

typical of disk planetaries while N/O in 108 - 76°1 is an order of magnitude larger. This suggests to us the possibility that varying amounts of mixing of CNO processed material has taken place in the progenitor stars. We do not detect [S II] or [S III] emission in K 648 or 108 - 76°1. In 49 + 88°1 [S II] and [S III] are present but weak and we derive an S abundance which is roughly a factor of 10 smaller than for disk planetaries. K 648 has the lowest abundances of O, N, and Ne of all these halo planetary nebulae.

CHEMICAL ABUNDANCES OF PLANETARY NEBULAE IN NGC 185, 205, AND 221

David C. Jenner and Holland C. Ford
Department of Astronomy, University of California, Los Angeles

Results are most complete for NGC 185-1, where the electron temperature is $17,900 \pm 1600^\circ\text{K}$. Compared to typical galactic planetary nebulae the abundance ratio in NGC 185-1 of helium/hydrogen (0.24 ± 0.08) is approximately twice that normally found, the abundance ratio of oxygen/hydrogen $(7.7 \pm 1.3)10^{-5}$ is approximately one-tenth that normally found, and the ratio of nitrogen/hydrogen (1.4×10^{-4} , poorly known) is approximately equal to that normally found.

A total of thirteen nebulae, two in NGC 205 and eleven in NGC 221, have partially complete observations - mostly at $\lambda 5007$ and $\lambda 6563$. The average nebula in NGC 185 and NGC 205 has weak [N II] $\lambda 6584$ emission relative to $\text{H}\alpha$ $\lambda 6563$, while the average nebula in NGC 221 has comparatively strong nitrogen emission. No gradient in the nitrogen/hydrogen emission ratio as a function of projected radial distance from the nucleus of NGC 221 is evident.

Although alternative explanations exist for the enhancement of the nitrogen lines in NGC 221, an enhanced abundance of nitrogen is the simplest explanation. Most likely, stars of the same age produce the planetary nebulae observed in these three galaxies. Thus, differences in the nitrogen emission-line strengths are most simply explained as being due ultimately to differences of chemical composition.