INTRODUCTION

One of the most important phenomena in the spectra of hot emission stars is the DACs (Discrete Absorption Components) phenomenon [1].

DACs are discrete but not unknown absorption spectral lines. They are spectral lines of the same ion and the same wavelength as a main spectral line, shifted at different Δλ, as they are created in different density regions which rotate and move radially with different velocities [2,3]. DACs are lines, easily observed, when the regions that give rise to such lines, rotate with low velocities and move radially with high velocities. However, if the regions, that give rise to such lines, rotate with large velocities and move radially with small velocities, the produced lines are quite broadened but have small shifts. As a result they are blended among themselves as well as with the main spectral line and thus they are not discrete. In such a case the name Discrete Absorption Component is inappropriate and we use only the name SACs (Satellite Absorption Components) [4,5].

DESCRIPTION OF THE MODEL

The Line Profile Function

Some years ago our research team proposed a new model to explain the complex structure of the density regions of hot stars, where the spectral lines that present SACs or DACs are created [2,3].

The main hypothesis of this model is that the atmospheric region where a specific line is created is not continuous, but it is composed of a number of successive independent absorbing density regions, a number of emission regions, and an external general absorption region.

By solving the radiation transfer equations through a complex structure, as the described one, we conclude to a function for the line profile, able to give the best fit for the main spectral line and its Satellite Components in the same time (Eq. 1).

\[
I_\lambda = I_\lambda^0 \int e^{-\tau_\lambda} \sum_j S_{\nu_j} \left(1 - e^{-\tau_\nu_j}\right) e^{\tau_\lambda} d\nu
\]

where: \( I_\lambda^0 \) is the initial radiation intensity, \( S_{\nu_j} \) is the source function, which, at the moment when the spectrum is taken, is constant and \( e^{-\tau_\lambda} \) is the distribution functions of the absorption, emission and general absorption lines, respectively. This function \( I_\lambda \) does not depend on the geometry of the regions which create the observed feature.

The Spherical Symmetry Hypothesis

In order to include in Eq. (1) some kinematical parameters such as the rotational and the radial velocities, we have to suppose a geometrical hypothesis. If we choose the spherical symmetry hypothesis, Eq. (1) becomes:

\[
I_\lambda = \int_0^\infty \left(1 - e^{-\lambda_0 \sin \varphi} \right) e^{\lambda_0 \sin \varphi} d\varphi
\]

\[
P(\lambda) = \frac{1}{\sqrt{2\pi} \sigma} e^{-\frac{\lambda - \lambda_0}{2\sigma^2}}
\]

The distribution function from the semi-spherical region is

\[
P(\lambda) = \frac{1}{\sqrt{2\pi} \sigma} e^{-\frac{\lambda - \lambda_0}{2\sigma^2}}
\]

Eq. (3) gives the final distribution function, which is a synthesis of the Rotation distribution and a Gaussian one.

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