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THE CARBON STAR V1965 Cyg

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V1965 Cyg is entry #2754 in the General Catalogue of Cool Carbon Stars (Stephenson, 1973), and #4347 in the Second edition of the same Catalogue (Stephenson, 1989).

Unfortunately, the star was mis-identified with the nearby Mira variable V1129 Cyg and this error propagated over many papers. Alksnis et al. (1990) and Kazarovets et al. (1990) tried to stop this confusion presenting observational evidences that V1129 Cyg and V1965 Cyg (= IRAS 19321+2757 = CGCS 4347 = RAFGL 2417 = C 2754 = NSV 12165 = IRC +30374 = CSV 4727) are indeed different objects.

V1965 Cyg has remained a poorly known object, without a devoted investigation in literature. We obtained low-resolution spectra of it in 1994, 1995 and 1997, and one Echelle spectrum in 1997. The low-resolution observations were secured with the Boller & Chivens+CCD ($R \sim 18$ Å) spectrograph of Padova & Asiago Astronomical Observatory 1.82 m telescope. The high-resolution spectrum was obtained with the Echelle+CCD ($R \sim 0.3$ Å) spectrograph at the same telescope. The spectra were extracted and calibrated in a standard fashion using the IRAF† reduction package running on a PC under Linux operating system. The journal of observations is given in Table 1.

Table 1: Journal of observations

Date	JD 2400000+	Exp. time [sec]	Resolution [Å]	Instrument
10. Dec. 1994	49697.28	45+720	18	B&C+CCD
15. Oct. 1995	50006.29	120+420	18	B&C+CCD
13. Nov. 1997	50766.26	1590	0.3	Echelle+CCD
20. Nov. 1997	50773.26	1500	18	B&C+CCD

The low-resolution spectra of V1965 Cyg are shown in Fig. 1 and the Hα order of the high-resolution one in Fig. 2. Both high- and low-resolution spectra show absorption lines and bands of a carbon star. In the Boller & Chivens spectra the strongest absorption feature is the blend of the NaI resonance doublet at 5889.953 Å and 5895.923 Å. The

†IRAF is distributed by the National Optical Astronomy Observatories, which are operated by the Association of Universities for Research in Astronomy, Inc., under cooperative agreement with the National Science Foundation.

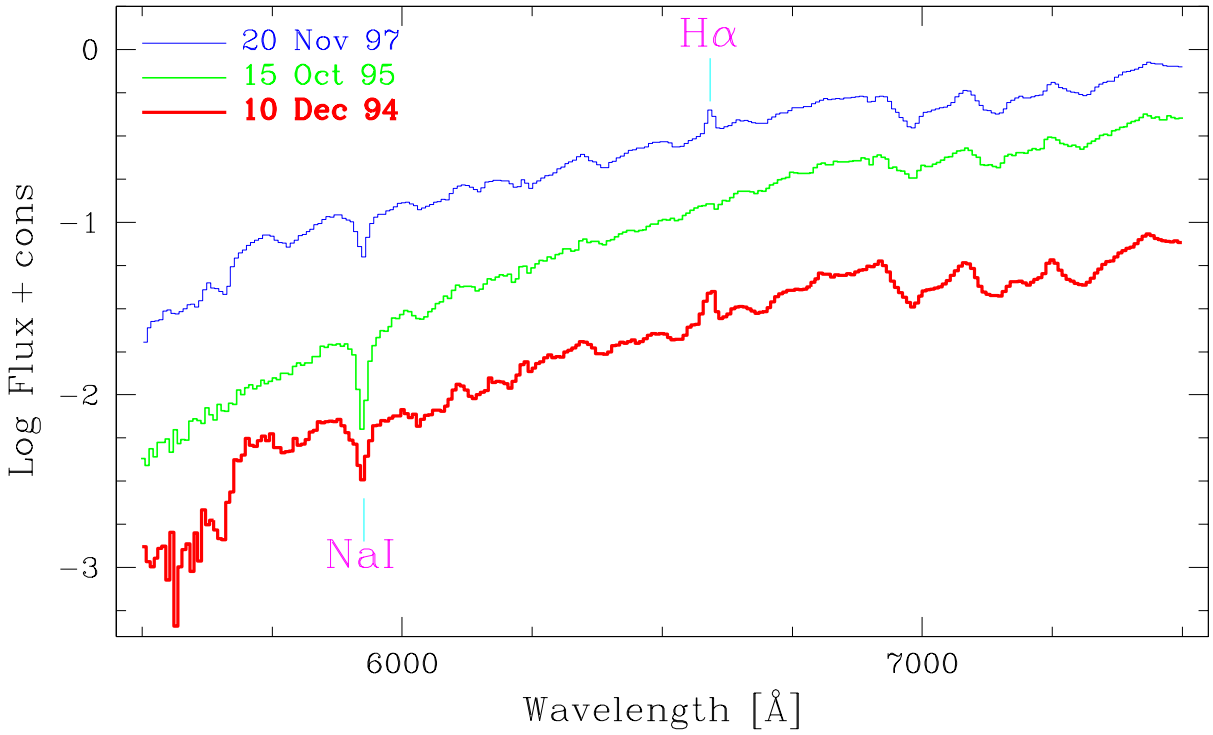

Figure 1. Flux calibrated Boller & Chivens spectra of V1965 Cyg.

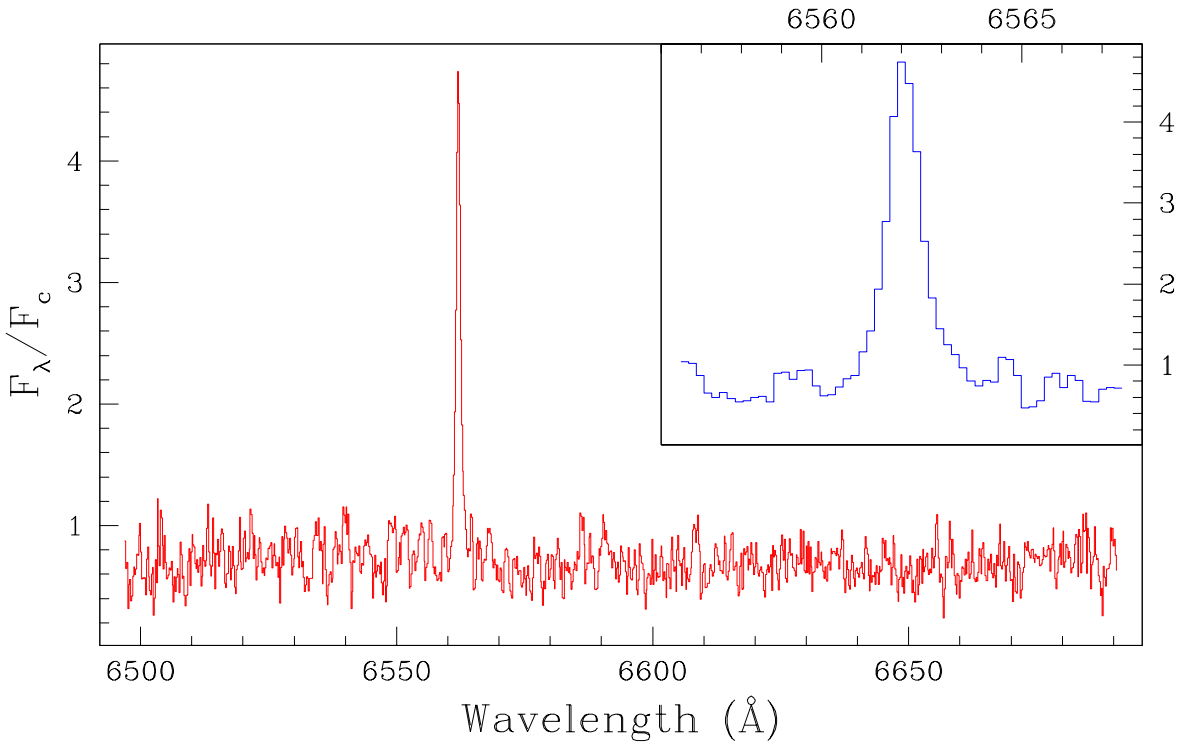

Figure 2. Hα order in the Echelle spectrum of V1965 Cyg (Nov 13, 1997).

most remarkable change in the low-resolution spectra of V1965 Cyg is the Hα that was in emission in 1994 and 1997 and absent in 1995. When the Hα was not in emission, the carbon absorption features retraced and the continuum appeared smoother. The integrated Hα flux is 1.7×10^{-13} on the Dec. 10, 1994 spectrum and 1.3×10^{-13} erg cm^{-2} s^{-1} on the Nov. 20, 1997 one.

The high-resolution spectrum of V1965 Cyg shows a sharp and moderate intensity Hα emission line with a symmetrical profile, whose FWHM is $\sim$0.9 Å (the FWHM of the instrumental PSF on night-sky lines is $\sim$0.3 Å) and the heliocentric radial velocity is -54.0 km s^{-1}.

Our observations are indeed not enough to address the issue on the nature of V1965 Cyg. They however document remarkable spectroscopic changes (affecting both the emission lines and the continuum) that could motivate a long term devoted photometric and spectroscopic monitoring. If the photometric behavior should not match that of a pulsating variable, the presence of Hα in emission and its large variability could suggest an interacting binary nature for V1965 Cyg.

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