SELF-CONSISTENT PHOTOIONIZATION MODELS OF PLANETARY NEBULAE LUMINESCENCE

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The modern self-consistent photoionization model of planetary nebula luminescence is described. All of the processes which play an important role in the ionization and thermal equilibrium of the nebular gas are taken into consideration. The diffuse ionizing radiation is taken into account completely. The construction of the model is carried out for the radial distribution of gas density in the nebular envelope which is consistent with isophotal map of the nebula. The application of the model is illustrated on the example of the planetary nebulae BD+30°3639 and NGC 7293. For each nebula, the intensities of the emission lines of ten basic chemical elements in the UV, optical and IR spectral ranges are calculated and matched with observational data. Both the chemical composition of the nebular gas and the continuum of the central star at the wavelengths $\leq$912Åare determined during the process of model calculation. It is shown that the continuum of the central star at $\leq$912Ådoes not correspond to the blackbody spectrum but agrees with the spectrum of the corresponding non-LTE model atmosphere. The radial distributions of electron density, electron temperature and other parameters in the nebular envelopes are found. The optical thickness of the nebulae in the Lyman continuum is derived.

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