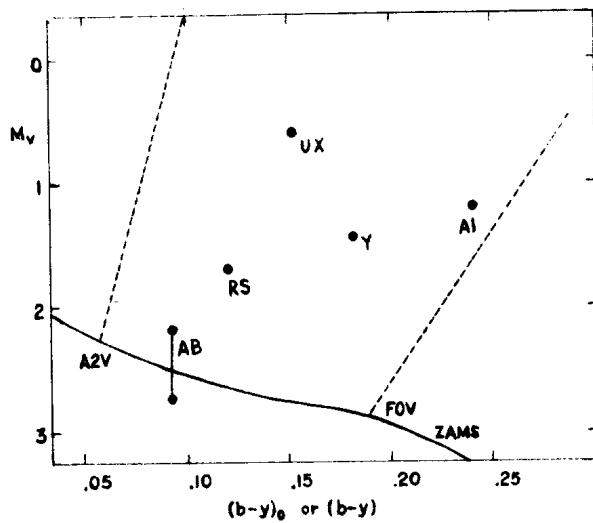


Figure 1

The parameters needed to construct this diagramme were taken from various sources, the borders of the instability strip are from Breger (1979). Because of large interstellar reddening in the cases of AB Cas and UX Mon we used the known uvby index calibra-

tions for the determination of the  $(b-y)_0$  values.

One can see from Figure 1 that all the five stars are indeed inside the Delta Scuti instability strip. The two  $M_V$  values for the hotter component of AB Cas plotted in Figure 1 (taken from different sources) suggest that this star is on the ZAMS and is unlike SX Phe.

Supposing that synchronism between rotation and revolution takes place for all the five systems we calculated rotation velocities  $V_{rot}$  of their pulsating components using radius and orbital period values. Pulsation constants  $Q$  were calculated for AB Cas, Y Cam, AI Hya and RS Cha using radius, mass, and pulsational period values (pulsational period of UX Mon is practically unknown). These values along with the physical parameters adopted are given in Table I.

Table I

| Star       | AB Cas                 | Y Cam   | RS Cha    | AI Hya   | UX Mon  |
|------------|------------------------|---------|-----------|----------|---------|
| Spectrum   | A3V                    | A9IV-V  | A5V       | F5       | A6V     |
| Mass       | 2.56 $_{\odot}$        | 2.15    | 1.86      | 2.0      | 3.47    |
| Radius     | 1.48 $_{\odot}$        | 3.03    | 2.14      | 3.88     | 4.30    |
| $P_{puls}$ | 0.0582874 <sup>d</sup> | 0.06646 | 0.084:    | 0.13803  | 0.02::  |
| $P_{orb}$  | 1.3668783 <sup>d</sup> | 3.30553 | 1.6698684 | 8.289676 | 5.90450 |
| $M_V$      | +2.75,+2.2             | +1.42   | +1.69     | +1.18    | +0.59   |
| $V_{rot}$  | 55 km/sec              | 46      | 65        | 24       | 37      |
| $Q$        | 0.046                  | 0.018   | 0.037:    | 0.026    | -       |

The values of  $V_{rot}$  and  $Q$  confirm that these pulsating components are Delta Scuti type stars. One can also suppose that variable components of AB Cas and RS Cha are pulsating in the fundamental mode, but first and maybe second overtone are excited in AI Hya and Y Cam consequently (in the frames of the radial oscillation hypothesis).

The eclipsing binary AB Cas was observed photoelectrically during 11 nights from November 1/2, 1980 to November 21/22, 1981. The 48-cm reflector of the High altitude station of Sternberg Astronomical Institute near Alma-Ata and a one-channel photometer with photon counting were used. The star was observed in the BV standard system.

Fragments of the light curve of AB Cas in B light versus

phases of the  $P_{orb} = 1.3668783^d$  are shown in differential magnitudes in Figure 2. One can see a small reflection effect in this system, the same effect was discovered by Ando (1980). Tempesti (1971) was the first who discovered the pulsational nature of the brighter (hotter) component in the AB Cas system. Ando (1980) confirmed this discovery.

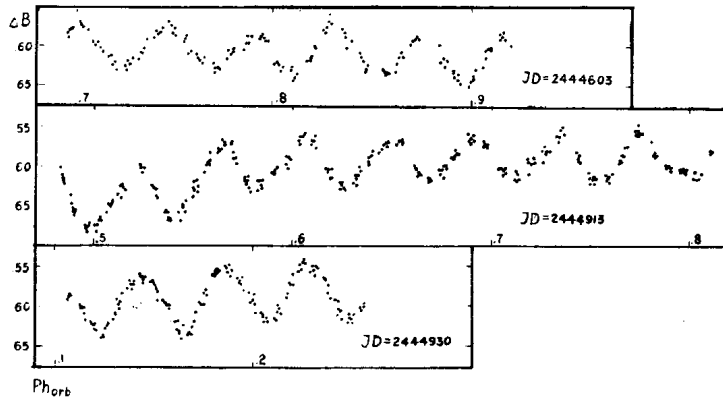


Figure 2

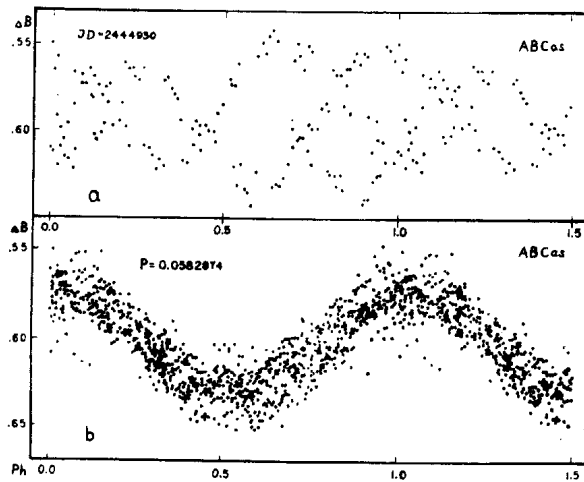


Figure 3.a.b

