PROTO-PLANETARY NEBULAE: MODELS AND IRAS OBSERVATIONS

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ABSTRACT. A number of high-galactic latitude supergiant stars of intermediate spectral types have been suggested to be proto-planetary nebulae (PPN), such as the 89 Her and R CrB stars. A number of these stars along with some IRAS sources expected to be PPN -either sources with IRAS low Resolution Spectra (LRS) showing features which may indicate unusually cool dust shells or unusually red IRAS sources for which CO emission from a circumstellar envelope has been observed- where chosen for study. The IRAS 12/25 and 25/60 μm colours of 32 such stars from 3 groups on a colour-colour diagram. Class I show colours similar to ordinary stars; Class II have a 60 μm excess but have normal 12/25 μm colours; Class III are much redder than ordinary stars.

The Class I sources may be binaries or normal late-type stars with poor quality spectra as observed by IRAS, leading to mis-classification. 89 Her, R CrB, HR 4049 and υ Sgr are in this group. Any PPN which may be found in this area cannot be separated from ordinary stars based upon the IRAS colours. The nature of Class II is unknown, although 2 of them are A0e stars. The Class III sources have IRAS colours intermediate between normal late-type stars and planetary nebulae. Thus they are the best PPN candidates.

Searching the IRAS data for sources of similar colour to the Class III objects yielded 371 sources after eliminating 24 objects associated with H II regions, galaxies, etc. 140 of them are planetary nebulae and another 200 have no identifications. 11 of them are SAO stars with spectral types between G7 and A5.

Radiative transfer models of stars with cool stellar wind dust shells have been carried out for comparison with the IRAS PPN candidates. The implications of these models will be discussed.

S. Torres-Peimbert (ed.), Planetary Nebulae, 452.