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DETECTION OF A SATELLITE LINE SYSTEM IN HIGH-DISPERSION SPECTRA OF THE BETA LYRAE TYPE BINARY HD72754

During a spectroscopic research on peculiar binaries carried out in February 1986 with the ESO 1.5m-telescope equipped with the Coudè-spectrograph the ß Lyrae type object HD72754 = FY Vel (B2I:pe; $08^h29^m24^s$; $-49^o16'$; 1900) was observed twice with a dispersion of 12A/mm in the spectral range 3650A $\leq \lambda \leq$ 5050A (baked IIaO-emulsion). The two spectra were obtained at JD2,446,467.68 and JD2,446,468.60 corresponding to orbital phases $\phi = 0.56$ (spectrum N^o 1) and $\phi = 0.59$ (spectrum N^o 2), respectively. The reductions were carried out at Astronet pole in Trieste, Italy, using a PDS microdensitometer and ELSPEC software package (Pasian, Rusconi and Sedmak, 1982). The RMS errors resulting from calibration are 2% in exposure and 0.01A in wavelength values. The wavelengths were reduced to a heliocentric scale.

Both spectra clearly show the Balmer series in absorption from H8 up to H28, while Hδ ; Hγ ; and Hβ display broad emissions superposed by a central absorption. In addition, the lines H8 up to H28 as well as the HeI-singlet lines $\lambda\lambda$ 3926, 3965, 4009, 4143, 4388, 4438, 4922, 5016 exhibit red- as well as blue-shifted satellite lines which are much more pronounced at orbital phase $\phi = 0.56$ than at $\phi = 0.59$; the same is true at least for CaIIK, while CaIIH is not completely separated from Hε . In Fig. 1 the profiles of the lines H15, H9 and HeI(51) λ4388 taken from spectrum N^o 1) are plotted as an example.

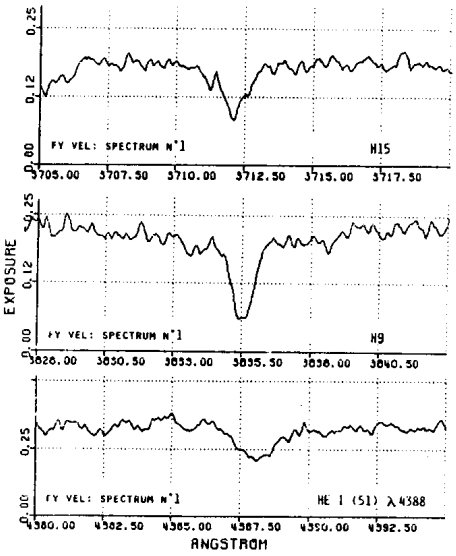

Figure 1

Especially at orbital phase $\phi = 0.56$, i.e., close to secondary minimum, part of the HeI-lines mentioned above seem to display even more satellite lines (complex multifolded structure of the profiles); as an example, Fig. 2 shows the region around HeI(50)λ 4438 for both spectra; note that this feature has considerably changed from $\phi = 0.56$ to $\phi = 0.59$, a fact which was also observed for some other lines.

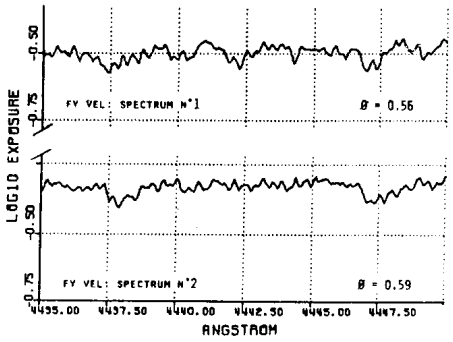

Figure 2

This satellite line phenomenon seems worth while being compared to ß Lyrae, which is similar to HD72754 in several respects (Thackeray, 1971), red-shifted satellite lines being observed shortly before and blue-shifted satellites shortly after primary eclipse.

The mean velocity-displacements of the line systems are given in Table 1 (no account has been made for the γ-velocity of the system).

Table 1: Mean Velocity-Displacements of the Line Systems

Spectrum N^{o} 1:

Blue-shifted satellite line : $\bar{v}$ = (- 67 ± 17)km/sec

Central component : $\bar{v}$ = (+ 7 ± 5)km/sec

Red-shifted satellite line : $\bar{v}$ = (+ 80 ± 27)km/sec

Spectrum N^{o} 2:

Blue-shifted satellite line : $\bar{v}$ = (- 58 ± 11)km/sec

Central component : $\bar{v}$ = (+ 22 ± 6)km/sec

Red-shifted component : $\bar{v}$ = (+121 ± 20)km/sec

The mean velocity of the central component increasing from orbital phase ϕ = 0.56 to ϕ = 0.59 is well in agreement with attributing this component (also being the strongest) to the primary.

The satellite lines then might be due to gaseous streams moving from one component to the following side of the other one.

It should be mentioned that at least part of the central absorption components mentioned above appear to be doubled or even multiple features.

Other features clearly identified are the HeI-doublet lines λλ4026, 4421, 4471, 4713 as well as the MgIIλ4481-doublet, and also some NII- and SiII-lines are seen, they all exhibiting complex multiple-structure profiles.

Also two red spectra of HD72754 with a dispersion of 20A/mm have been obtained; analysis is still in progress, and results will be published later. High-resolution spectroscopy covering a whole cycle in well spaced intervals will be necessary to derive a detailed model of this interesting system.

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References:

Thackeray, A.D., 1971, Mon. Not. R. Astr. Soc. 154, 103
Pasian, F., Rusconi, L., Sedmak, G., 1982, Publ. Oss. Astron. Trieste Nº 806