UV SPECTRA OF NEBULAE AND NOVAE

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Optical spectra of nebulae and novae are dominated by recombination lines of H I, Be I and He II and by forbidden lines, such as those of [O III]. Their IR spectra show the fine-structure lines and continua due to dust. Most of the lines observed in the UV (say from 3000 to 1200 Å) are either due to resonance transitions (e.g. C IV 1549) or are of intercombination type (e.g. C III] 1908). Some elements do not have many lines in the optical - nitrogen gives only [N II] and there are no forbidden lines of ionized carbon - and for such elements much valuable information is provided by UV lines (e.g. N III], N IV], N V, C II], C III] and C IV). Carbon/oxygen abundance ratios deduced from combined UV and optical observations agree well with those deduced from IR continuum features (Seaton, 1983).

The nebular continua observed in the UV (Clegg et al. 1983) are mainly due to two-photon 2s-1s transitions in hydrogen. Some lines, such as C III 2297, appear with a strength which was unexpected and which has been explained in terms of the process of di-electronic recombination (Storey, 1981). For resonance lines, such as C IV 1549, scattered optical depths can be of order 10000 and radiation trapping can lead to absorption by dust even when the dust optical depth is small.

IUE observations of novae have enabled detailed abundance analyses to be made. Nova Cygni 1978 was found (Stickland et al., 1981) to have high abundances of C and O and a very high abundance of N, in accordance with predictions for thermo-nuclear run-away models. Two remarkable novae have been studied recently, Cra. 1981 (Williams et al., 1984) and Aql. 1982 (Snijders et al., 1984). Both have surprisingly high abundances of heavier elements - neon accounted for about one half of the mass in the gaseous envelope of Aql. 1982! Some gas-phase abundance anomalies are due to condensation of C, O, Mg and Si into dust grains. Others must be explained in terms of nuclear processing in the progenitors and during the outburst.

XR observations of nebulae and novae will be of great interest.

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