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**THE VARIABLE M GIANT GSC 0375-00202  $\equiv$  V866 Her**

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The variability of V866 Her (= Antipin V9 = GSC 0375-00202 = IRAS 16582+4115) has been discovered by Antipin (1994). He found a moderate amplitude and irregular variability, remarked about the star's red color on Palomar charts and reported a  $12^m.1 \leq B_{pg} \leq 14^m.2$  range.

In 1995 and 1996 we obtained several spectra of V866 Her with the Padova & Asiago Astronomical Observatories' 1.82 m telescope equipped with the Boller & Chivens+CCD and Echelle+CCD spectrographs. The spectra were extracted and calibrated in a standard fashion using the IRAF<sup>†</sup> reduction package on a PC running under the Linux operating system. The journal of observations is given in Table 1.

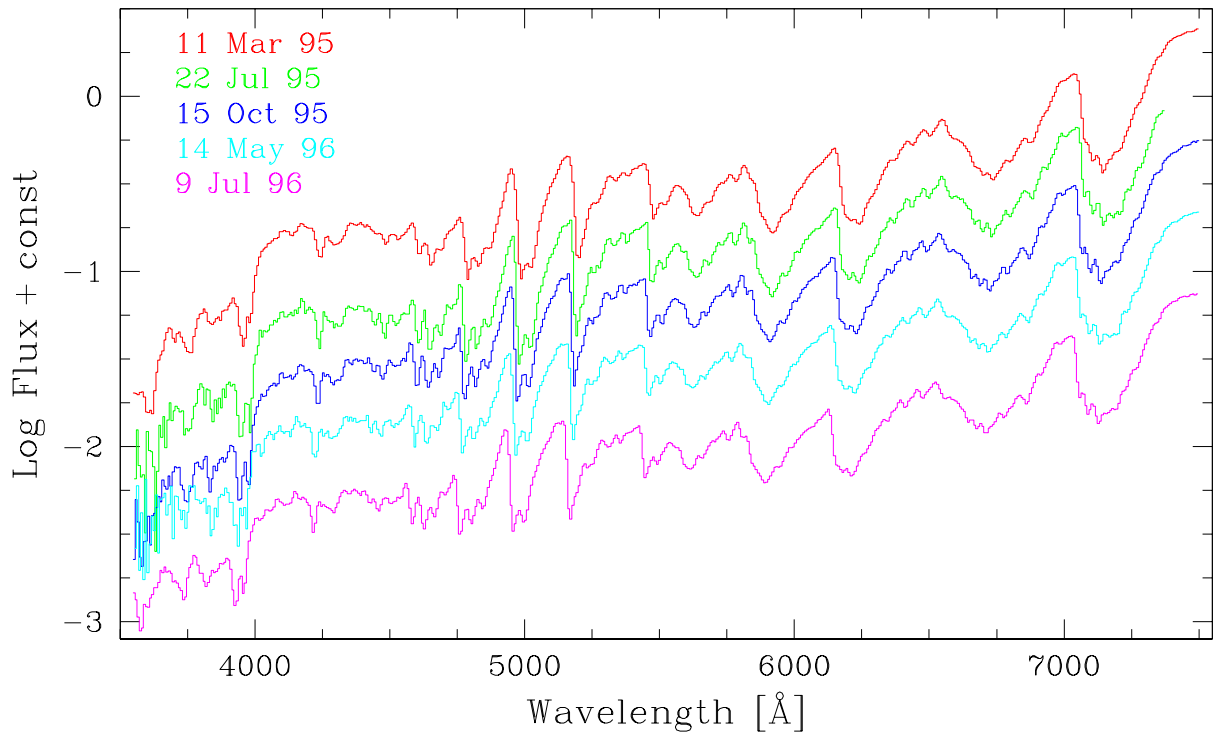
Table 1: Journal of observations

Date	JD 2400000+	Exp. time [sec]	Resolution [Å]	Instrument
11. Mar. 1995	49787.61	20+200	18	B&C + CCD
21. Mar. 1995	49798.50	900	0.3	Echelle + CCD
22. July 1995	49921.44	240	18	B&C + CCD
15. Oct. 1995	50006.26	60+180	18	B&C + CCD
14. May 1996	50218.39	180+180	18	B&C + CCD
09. July 1996	50274.35	60+240	18	B&C + CCD

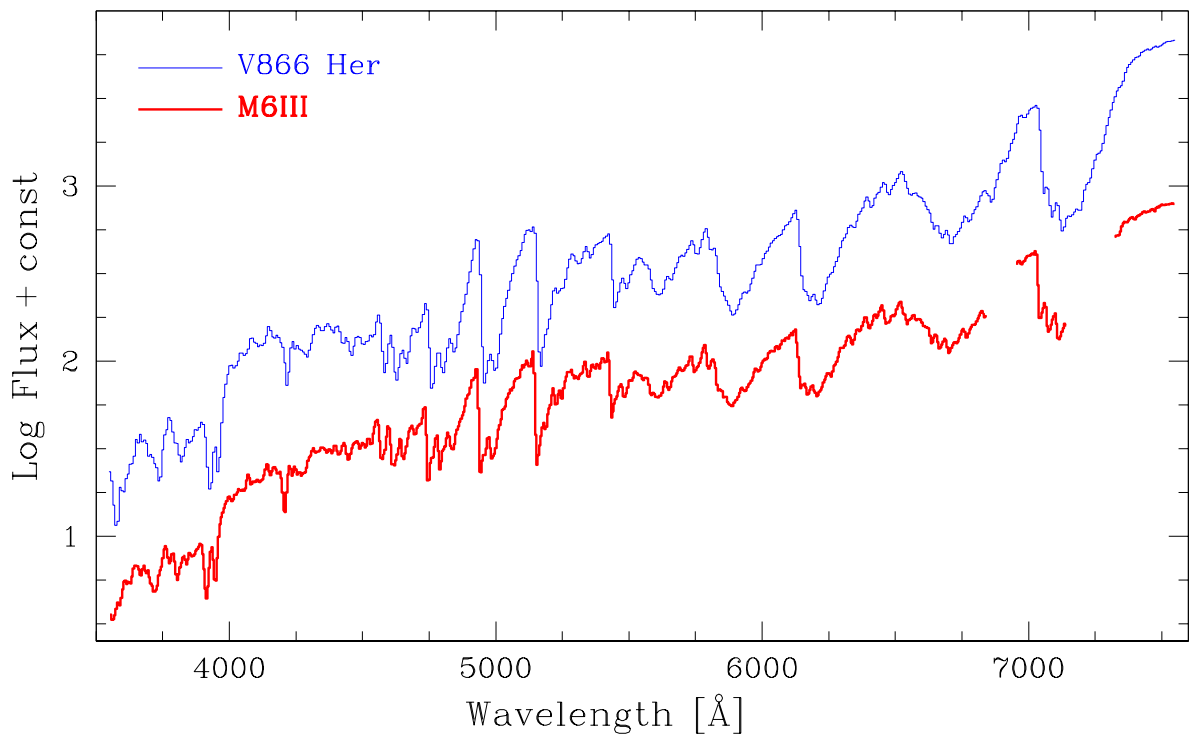
The low-resolution spectra of V866 Her, dominated by molecular absorption bands, are typical for O-rich late type giants (cf. Figure 1). A comparison with the M-giant spectra from the Silva & Cornell (1992) atlas show an excellent match to the M6III spectral type (cf. Figure 2). The continuum in the Echelle+CCD is very much the one expected from a M giant and no trace of emission lines is found (cf. Figure 3 where a comparison is made with T CrB in the H $\alpha$  region).

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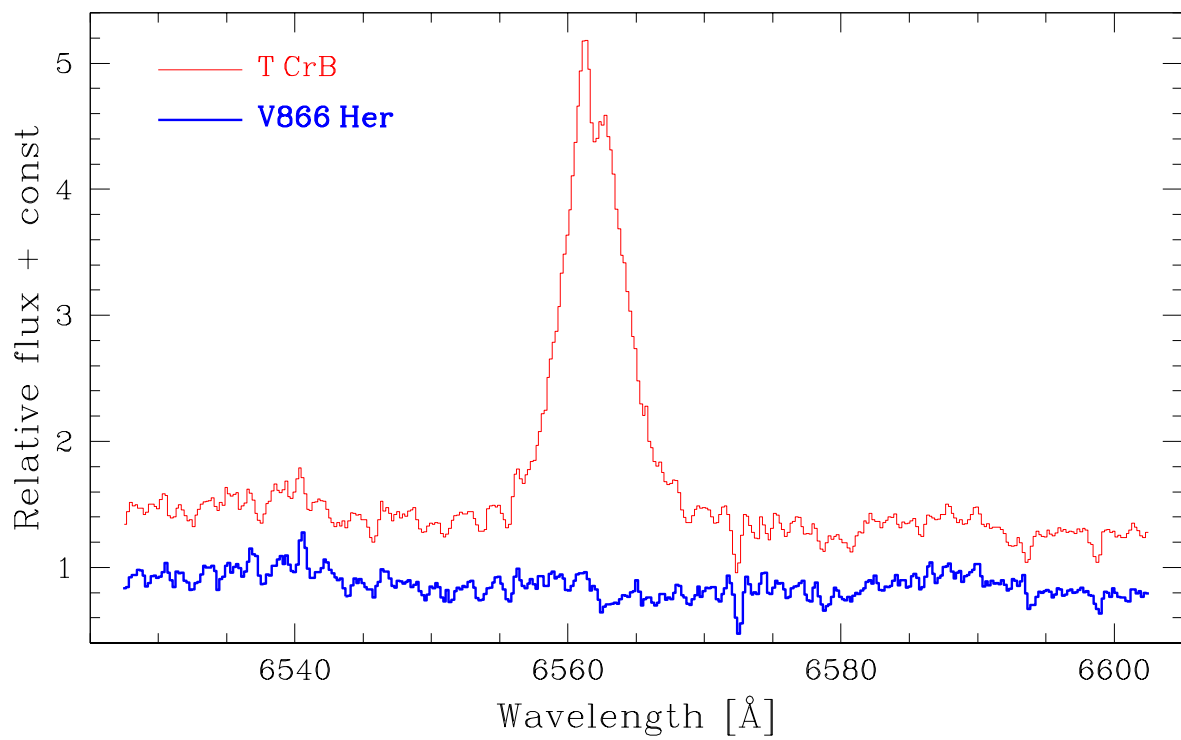
<sup>†</sup>IRAF is distributed by the National Optical Astronomy Observatories, which are operated by the Association of Universities for Research in Astronomy, Inc., under cooperative agreement with the National Science Foundation.



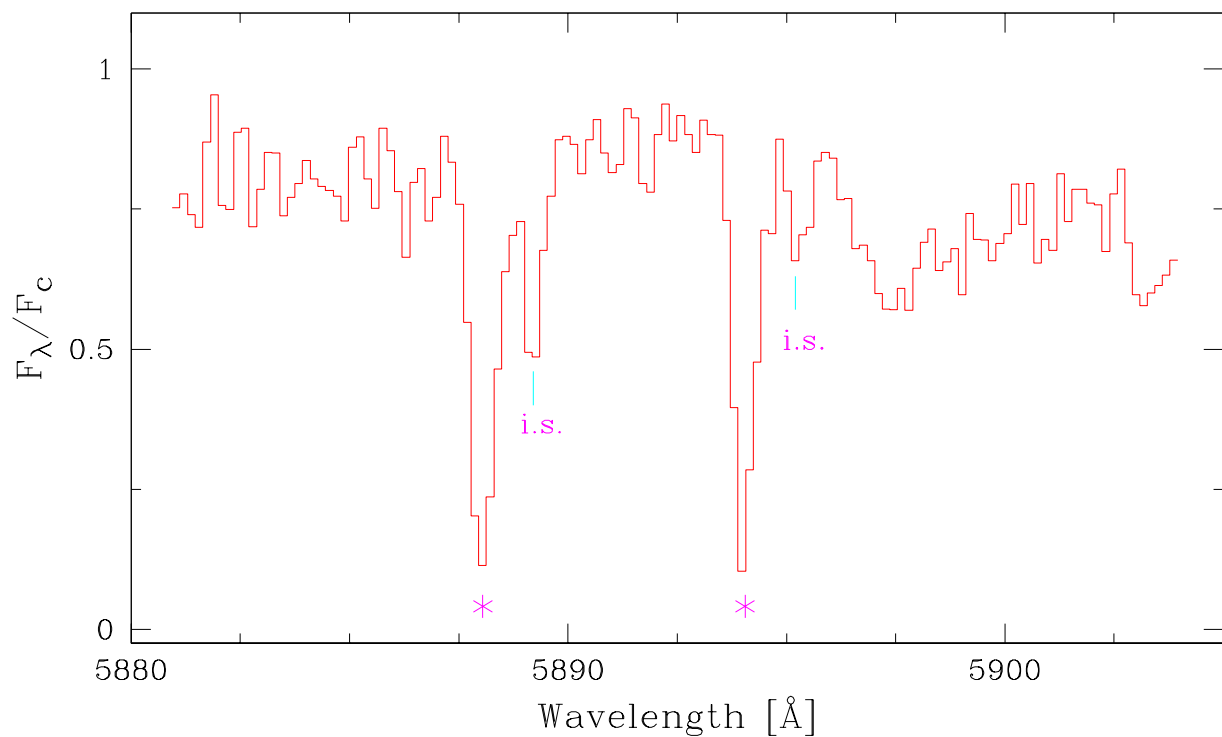
**Figure 1.** The low-resolution spectra of V866 Her. The dates in the up left corner are arranged from top to bottom in the same way as the spectra.



**Figure 2.** The spectrum of V866 Her compared to a M6III standard from Silva & Cornell (1992).



**Figure 3.** The H $\alpha$  Echelle order for V866 Her compared to that of T CrB observed the same night. In V866 Her there is evidently no trace of even the weakest H $\alpha$  in emission.



**Figure 4.** The NaI resonance doublet absorption lines as observed in the Echelle spectrum of V866 Her. The stellar and interstellar components are marked.

The heliocentric radial velocity of V866 Her measured on the Echelle spectrum is  $RV_{\odot} = -84.2 \pm 0.3 \text{ km s}^{-1}$ , suggesting a relationship to the spheroidal galactic component. The NaI doublet shows two components (cf. Figure 4), one at  $RV_{\odot} = -85.3 \pm 0.25 \text{ km s}^{-1}$  (therefore of stellar origin) and another at  $V_{\odot} = -23.9 \pm 2.8 \text{ km s}^{-1}$  of a most probable interstellar origin.

The equivalent width of the interstellar NaI D absorptions in the V866 Her Echelle spectrum is  $0.18 \text{ \AA}$ , which corresponds to a reddening of  $E_{B-V} = 0.06 \text{ mag}$  according to the Munari & Zwitter (1997) calibration. It is worth to note that the Burstein & Heiles' (1982) global maps give a value  $E_{B-V} = 0.0$  in the direction of V866 Her, which is evidently not the case given the presence of fairly strong interstellar NaI D lines. Combining a mean  $\langle B_{pg} \rangle = 13^{\text{m}}0$  with a color  $B-V = 1.58 \text{ mag}$  appropriate for a M6III and the absolute  $M_V$  magnitudes for the M giants belonging to the spheroidal galactic component ( $M_V = -1.6 \text{ mag}$ , Frogel and Whitford 1987), a distance to V866 Her of  $3.7 \text{ kpc}$  is found. The galactic coordinates of V866 Her are  $l = 65^{\circ}54$ ,  $b = +37^{\circ}86$ , which means a distance of  $z = 2.3 \text{ kpc}$  from the galactic plane. The latter is typical of a galactic Halo object, in agreement with the above evidence from radial velocity. Therefore V866 Her is an old star of  $M \leq 1.0 M_{\odot}$  mass.

#### References:

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