NUMERICAL MODELS OF DYNAMICAL AND SPECTRAL EVOLUTION OF PLANETARY NEBULAE

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Numerical models of planetary nebulae (PN) dynamical evolution are calculated under the assumption of spherical symmetry and discussed in the light of infrared, radio and optical observations. The set of hydrodynamical equations is solved simultaneously with equations for nongrey radiative transfer.

Continuous spectra of outgoing radiation are constructed in the range 10^7 - 10^{16} Hz. Some model parameters - mass of central star M_{nucl}, mass loss rate $\dot{M}_w$ and dust to gas density ratio ρ_d/ρ_g - are systematically varied. The mass of the envelope M_{env} is assumed to be 0.2 $M_\odot$. The formation of the envelope is interpreted as the phase of mass outflow with constant $\dot{M}_w$ followed by phase of high velocity wind (up to 2000 km/s). The evolution of the central star is considered as an inner boundary condition.

Density distribution and spectra for one of the model sets are shown in the Figure. Times, beginning from the onset and from the end (in parentheses) of outflow are indicated. Fluxes are normalised at a distance of 3 kpc.

Results of comparison of some models with observations of NGC 7027 and CRL 2688 show the usefulness of the models for the analysis of observable data.

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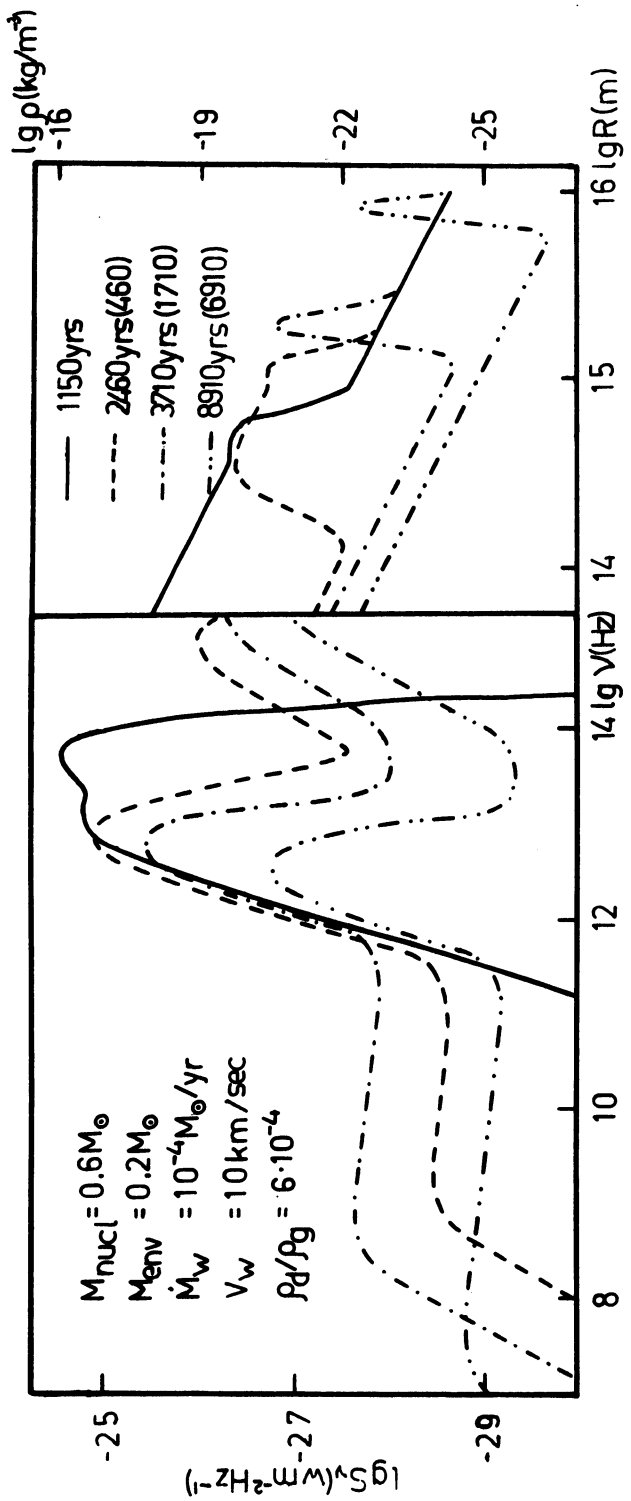

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