Posters

Stellar and wind parameters of massive stars from spectral analysis

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Abstract. The only way to deduce information from stars is to decode the radiation it emits in an appropriate way. Spectroscopy can solve this and derive many properties of stars. In this work we seek to derive simultaneously the stellar and wind characteristics of a wide range of massive stars. Our stellar properties encompass the effective temperature, the surface gravity, the stellar radius, the micro-turbulence velocity, the rotational velocity and the Si abundance. For wind properties we consider the mass-loss rate, the terminal velocity and the line–force parameters α, k and δ (from the line–driven wind theory). To model the data we use the radiative transport code FASTWIND considering the newest hydrodynamical solutions derived with HYDWIND code, which needs stellar and line–force parameters to obtain a wind solution. A grid of spectral models of massive stars is created and together with the observed spectra their physical properties are determined through spectral line fittings. These fittings provide an estimation about the line–force parameters, whose theoretical calculations are extremely complex. Furthermore, we expect to confirm that the hydrodynamical solutions obtained with a value of δ slightly larger than ~ 0.25, called δ-slow solutions, describe quite reliable the radiation line-driven winds of A and late B supergiant stars and at the same time explain disagreements between observational data and theoretical models for the Wind–Momentum Luminosity Relationship (WLR).

Keywords. stars: early-type, stars: atmospheres, stars: fundamental parameters, stars: winds, outflows

Grid of Models

To produce the grid of synthetic line profiles with the code FASTWIND (Puls *et al.* 2005), we first compute the grid of hydrodynamic wind solutions with the stationary code HYDWIND (Curé 2004). These hydrodynamic solutions are calculated with the purpose to obtain the mass loss rate and the terminal velocity from the wind. Only the 30% of our initial grid of hydrodynamic models obtained a physical wind solution. In the case of the FASTWIND model grid, we obtained about 400 000 models. From these models the line profiles of the H, He, and Si elements are obtained in the optical range. Currently, we are developing the tool for the automatic analysis of an observed spectrum in order to derive their stellar and wind parameters. One of the expected applications of our tool has focus on the winds of A and late B supergiant stars. Our purpose try to explain disagreements between observational data and theoretical models for the Wind–Momentum Luminosity Relationship (WLR) utilizing the δ-slow solution (Curé *et al.* 2011).

References

Curé, M. 2004, *ApJ*, 614, 929

Curé, M., Cidale, L., & Granada, A. 2011, *ApJ*, 737, 18

Puls, J., Urbaneja, M. A., Venero, R., Repolust, T., Springmann, U., Jokuthy, A., & Mokiem, M. R. 2005, *A&A*, 435, 669