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B[e] Phenomenon in a Binary System V2028 Cyg

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Abstract. We present a preliminary analysis of our f ve-years observation campaign of the B[e] stellar system V2028 Cyg (MWC 623). The time variability of spectral features is described.

V2028 Cyg (MWC 623) belongs to the group of B[e] stars. The depth of absorption lines and also f tting the photometric curve (Zickgraf & Stahl, 1989) indicate that the star is a binary with an earlier (B4III) and later (K2II-Ib) component. We present here a preliminary analysis of spectra obtained during our f ve-year observation campaign.

Equivalent widths W are measured by trapezial sum method. Errors are computed following Vollmann & Eversberg (2006). Radial velocities are measured by several methods: curve f tting, prof le mirroring and cross-correlation.

Discussion

Our observations show variations of the H_α emission, which is in correlation with its equivalent width (see Fig. 1). The previously obtained H_α radial velocities (Zickgraf, 2001) agree with our measurement (see Fig. 1). Nevertheless, the signif cant decrease appeared in the late nineties.

The radial velocity of the K star absorption components slightly varies (see Fig. 2). However, no signif cant variations were observed during the past twenty years, hence no reasonable period was found up to now. Also the equivalent widths of the K star absorption lines do not show any signif cant variations.

The H_α prof le indicates a rotating circumstellar structure. The prof le and also radial velocity variations imply a binary seen in near to pole-on direction. It is, however, in contradiction with polarisation measurements, which show the inclination angle $\sim 30° - 45°$ (Zickgraf & Schulte-Ladbeck, 1989).

The main indication of binarity is the possibility to describe the spectra as a hot and cold star with circumstellar dust and gas (Arkhipova & Ipatov, 1982, Zickgraf & Stahl, 1989). These models describe every component separately. We would like to focus on the construction of a more consistent model.

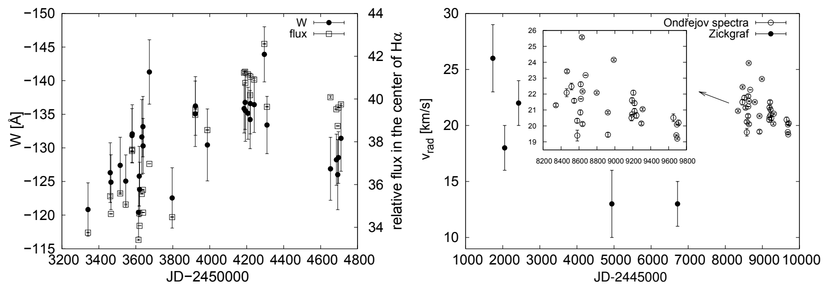

Figure 1. **Left:** *Equivalent widths (dots) and intensities (squares) of H_α line.* Intensity error bars are of the size of plot points. **Right:** *Radial velocities of the H_α line.* Ondřejov spectra are measured by f tting polynomial $a_0 + a_1 x + \sum_{i=1}^{n} a_{i+1} \sin(i\pi x/\Delta l)$, where Δl denotes length of the interval. The previous Zickgraf's (2001) results are depicted also there.

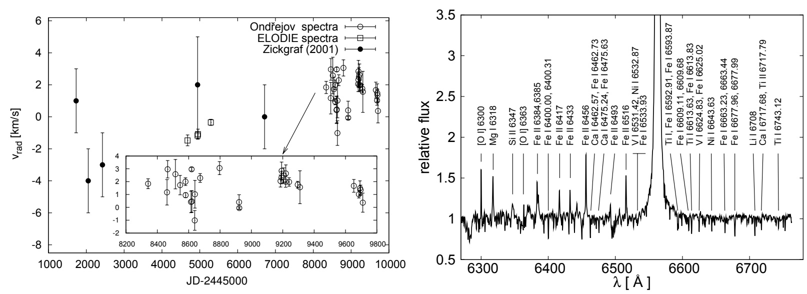

Figure 2. **Left:** *Radial velocities of the K component.* Ondřejov spectra are measured by cross-correlation method and ELODIE (see Moultaka et al., 2004) using gaussian f tting of chosen lines. Dots denote results from Zickgraf (2001). **Right:** *Line identif cation around H_α.* Emission lines are adopted from Zickgraf & Stahl (1989). We identif ed absorption lines using ATLAS9 model (Castelli & Kurucz, 2004) and SYNSPEC (Hubeny & Lanz, 1995).

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References

Arkhipova, V. P., & Ipatov, A. P. 1982, Soviet. Astron. Lett., 8, 298
Castelli, F., & Kurucz, R. L. 2003, IAUS, 210, A20
Hubeny, I., & Lanz, T. 1995, ApJ, 439, 875
Miroshnichenko, A. S. 2007, ApJ, 667, 497
Moultaka, L., Ilovaisky, S. A., Prugniel, P., & Soubiran, C. 2004, PASP, 116, 693
Vollmann, K., & Eversberg, T. 2006, AN, 327, 862
Zickgraf, F.-J. 2001, A&A, 375, 122
Zickgraf, F.-J., & Schulte-Ladbeck, R. E. 1989, A&A, 214, 274
Zickgraf, F.-J., & Stahl, O. 1989, A&A, 223, 165