

Millimetre Observations of Planetary Nebulae

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We have observed a sample of 16 PNe of different morphological classes (from stellar to bipolar) in the mm-region, using the 15m Swedish-ESO Submillimetre Telescope (SEST). Continuum observations at 230 GHz were made with the SEST bolometer, and recombination line and continuum observations at 99 GHz ($H40\alpha$) and 147 GHz ($H35\alpha$) were made with SIS receivers.

All PNe in the sample were mapped with the bolometer. The emission from all of them was found to be point like at the resolution of SEST at 230 GHz (23"). From their energy distributions it is seen that the continuum emission at mm wavelengths in most of our sources corresponds to free-free emission, but in few cases emanates from cold dust.

Emission in the $H40\alpha$ and $H35\alpha$ recombination lines was detected in 13 of the PNe. The line widths are similar for most sources (30 – 50 km s⁻¹), except Mz3 which has a remarkably large line width of more than 100 km s⁻¹. Towards NGC 6302 we also detected helium recombination lines and the CS (3-2) line. Electron temperatures and densities were determined assuming LTE conditions. For a few sources, for which the $H76\alpha$ line intensities have been reported in the literature, a simple model of the line to continuum ratio was applied to derive electron densities and temperatures, assuming a non-thermal, homogeneous nebula, and taking into account non-LTE effects. We did not find a clear difference between the physical parameters of PNe of different morphological classes.