MASS-LOSING AGB STARS IN THE MAGELLANIC CLOUDS

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Asymptotic giant branch stars are the immediate precursors to the planetary nebula stage of stellar evolution. It is clear that the latter stages of a stars life on the AGB are accompanied by either continuous or episodic mass-loss, with the final convulsion being the ejection of the envelope (the future planetary shell), the gradual exposure of the bare CO core and the rapid horizontal evolution to the blue in the H-R diagram. Thus, the structure of the planetary nebula luminosity function, particularly at the higher luminosities (although this phase is extremely rapid), is intimately tied to the luminosity function of the AGB.

The exact point of termination of the AGB phase of evolution, however, remains a matter of some debate, with the Magellanic Clouds providing the debating hall. Clearly some AGB stars achieve luminosities close to the canonical theoretical limit of $M_{bol} = -7.1$ (Wood, Bessell & Fox (1983)), but, as is well known, the numbers fall short of the predictions. Several mechanisms have been proposed to account for this deficit, with the current favourites either being the intervention of high mass-loss rates terminating evolution at $M_{bol} \sim -5.5$ to -6, or the presence of efficient envelope convection in the more massive stars leading to more rapid evolution *beyond* $M_{bol} = -7.1$ (Blocker & Schonberner, 1991). (Note, however, that no AGB stars have been observed at such high luminosities (P.R. Wood et al., preprint)). We have used IRAS observations to search for dusty AGB stars, discovering ten optically-invisible 'cocoon' stars (Reid, 1991) in a 15-square degree region of the northern LMC. We have extended this survey to cover the entire LMC, the SMC and six dwarf systems. However, although we identify sixteen new candidates in the LMC (and none in any of the other galaxies), none have striking IR properties - all are consistent with $M_{bol} \sim -5.5$ AGB stars undergoing mass loss at rates of $\sim 10^{-6} M_{\odot} yr^{-1}$. We have, however, potential identifications of a further 20 LMC planetary nebulae. Further observations are required to confirm the identification and characteristics of these objects.

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References

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