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THE ULTRAVIOLET SPECTRUM OF CLOSE BINARY STAR V448 CYGNI

The ultraviolet spectrum of V448 Cygni was obtained on July 25, 1982, using the IUE SWP 1746 camera in the range from 1165 Å to 2126 Å, with the resolution ~6 Å (see Fig.1) at the phase of orbital period $0^{P}.74$. Because of low resolution, the spectra of primary and secondary components were not separated, despite in optics it is possible at this phase (Glazunova, 1987).

For comparison with the models of Kurucz (1979), the interstellar absorption was taken into account by using the known dependence of X_{λ} from $E(\lambda-V)/E(B-V)$ relationship (Nandy et al.,1975), where the value of color excess $E(B-V)= 0^{m}.67$ for V448 Cygni was used (Hiltner,1956). The main parameters of the model of Kurucz were derived by Glazunova (1987): T_{eff}=20000 K, lg g = 3 for the primary; and T_{eff}=30 000 K, lg g = 4 for the secondary,respectively. Continuum fluxes, obtained by using the programs of Kurucz (1979) in LTE-approximation, were summarized for both components. The parameters of components obtained in the optical range are describing the binary system's UV-spectrum rather well (Fig. 2).

The identification of the absorption lines was made by comparing with the synthetic spectrum (Kurucz, 1979). The strong resonance lines such as Ly_{α}, CIV 1550, SiIV 1394-1403, and strong lines CII 1335, SiIII 1206, SiIII 1298-1304, NIV 1718, as well as a set of Fe lines, in various ionization stages were identified. From Howarth and Raman(1989), one may

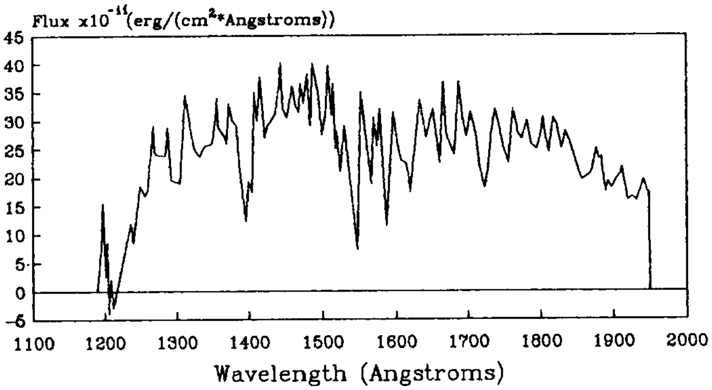

Figure 1

— Flux $x10^{-11}$(erg/cm^2*A)

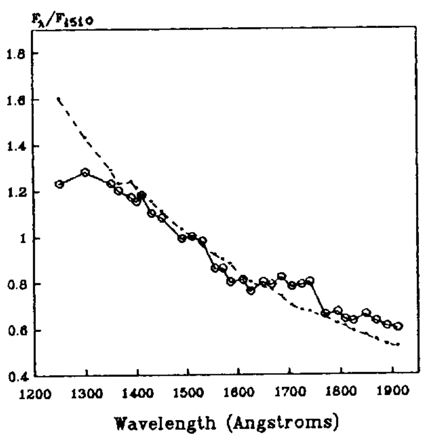

Figure 2

--- Ftheor/F_{1510} —o— Fobs/F_{1510}

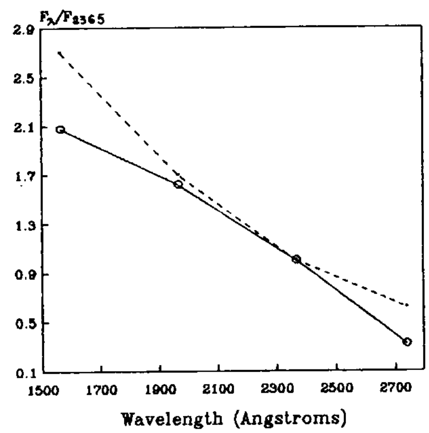

Figure 3

--- Ftheor/F_{2365} —o— Fobs/F_{2365}

obtain the mass loss rate in lines of these ions

Ion	$\dot{M}$ ($M_\odot$ / yr)
C^{3+}	$10^{-9.9\pm0.5}$
N^{4+}	$10^{-9.6\pm0.5}$
Si^{3+}	$10^{-9.3\pm0.5}$

The total mass loss rate by stellar wind for V448 Cygni is $\sim 10^{-7.1\pm0.5}$ $M_\odot$/yr.

Besides that, we studied the data for some absolute fluxes in the UV range for V448 Cygni measured in 1978 by the Sky Survey Telescope aboard the ESRO satellite TD-1 (Catalogue of Stellar Ultraviolet Fluxes, 1978).

Wavelength ,Å	2740	2365	1965	1565
Flux , $E \cdot 10^{-12}$ erg/(cm^2·s·Å)	2.63	2.24	3.62	3.61
E r r o r, $E \cdot 10^{-12}$erg/(cm^2·s·Å)	0.26	0.41	0.69	0.41

In Fig.3 one may compare the UV-fluxes (corrected for the interstellar absorption), from TD-1, with the models of Kurucz. Empirical and theoretical energy distributions in the spectrum of V448 Cygni are normalized to the flux at λ2365. One may see the depressions of the continuum from 1565 Å to 1965 Å and from 2400 Å to 2800 Å. The range of λλ2400-2800 Å was used to estimate the circumstellar envelope parameters while assuming the outstanding additional absorption in numerous UV-lines. The mean depression value was $\bar{D}=0^m.307$, and the parameters of two envelope models computed by Jafarli and Lyubimkov (1988), are:

a) $T_s = 10^4$ K, $Ne = 10^{12}$ cm^{-3} , $R_s = 1.23 \cdot R_*$;

b) $T_s = 10^4$ K, $Ne = 10^{11}$ cm^{-3} , $R_s = 30 \cdot R_*$.

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