3D Monte Carlo Radiative Transfer in inhomogeneous massive star winds – application to resonance line formation

Brankica Kubátová*[1]

[1]Astronomický ústav AV ČR, 251 65 Ondřejov – Czech Republic

Abstract

The true mass-loss rates from massive stars are important for many branches of astrophysics. For the correct modeling of the resonance lines, which are among the key diagnostics of stellar mass-loss, the stellar wind clumping has been found to be very important. To incorporate clumping into a radiative transfer calculation, three-dimensional (3D) models are required. Various properties of the clumps may have a strong impact on the resonance line formation and, therefore, on the determination of empirical mass-loss rates.
In this talk we will present our full 3D Monte Carlo radiative transfer code for inhomogeneous expanding stellar winds in which we incorporate the 3D nature of the wind clumping. We use set of the parameters which describe dense as well as the tenuous wind components. At the same time, we account for non-monotonic velocity fields. We will show how the 3D density and velocity wind inhomogeneities strongly affect the resonance line formation. A set of representative models for various sets of model parameters and their influence on the resonance line formation will be presented.

*Speaker