# 1.6-1.75 AND 3.1-3.75 $\mu$m SPECTRUM OF Hb5

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We have recently obtained high resolution IR spectra ($\lambda/\Delta\lambda \approx 1000$) of the planetary nebula Hb 5, over the range 1.6–1.75 $\mu$m and 3.1-3.75 $\mu$m (Magazzú & Strazzulla 1992) at the European Southern Observatory (ESO). Emission bands have been detected the most prominent being at 3.3, usually attributed to PAH molecules, and 3.4 $\mu$m. For the predicted (de Muizon et al. 1986) first armonic (at 1.67 $\mu$m) of the 3.3 $\mu$m band we get an upper limit at least 45 times weaker than the 3.4 $\mu$m feature. This, together with the high ratio of fluxes F3.4/F3.3, challenges the hypothesis that the 3.4 $\mu$m band is the first hot band. We suggest that the first hot band may be identified with a small feature at 3.46 $\mu$m. In this case the first armonic would fall at 1.686 $\mu$m where we detect a small feature.

From the measured flux ratios we evaluated (considering the absorption of a 9 eV photon) the peak temperature of the emitting species ($T_{\rm peak}$) and the total number of atoms per molecule ($N_{\rm t}$) (Magazzú & Strazzulla, 1992). In order to have an idea of the possible size distribution, we also calculated, using data from the literature (Aitken & Roche 1982; 1984) the ratio F(11.3)/F(3.3). We showed that the colour temperature (~1420 K) obtained from the ratio $F(1.686)/F(3.3)$ is larger than that obtained from $F(11.3)/F(3.3)$ (~1050 K) and, accordingly, species emitting at 3.3 $\mu$m are smaller in size than those emitting at 11.3 $\mu$m.

In Conclusion:

-The 3.4 $\mu$m band in Hb 5 cannot be identified with the first hot band of anharmonically emitting PAHs.

-An interesting possibility is that the first hot band may be identified with a small feature at 3.46 $\mu$m. We have evidenced for the first time a size distribution of PAHs, the smaller being hotter and responsible for emission at lower wavelength.

-The overall spectrum observed in the 3 $\mu$m region seems difficult to be accounted for only by PAH molecules.

## References

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