SYNTHETIC P-AGB POPULATIONS

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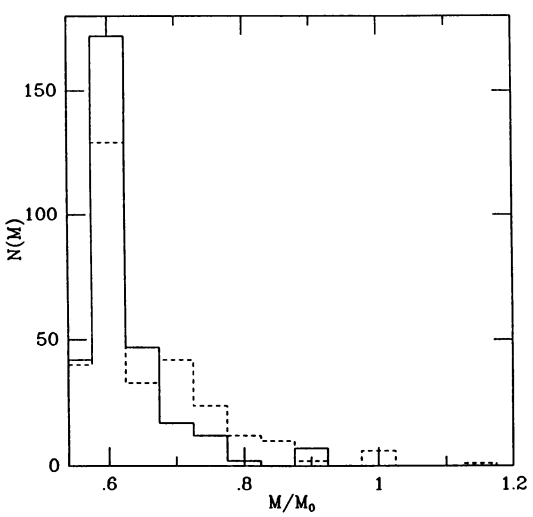
Extensive Montecarlo simulations of populations of post-Asymptotic Giant Branch (P-AGB) stars have been constructed. The time evolution of luminosity and effective temperature for any stellar mass has been approximated by suitable analytical approximations based on the P-AGB evolutionary tracks of Paczyński (1971, Acta Astron. 21, 417) and Schönberner (1983, A&A 79, 108). By constructing synthetic HR diagrams for P-AGB stars we explore the effects of various assumptions, such as the IMF, the initial mass-final mass relation, the AGB to PN transition time, etc. We have also investigated how the uncertainties in the various assumptions and observational errors in luminosity and temperature propagate into the inferred mass distribution of the P-AGB stars. As an example of the possible applications, we show in the Figure the mass distributions of two P-AGB populations, which differ only on the effective temperatures. We have assumed a systematic error in the *observed* temperature, such as $\log T_{\rm obs} = 1.01 \cdot \log T_{\rm true} + 0.01$. Such an error is very small in comparison to usual Zanstra temperature uncertainties for Planetary Nebula Nuclei, yet the two distributions are remarkably different. The broken line represents the *observed* distribution. The mean mass are respectively $< M/M_{\odot} >= 0.594$ for the *true* distribution (i. e. using $T_{\rm true}$), and $< M/M_{\odot} >= 0.628$ for the *observed* one (i. e. using $T_{\rm obs}$). This simulation emphasizes the need for accurate temperatures in order to obtain useful mass distributions for P-AGB stars, when using an *observed* distribution of P-AGB stars in the HR diagram. Further applications and details will be included in a forthcoming paper (Stanghellini & Renzini, *in preparation*).



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