

CONTINUUM FLUX AND POLARIZATION IN B[e] SUPERGIANTS

F.X. DE ARAÚJO, PH. STEE and J. LEFÈVRE

Observatoire de la Côte D'Azur, B.P. 229 Nice Cedex 4, 06304 - France

B[e] supergiants constitute one group of stars in the upper left part of the HR diagram. On the basis of their hybrid spectrum and their intrinsic polarization a two components envelope was suggested (Zickgraf & Schulte-Ladbeck, 1989): a “polar wind” and a denser “equatorial disc”.

Recently Araújo *et al* (1993) have presented an axi-symmetric model in which the radiative line force varies from pole to equator. Some typical density profiles (arising from the application to B[e] supergiants) may be seen in fig. 1. In this particular model it was adopted $M = 30M_{\odot}$, $R = 75R_{\odot}$, $T_{eff} = 20000^{\circ}K$ and a rotational rate of 70% of the critical speed. There is a density enhancement towards the equatorial plane which is due to a greater mass flux and a lower expansion.

Assuming a fully ionized, pure hydrogen envelope the density laws give directly the electronic distribution. (A numerical code is being developed in order to overcome this drastic hypothesis, see Stee & Araújo, this Symposium). Fig. 2 shows the optical thickness due to electronic absorption as a function of wavelength (lines) and that due to electronic scattering (circles), which is λ independent. It is clearly seen as opacity increases from pole to equator.

Subsequently the propagation of stellar radiation in the envelope was followed by employing a Monte Carlo type scheme (Lefèvre & Daniel, 1988). Figure 3 shows the flux that escapes from the envelope as a function of λ at some inclination angles: $i = 0^{\circ}$, $i = 45^{\circ}$ and $i = 90^{\circ}$. We see that i) emission decreases with λ (the star radiates as a blackbody with $T = 2.10^4 K$); ii) the flux is dependent on the line of sight due to different opacities; and iii) the wavelength dependence of absorption is found in the increasing separation of lines. In fig. 4 we plot the global flux that escapes in all directions as a function of the number of scatterings. We may conclude that the single scattering approximation is not reasonable since at least 50% of radiation is scattered twice or more.

Concerning polarisation degrees we stress they are preliminary ones since we have not been able yet to perform computations with a number of interactions great enough to prevent statistical fluctuations. Fig. 5 shows that we have obtained degrees between about 0.5% and 4.5%, increasing with inclination angles. On the other hand we can see in fig. 6 that no dependence on wavelength was obtained. This result however must be kept with great caution since we have not included the envelope emission. It will most likely

add up a no (or weakly) polarised flux which is strongly increasing with λ . In order to compare the results with observational data we must taking into account ionisation equilibrium, including envelope emission and performing more accurate numerical simulations.

References

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 Zickgraf, F.-J., & Schulte-Ladbeck, R.: 1989, *Astronomy and Astrophysics* 214, 274

