

Fundamental Parameters and Spectral Variations of HD 85567

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Abstract. We report the results of a spectroscopic study of the emission-line star HD 85567. We refined its fundamental parameters and concluded that it is not a pre-main-sequence star but rather a more evolved FS CMA type object.

1. Introduction

HD 85567 was included in catalogs of Be stars (Jaschek & Egret 1982) and Herbig Ae/Be (HAeBe) stars Thé et al. (1994). Lamers et al. (1998) in their classification of B[e]-type stars also suggested that HD 85567 was a HAeBe star. This conclusion was adopted in some more recent papers (e.g., Vieira et al. 2003; Verhoeff et al. 2012). Nevertheless, Miroshnichenko et al. (2001) speculated that it was a more evolved binary system. Baines et al. (2006) detected signs of the object’s binarity by spectro-astrometry. Miroshnichenko (2007) included it in the FS CMA group. In an attempt to re-investigate the nature and evolutionary state of HD 85567, we obtained high-resolution spectra of the object and multicolor photometry of stars in its vicinity.

2. Observations and Results

Optical high-resolution ($R = 80000$, $\lambda\lambda 4300\text{--}9000 \text{ \AA}$) spectroscopic observations of HD 85567 were obtained during two periods, 2012/03/03–2012/04/05 (5 spectra) and 2015/04/18–2015/05/23 (10 spectra), at a 1.5 m telescope of CTIO with the HIRON spectrograph (Tokovinin et al. 2013) with an average signal-to-noise ratio of ~ 100 . Photometric $UBV(RI)_c$ data of a $10' \times 10'$ field around HD 85567 and some projec-

tionally close fields were obtained in February–April and November 2015 at 3 robotic PROMPT telescopes (Reichart et al. 2005) located at CTIO.

We derived the following parameters for HD 85567: distance $D=1.3\pm 0.1$ kpc, $T_{\text{eff}}=15000\pm 500$ K (spectral type B4/B5), interstellar reddening $E(B-V)=0.50\pm 0.02$ mag, luminosity $\log L/L_{\odot}=3.3\pm 0.2$, and $v \sin i=31\pm 3$ km s $^{-1}$. Based on the disk inclination angle ($i=53^{\circ}$, Vural et al. 2014), its full rotational velocity is $v=37\pm 3$ km s $^{-1}$. We detected fast variations of the Balmer line profiles (Fig. 1) similar to those of some FS CMA objects (see Miroshnichenko et al. 2015, for a qualitative model).

3. Conclusions

Our results are inconsistent with the pre-main-sequence status of HD 85567. It may be a non-interacting binary system with a much fainter (similar to MWC 728, Miroshnichenko et al. 2015) or a compact secondary component.

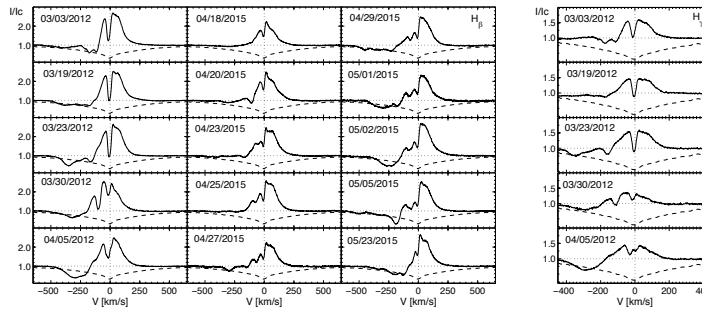


Figure 1. Variations of the $H\beta$ and $H\gamma$ lines in the spectrum of HD 85567. Horizontal dotted lines show the continuum level across the line profiles, and vertical dotted lines show the systemic radial velocity. Dashed lines show the $H\beta$ line profile of BS 1149 ($T_{\text{eff}}\sim 14300$ K, $\log g\sim 4.0$, $v \sin i\sim 33$ km s $^{-1}$, Zorec et al. 2009).

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