OPTICALLY THICK WIND FROM POST-AGB STARS AND FORMATION OF PLANETARY NEBULAE

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ABSTRACT. Self-consistent mass-loss solutions are computed for post-AGB stars, and the evolution of the central star is followed by utilizing the sequences of the steady mass-loss and the static solutions. The mass loss is driven by the radiation pressure gradient and the matter is accelerated in the inner region to the photosphere. The optically thick wind occurs when the H-burning luminosity is larger than the Eddington limit at the surface region. Such a situation is realized in the low-temperature region of the H-R diagram. Therefore no wind solution exists when the surface temperature becomes high enough.

Both the mass-loss rate and the wind velocity are large when the surface temperature is relatively low, and both of them decrease as the central star evolves toward the high temperature region of the H-R diagram. For an 1.2 $M_\odot$ WD, for instance, the mass-loss rate $\dot{M}$ is 4.21×10^{-4} $M_\odot$/yr and the wind velocity at the photosphere is v = 38 km/s at log T_{ph} = 3.81, and $\dot{M}$ is 1.25×10^{-5} $M_\odot$/yr, v = 17 km/s at log T_{ph} = 3.97; just before the mass-loss stops. The wind ceases when the surface temperature becomes higher than log T_{ph} = 4.05.

S. Torres-Peimbert (ed.), Planetary Nebulae, 457.