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 $M = 30M_\odot$, $R = 75R_\odot$, $T_{eff} = 20000^oK$ 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: $i = 0^o$, $i = 45^o$ and $i = 90^o$. We see that i) emission decreases with λ (the star radiates as a blackbody with $T = 2.10^4K$); 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

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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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figure 1

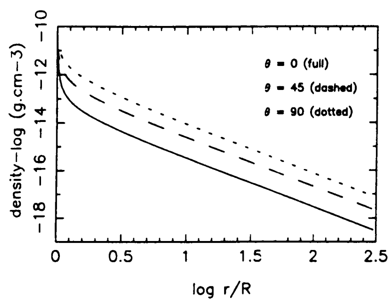

figure 2

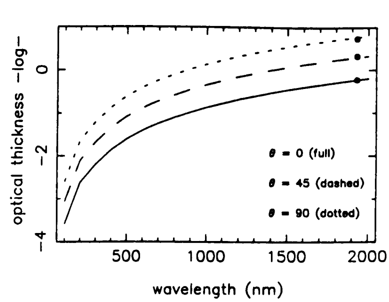

figure 3

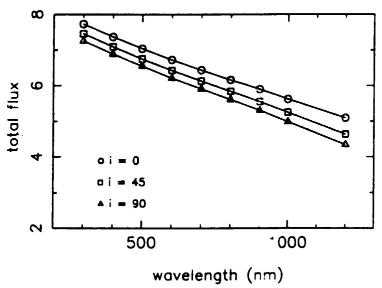

figure 4

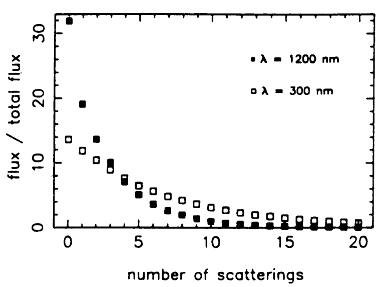

figure 5

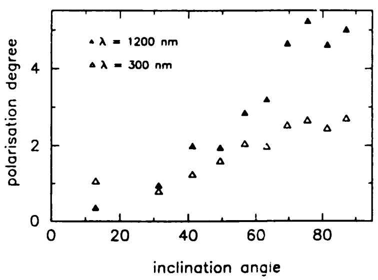

figure 6