NITROGEN ABUNDANCE AND RECOMBINATION LINES IN NOVA SHELLS

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Non-hydrogenic permitted transition probabilities and recombination coefficients of N II have been calculated using a model potential for a multielectron ion (Victor and Escalante 1988, *Atomic Data and Nuclear Data Tables*, **40**, 227; Victor and Escalante 1989, in preparation; Caves and Dalgarno 1972, *J. Quant. Spectrosc. Radiat. Transfer*, **12**, 1539). This allows the calculation of intensities of N II lines produced by electron recombination or radiative excitation and subsequent decay of the excited states. The two-electron transition probabilities and dielectronic recombination coefficients computed by Nussbaumer and Storey (1984, *Astr. and Ap. Suppl.*, **56**, 293) were also included in the calculations. In the limiting cases in which N II resonant transitions are optically thick or thin, the intensities of non-resonant recombination lines are proportional to the effective recombination coefficient, the electron density and the abundance of the N III ion.

By comparing relative intensities of N II lines, it is possible to determine whether the lines are produced by electron recombination in a manner nearly independent of assumed physical conditions. When the excitation mechanism is electron recombination, the relative N II abundance can be determined by comparison with Balmer lines. Recombination lines are weakly dependent on temperature. Thus abundance determinations using recombination lines during the nebular shell stage are more reliable and give more consistent results than analyses of observations of other stages of the nova outburst.

We compare reported measurements of N II emission line intensities in resolved nova shells in the nebular phase with theoretical calculations of the emission spectra, and show that the relative intensities of the lines are consistent with the mechanism of excitation by electron recombination of N III and not by flourescence. Because of the low temperature of the shells, the forbidden lines are also excited by electron recombination. The observed line intensities indicate a high nitrogen content in nova shells, N/H $\sim$ 0.05, in qualitative agreement with abundance determinations of earlier stages of nova outburst.

THREE NEW PLANETARY NEBULAE FROM THE IRAS POINT SOURCE CATALOGUE

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From low resolution spectroscopy, three new planetary nebulae have been found, when carrying out a survey of IRAS sources with infrared colours like planetary nebulae. IRAS 16455–3455 is a high excitation planetary nebula with chemical abundances similar to the mean values found for planetaries in the Galaxy. IRAS 15154–5258 is a hydrogen-poor nebula with a high infrared excess. The central star shows emission features of a WC4 Wolf-Rayet star. In the case of IRAS 18186–0833 the excitation is low and it seems to present a high helium abundance.

A NEW HALO PLANETARY NEBULA

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A new halo planetary nebula at R.A. = 21 hrs 02 min 44.5 sec and declination = −37° 20' 37" (equinox 1950.0), corresponding to galactic coordinates l^{II} = 6°. 165 and b^{II} = −41°.957, is presented. Spectrophotometric data have been obtained during 1988, with the CTIO 4-m telescope equipped with a R–S spectrograph and CCD detector. We have estimated a diameter of 8".2 for the nebula and the central star has a visual magnitude $V \cong 17$ mag. The reddened Hβ flux, observed through a 2" × 2".5 slit centered on the object, is log F(Hβ) = −13.80.

From spectrophotometric data, we have derived the logarithmic reddening correction, c(Hβ) = 0.15 ± 0.05, and the electron temperature, T(O III) = 15000 K ± 1500 K. The electron density has been assumed to be N_e = 500 cm^{-3}. By the usual procedures, we obtained the following nebular chemical composition: