V641 CAS - A SYMBIOTIC CANDIDATE ?

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The light variability of V641 Cas was discovered by Guinan et al. (1982). Spectral investigations were made earlier by Barbier(1971,1975), wich classified it as a VV Cep-type star and suggested that the V641 Cas is a binary system consisting of M3Ia supergiant and a B type star. Shaw and Guinan(1985) estimated the spectral class of the companion as B2.5. Recently Guinan et al. (1986) reported about semiregular changes with maximal amplitude of about 1.0^mduring 1979-1986. Slow variations in the brightness with a mean period 310d and variable amplitude of 0.3^m-0.9^m ph are established by Berthold(1983).

Our photometric and spectroscopic observations of V641 Cas are made during Nov.-Dec. 1986. The UBV photometry shows small increase in V from 8.50^m(Nov.12) to 8.46^m(Dec.11), while the star brightened by about 0.2^min U. This may be interpreted in terms of presence of a hot, variable component, observed in UV by Shaw and Guinan (1985). The position of V641 Cas on the (B-V)/(U-B) diagram (Fig.1) indicates a relatively low contribution of the hot component to the optical light. It is conspicuous, that assuming a luminosity class I for the M component the resulting reddening is remarkably low for an object lying in the galactic plane (l=118.3, b=+1.5). Thus, we can expect that it is either a reddened bright giant or a giant with additional circumstellar reddening. This implies that the hot component is about 100-1000 times fainter than a B2-3 main sequence star. The patrol observations show possible rapid light changes in U band with an amplitude of 0.1^m-$0.15^m$and on a time scale of 5-15 min. These are similar to the flickering observed in CH Cyg (Tomov et al.,1986) and in o Cet (Warner, 1972).

Our spectral observations of moderate (18 A/mm) dispersion show, that the absorption spectrum is very similar to one of a M2-3II star. The emission spectrum (especially the forbidden lines) is rather similar to this of CH Cyg than to the VV Cep (Fig.2). The Balmer emission lines, as well, as the broad absorptions (reported early by Barbier,1971,1975) are absent here. The average radial velocities of the M absorption lines and of the emission lines of [FeII] are close to those published by Barbier and the differences does not exceed 3-4 Km/s.

Additionally we have found 6 spectra of V641 Cas in the Torun collection of objective prism plates, in 1964-1972. On these spectra the

J. Mikolajewska et al. (eds.), The Symbiotic Phenomenon, 23–24.

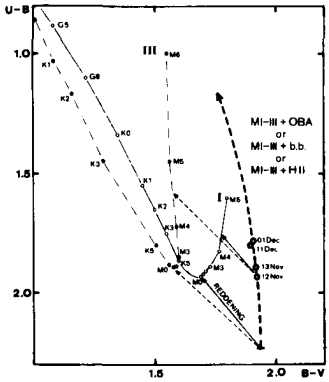

Fig.1

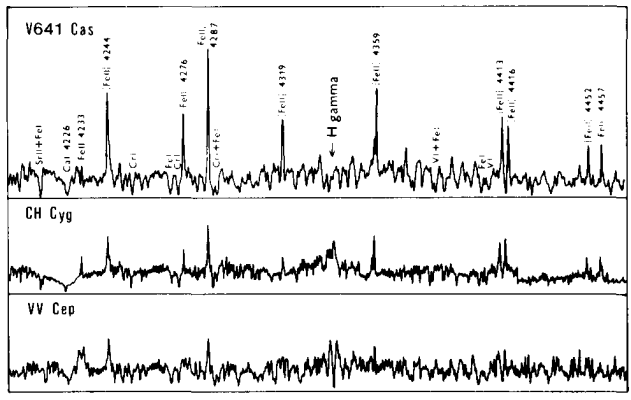

Fig.2

Figure 1. UBV observations of V641 Cas on the color-color diagram (large open circles). The sequences of giants (dots) and supergiants (small open circles) and interstellar reddening vectors are marked. Thick dashed line reflects positions of an object with composite spectrum.
Figure 2. A sample of the spectra of V641 Cas, CH Cyg and VV Cep.

Balmer lines (H_γ and higher) show remarkable changes. The behaviour of H_γ is especially interesting. Relatively strong emission is seen on all the spectra, except this from 17 Feb. 1966, where no emission is seen.

In spite of the fact that the observational data about V641 Cas are still quite scanty, it seems that the possible binary period of the system is about 1900d. The last deep minimum in broad-band H_α photometry (Guinan et al.,1986) occured about 1900d before our observations. On our spectra the emissions and absorptions of HI are absent, and the objective prism spectra show, that these are not seen also in 1966 - about 4x1900d before our observations.

In conclusion we suggest two possibilities about V641 Cas:
1. It is a long-period binary (possible eclipsing) consisting of M2-3 bright giant and a main sequence star - similar to VV Cep-type stars.
2. The V641 Cas is an object related to CH Cyg and o Cet, with accreting white dwarf as a secondary. If the companion is a subluminous object one may expect symbiotic phenomenon in this star.

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