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Time scale variation of NV resonance line profiles of the Be star HD 203064

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1 Introduction

Hot emission stars, such as Be and Oe, present many spectral lines with very complex and peculiar profiles. In order to explain this complexity Danezis et. all (2007) constructed a model (GR model) that had as fundamental idea that the whole observed feature of these complex profiles is not the product of a uniform atmospherical region, but by a number of components, which are created in different regions that rotate and move radially with different velocities (Danezis et al. 1991, Lyratzi et al. 2003, 2007, Danezis et al. 2007). These components were named Discrete Absorption Components or Satellite Absorption Components (e.g. Doazan 1982, Danezis et al. 1991, Doazan et al. 1991, Lyratzi et al. 2007, Danezis et al. 2007). We have used the GR model (Danezis et al., 2007) to calculate of a group of physical parameters such as the apparent rotational, radial, and random velocities of the thermal motions of the ions, the Full Width at Half Maximum (FWHM) and the absorption energy of the independent regions of matter, which produce the main and the satellite components of the studied spectral lines. In addition, we determine the time scale variations of the above physical parameters. We analyze the N V resonance lines $\lambda\lambda$ 1238.821, 1242.804 $\mathring{A}$ in the spectra of the Be star HD 203064 in three different periods (16 Aug 1986, 19 Oct 1989, 16 Oct 1994) in order to investigate the presence of Discrete Absorptions Components (DACs) and to calculate the values of the above parameters.

2 Data and Spectral Analysis

In this paper the data are the N V resonance lines of the Be star HD 203064, taken in three different periods(16 Aug 1986, 19 Oct 1989, 16 Oct 1994). The spectra of the star have been taken with IUE satellite, with the Long Wavelength range Prime and Redundant cameras (LWP, LWR) at high resolution (0.1 to 0.3 $\mathring{A}$). From our analysis we have detected that each of the studied spectral lines consists of two components.

The rotational velocities of the independent regions of matter which produce the N V resonance lines are 150 $\pm$ 0 km/s for both components. The radial velocities of the independent regions of matter which produce the studied resonance lines are -531 $\pm$ 24 km/s and -2327 $\pm$ 30 respectively. The values of the random velocities of the thermal motions of the ions of the independent regions of matter which produce the studied resonance lines are 340.0 $\pm$ 1.7 km/s and 340.0 $\pm$ 1.8 km/s respectively. Finally, the absorbed energy of each one of the two independent regions of matter for the first resonance line is 2.5 $\pm$ 0.4 eV and 3.38 $\pm$ 0.07 eV. The absorbed energy of each one of the two independent regions of matter for the second resonance line is 2.2 $\pm$ 0.3 eV and 2.98 $\pm$ 0.07 eV respectively.

In Figure (1.i) we present the best fit of the UV N V resonance lines. We note that in all three cases the best fit has been obtained using two Satellite Absorption Components. In Figures(1.ii) - (1.iv) we present the time scale variation of the rotational and random velocities of the independent regions of matter which produce the main and the satellite components of the studied spectral line, as well as the variation of the random velocity of the thermal motions of the ions . In Figures (1.v) and (1.vi) we present the time scale variation of the the absorption energy for each one of the resonance lines of N V.

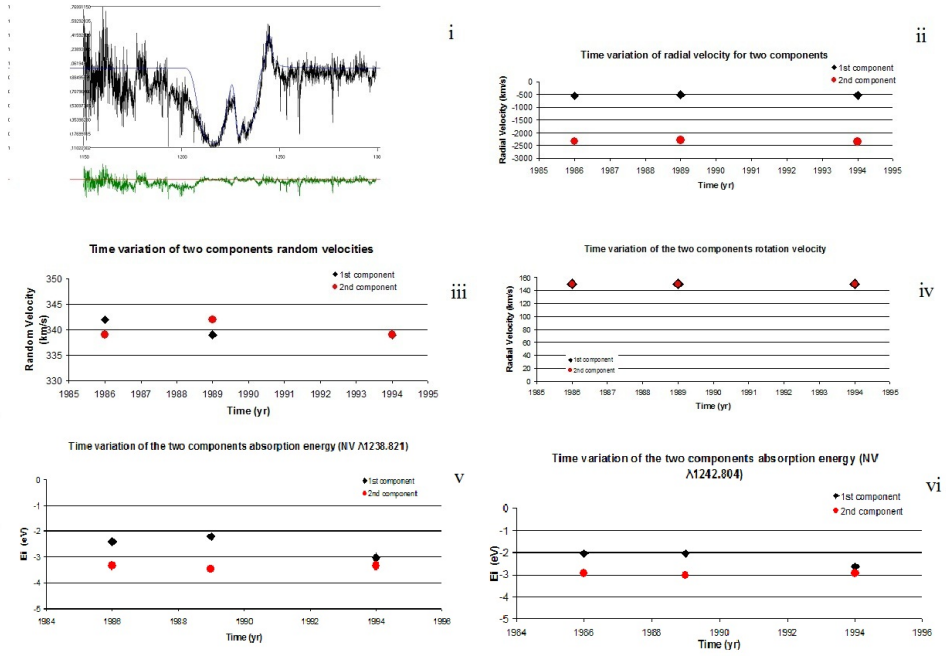

Figure 1: (i): Best fit of the UV N V resonance lines. (ii)-(vi): Time scale variations of the physical parameters of the N V resonance lines in the case of the Be star HD 203064

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