

NEW ABSOLUTE INTENSITIES OF THE EMISSION LINES OF 15 PLANETARY NEBULAE
THE MEMBERS OF THE GALACTIC CENTRE GROUP

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The new results have been obtained for 15 planetary nebulae, using the new spectrograms obtained at the Abastumany Observatory in 1971. The planetaries belong to the large Galactic centre group, studied by the authors earlier.

The monochromatic energy flux measured in series of emission lines in the region 3700-6700 Å (in 10^{-12} erg \cdot cm $^{-2}$ \cdot sec $^{-1}$) is given.

EMISSION LINES IN THE NEAR INFRARED SPECTRA OF FAINT PLANETARY NEBULAE

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We obtained spectra of twelve faint planetary nebulae at the Cassegrain focus of the 193 cm telescope at Haute Provence Observatory (dispersion: 230 Åmm $^{-1}$, spectral range 8000-11000 Å, receiver: ITT image tube with S1 photocathode).

All nebulae exhibit the three strong lines of HeI λ 10830 and of [SIII] at λ 9069 and 9532.

In addition the high excitation nebulae IC 2003, IC 351, NGC 6886 and J900 show HeII λ 10123.

Paschen lines are visible in NGC 6720 (P9, P8 blended with [SIII], and P7), NGC 6879 (weak), NGC 6886 (P6 to P11), IC 2149 (P6 to P20) IC5217 (P7 probably present), J900 (P6 to P13). They are absent in IC 1747, Hu 1-1, Vy 1-1 and J320.

Let us note that :1-HeII λ 10123 is absent in Hu 1-1, while λ 4686 and λ 5411 are present; 2-HeI in λ 10830 is weak in NGC 6720 compared to the [SIII] lines. (Paper will appear in Comptes Rendus de l'Académie des Sciences de Paris.)

DISCUSSION

Peimbert, M.: Have you observed forbidden CI lines in the spectra of any planetary nebulae?

Andrillat: We have observed [CI] only in NGC 7027 and never in the others.

Zuckerman: In the January 15, 1977 Ap.J. Letters we published a paper concerning CO emission from M1-78. These CO results make it quite clear that M1-78 is a compact HII region, not a planetary nebula, and I suggest that Dr. Kohoutek remove it from his catalogue.

Aller: Therefore it's purged and we can't discuss it anymore!

OBSERVATIONS OF COOL DUST IN PLANETARY NEBULAE

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We have observed BD +30 3639, IC 418, NGC 6572, NGC 6543, NGC 3918, NGC 2440, NGC 3242, A30, M1-78, and NGC 6210 in two broad passbands with effective wavelengths of 35μ and 75μ . All were detected at 35μ , and all but IC 4997 at 75μ . Their spectral energy distributions are similar in that most have peak flux densities at wavelengths ranging from 30μ to 45μ . The two nebulae with markedly different energy distributions are IC 4997, which has a hot spectrum peaking near 20μ , and M1-78, whose flux density rises rapidly from 35μ to 75μ , characteristic of compact H II regions.

These observations allow us to determine accurately the temperature of the cool dust in these nebulae and obtain improved estimates of their infrared luminosities. Typical dust temperatures are $\sim 95^\circ$, roughly a factor of two lower than those determined by Cohen and Barlow (1974, Ap.J. 193, 401) on the basis of 10μ and 18μ observations. This results in dust-mass estimates over an order of magnitude higher than theirs for the same nebulae. Thus, dust-to-gas ratios based on far-infrared data are near or only somewhat below the average interstellar value. (Paper will appear in The Astrophysical Journal.)

DISCUSSION

Forrest: What kind of dust do you assume to estimate the dust masses in planetary nebulae?

Moseley: We assumed an emissivity at 36μ comparable to that of olivine which is a pretty good emitter. Therefore it should give a lower limit.