THE SPECTRUM OF CH CYGNI - A SEARCH FOR RAPID LINE VARIATIONS

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The spectacular changes of CH Cyg spectrum during the last period of activity and the flickering in short wavelength light suggest the possibility of rapid line variations (Walker et al.,1969). In November 1982 a series of spectral observations has been accomplished at Rozhen Observatory to investigate the subject.

In that period the spectrum of CH Cyg is dominated by type A shell lines. They are supposed to originate in an accretion disk surrounding the hot star of the binary system. The flickering in the optical wavelengths is characteristic for CH Cyg during periods of activity . Evidently it is related with the mass transfer. The investigation of its origin and relations with the other observational characteristics of the star could elucidate the accretion mechanism in this system.

On November 3, 1982 in 3 hours 11 spectra of CH Cyg have been taken at the coude spectrograph of the 2-m telescope in Rozhen Observatory. The original dispersion is 18 A/mm and the spectral range covered 3600-4900AA. The exposure time is 12-15 min.

The behaviour of some representatives of the different line systems has been studied. Some of them are shown in Fig.1. On the top the U - light curve of CH Cyg for the same time is presented. The photometric observations have been accomplished simultaneously with the spectral ones at Rozhen with 60-cm telescope (Chochol et al.,1984). There is well pronounced flickering of amplitude about 0.4^m and on a time scale of minutes or an hour.

The line profiles change in details. The violet emission peak of Hβ exhibits noticeable intensity variations, the red one being practically constant. So does the red emission of Hδ. The absorption line ScII 3630.74A on some spectra is nearly equal to CrII 3631.72A and on others it is considerably deeper. CaI 4226.73A shell line is well outlined on some spectra and hardly discernable on others.

The equivalent widths of some representative lines have been measured: the absorptions FeI 4045.82A, FeI 4071.74A, CaI 4226.73A for neutral atoms, the resonance line SrII 4077.71A, two lines of ScII 3630.74A and 3651.80A exhibiting no emissions, the [FeII] emissions at 4359.34A, 4728.07A and 4814.55A. The absorption line variations are small and rather random with a slight tendency to increase after 18h 10m. The in-

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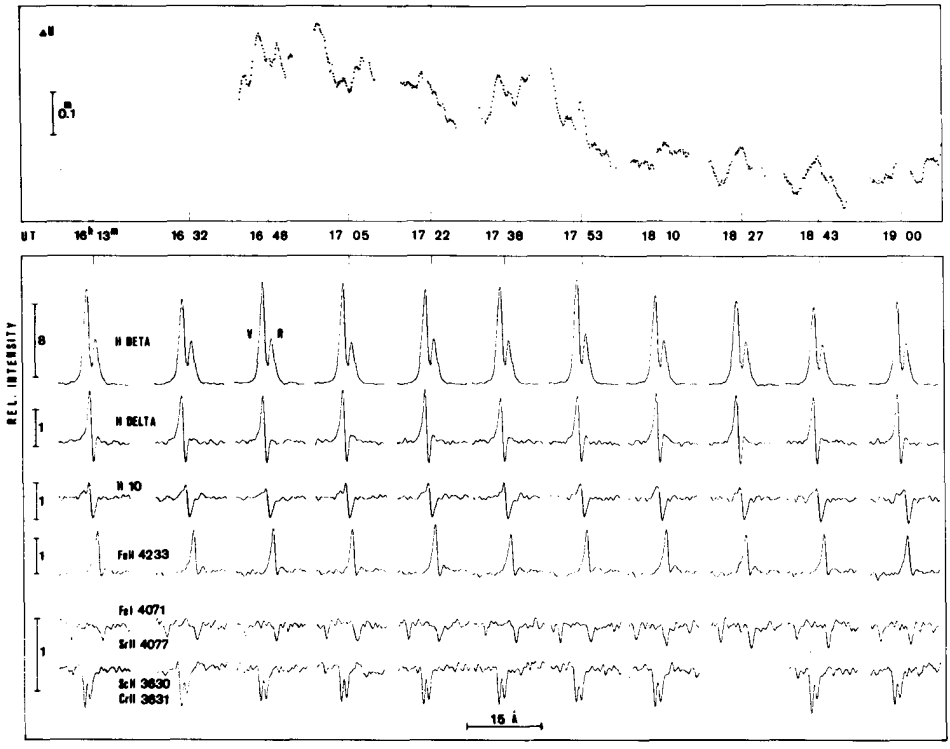

Figure 1. Relative intensity line profiles of CH Cyg spectrum on November 3, 1982. Top: U-light flickering at the same time. The UT is marked by the moments of mid-exposure.

tensity variations of the forbidden lines are evidently accidental.

The mean radial velocities from all the spectra are: -32.2 ±0.6 km/s measured from 11 FeI absorption lines on each spectrum; -35.5 ±0.3 km/s from 23 lines of ionized metals (ScII, TiII, CrII); -63.0 ±0.4 km/s from 8 lines of [FeII]; -71.7 ±0.3 km/s from 12 FeII emission lines. Their variations hardly exceed $2\sigma_i$ by amplitude (σ_i - the mean error of Vr from a given spectrum).

Our study showed no considerable rapid variations of the line spectrum of CH Cyg on the time scale of the flickering. The small profile changes do not correlate with the light variations. That suggests that the flickering does not originate in the regions where the studied line systems are formed.

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