

COMMISSION 27 OF THE I. A. U.
INFORMATION BULLETIN ON VARIABLE STARS

Number 1951

Konkoly Observatory
Budapest
1981 April 8

HU ISSN 0374-0676

FURTHER SPECTROSCOPIC OBSERVATIONS OF
BD + 16^o 516 (V 471 TAURI)

Spectroscopic observations of the white-dwarf eclipsing binary V 471 Tauri are reported. The star was observed in February 1980 and 22 spectra were obtained where, particularly H and K lines of CaII were investigated (Hamzaoglu, 1980). Further simultaneous spectroscopic and photoelectric observations were carried out, starting from November 1980 until the second part of February 1981. The spectroscopic observations were carried out at the Astrophysical observatory of Asiago-Italy and the photoelectric observations were achieved at Ege University Observatory-Izmir. In the course of spectroscopic observations over 70 spectra with the 122 cm telescope (cassegrain), prism spectrograph (with dispersions 42 Å/mm and 40 Å/mm at λ 3968 and λ 3933 Å, respectively) and RCA image-tube were obtained. Some of these spectra were taken in a "single-trail" mode as suggested by Walker and Chincarini (1968). In this mode of observations the H and K double reversals (absorptions+emissions) of CaII are seen more clearly and any kind of variation, if exist can be discerned very easily. Also in the same spectra, apart from the central emission component (K_3) of λ 3968 line, the two weaker emissions (K_{2r} , red displaced and K_{2v} , violet shifted) within the same absorption line are clearly visible. The radial velocities of these K_{2v} , K_{2r} emissions were determined and presented in Fig.1. The orbital elements of the star were determined using 36 spectra appropriately spaced in orbital phases. The spectral lines of KOV spectral type star were used in the determination of the mean radial velocity. From the radial velocity curves it was deduced that,

a. All spectral lines utilized in the radial velocity measurements are in absorption (as seen in KOV spectral type stars)

except $\lambda 3933$, $\lambda 3968$ (H,K) of CaII and very likely H_α is in emission (H_α was separately observed with the 182 cm telescope and Echelle spectrograph).

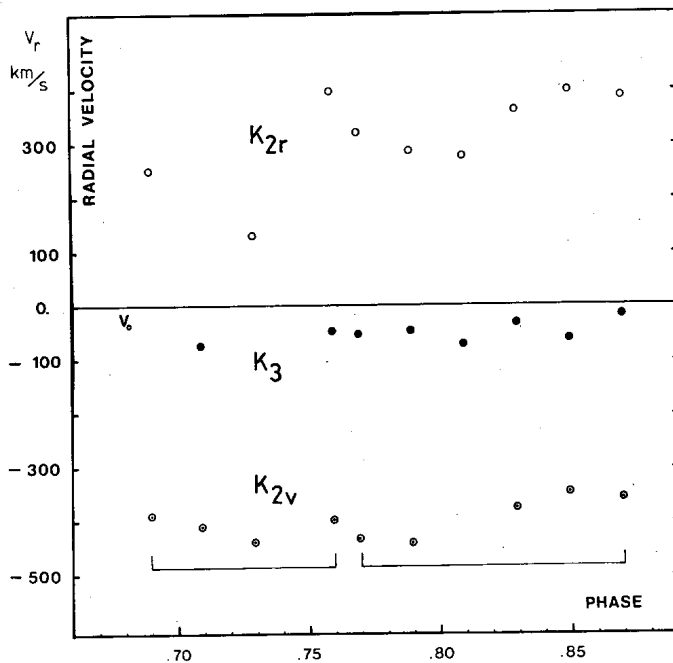


Fig.1. Displaced emission lines of the KOV component of the star. They were measured in the single-trail spectra among 0.69-0.87 orbital phases. Dots, open circles and dotted circles indicate:
 a. Central emission (K_3)
 b. Red-shifted emission (K_{2r}) and violet displaced emission (K_{2v}) of $\lambda 3968 \text{ \AA}$ line, relative to the baricentric γ velocity (+39 km/s) of the star. The first four spectra (0.69-0.76 phases) were obtained (January 2, 1981) on the same night consecutively on the same plate. Whereas the last six spectra (0.77-0.87 phases) were obtained (December 31, 1980) in the same way (single-trail) as the first four spectra.

b. Although $\lambda 3933$ and $\lambda 3968 \text{ \AA}$ emission lines of CaII are chromospheric in origin their radial velocities conform with the

mean radial velocity curve. (Fig.2.)

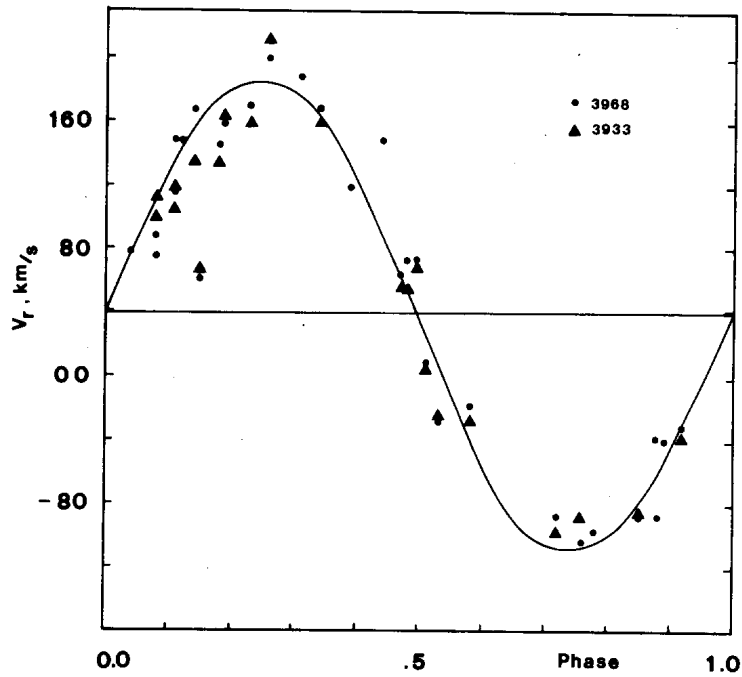


Fig.2. Observed data obtained from $\lambda 3968$ and $\lambda 3933$ Å emission lines of CaII. The solid curve represents the orbital elements with $e=0.0$, $K=147$ km, $\gamma=39$ km/s (V_0) and $P=0.52118286$ (assumed).

c. Although 4340 Å (H_γ) line (in absorption) appears clear and sharp in the spectra, does not conform with the radial velocity curve, obtained using the other lines within the spectra. H_γ exhibits different barycentric γ velocity values (Fig.3).

Acknowledgements: I would like to thank Prof.L.Rosino, Director of the Astrophysical Observatory of Asiago for constant comments on the spectra and to Prof.L. Bernacca for the financial support obtained through CNR.

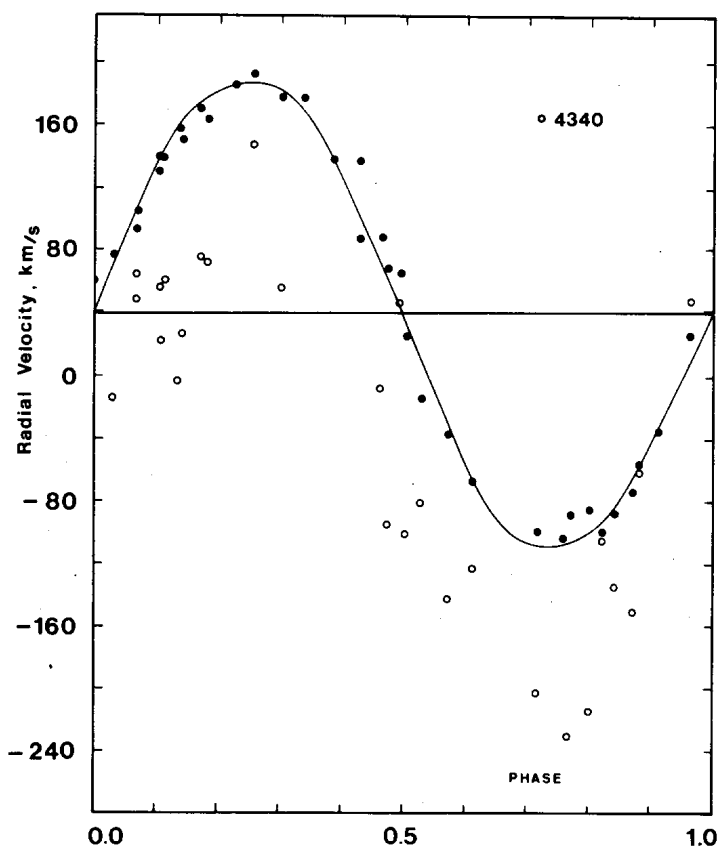


Fig.3. H_{γ} ($\lambda 4340 \text{ \AA}$) data measured in the same spectra, do not conform with the radial velocity curve obtained for the elements cited in Fig.2.

ESAT HAMZAOGLU

Ege University Observatory
P.K. 21 Izmir-Turkey

References:

- Hamzaoglu, E., 1980 I.B.V.S. No. 1860
 Hamzaoglu, E., 1980, *Astrophys. Space Sci.* to be published
 Walker, M.F. and Chincarini, G., 1968. *Ap.J.*, 154, 157