THE PROGENITORS OF PLANETARY NEBULAE

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Based on a new sample of (IRAS based) OH/IR stars (te Lintel Hekkert et al., 1991, A&AS, in press), and a catalogue of planetary nebulae compiled by Acker (1983, A&AS, 54, 315), we show the relation between these two groups of objects, in terms of the kinematics and the Galactic distribution. In contrast with earlier analyses of samples of OH/IR stars, we find a close correlation between the kinematics of the planetary nebulae and the IRAS based sample of OH/IR stars. In particular, we find that the distribution of the planetary nebulae (PN) shows a good correlation with the OH/IR stars which have a low outflow velocity ($v_{exp} < 12.5$ km s^{-1}). Whether the high outflow velocity OH/IR stars also have a counterpart among PN is not clear.

The majority of the known PN thus appear to originate from low outflow velocity OH/IR stars. The ZAMS progenitor masses are probably in the range 1-1.5 $M_{\odot}$, and the stellar ages are $\approx$ 5-10$\times 10^9$ yrs. Only in the plane of the Galaxy may a significant fraction of the PN come from more massive progenitors. In the outer part of the Galaxy, a relatively larger fraction of PN appears to originate from carbon stars instead of OH/IR stars.

A BINARY EVOLUTIONARY MODEL FOR THE PROGENITOR OF SN 1987A

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In this paper we explore the hypothesis that the blue progenitor of SN 1987A was a component of a close binary. It is shown that a blue spectral appearance at the end of core helium burning (and possibly also during the following evolutionary phases) is a natural phenomenon for a star with initial mass between 9 $M_{\odot}$ and 15 $M_{\odot}$ which was originally in a close binary with mass ratio q $\approx$ 1 and who accreted at least 8 - 10 $M_{\odot}$ while already being a hydrogen shell burning star. This phenomenon does not depend on the exact treatment of the convective core overshooting, the stellar wind mass loss rate, and the metallicity. A blue SN progenitor in the Galaxy would therefore be a surprise.