Clumping in Hot Star Winds
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Wavelets for looking for clumping in the wind of OB stars

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The wind of hot stars are strongly structured and carry the numerous clumps of very different sizes and masses. Contrary to the Wolf-Rayet stars, the individual clumps in the winds of OB stars are rather small and not very long-lived objects. This makes the detecting clumps in OB star wind a hard problem. We use the wavelet analysis as a powerful tool for searching the details of the line profiles, connected with clumps. We use the dynamical wavelet spectra of line profile variations (lpv) for studying a regular and a stochastic lpv.

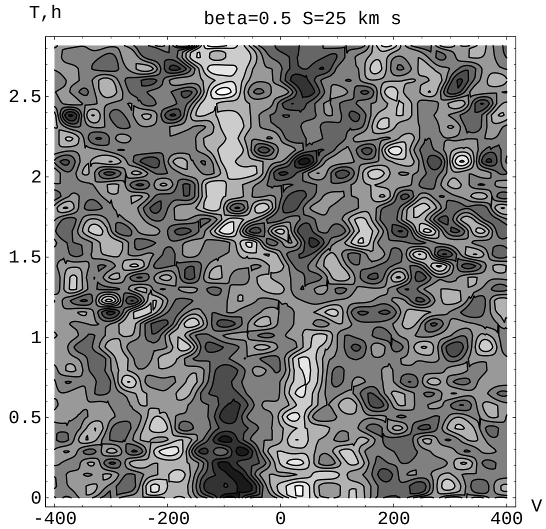

Figure 1: Dynamical wavelet spectra for line HeII $\lambda\,4686$ in a spectra of the star δ Ori A for the scale=25 km/s.

The clump contribution in the total line profile for OB stars is smaller than for WR ones and can be restored using the wavelet analysis via the *dynamical wavelet spectra* (Kholtygin et al. 2006). Those are the wavelet transform of the line difference spectra in the velocity V space for the fixed scale S. For scales in an interval $S = 1 - 5$ km/s the dynamical wavelet spectra is determined by the noise contribution, whereas for large scales $S > 25$ km/s mainly regular variations in the *dynamical wavelet spectra* can be detected.

For intermediate scales the contribution of the stochastic lpv for line HeII $\lambda\,4686$ in a spectra of a triple system δ Ori A (O9.5II) connected with the clumps can be seen in Fig. 1. The *dynamical wavelet spectra* for the same line for scale $S = 50$ km/s show mainly the regular components of lpv (Fig. 2), connected with the non-radial pulsations of the main component δ Ori Aa[1] (Kholtygin et al. 2006).

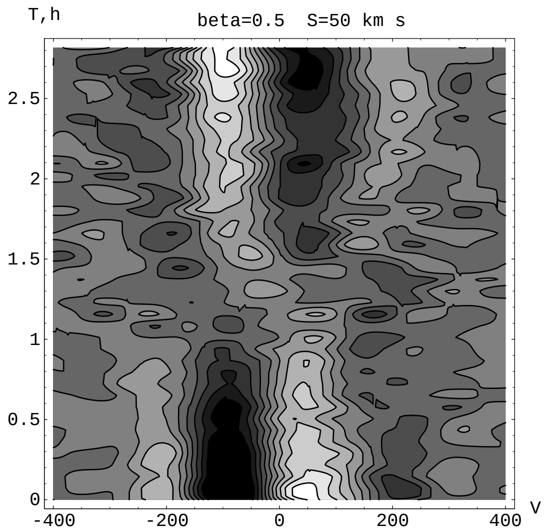

Figure 2: The same as in a Fig. 1 but for the scale=50 km/s.

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References

Kholtygin, A.F., Burlakova, T.E., Fabrika, S.N., Valyavin, G.G., Yushkin, M.V., Astronomy Reports, 2006, 50, 887