

CARBON MONOXIDE EMISSION FROM YOUNG PLANETARY NEBULAE

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We have mapped the CO J=2-1 and J=1-0 emission with high angular resolution (about 10" and 20", respectively) from the young planetary nebulae NGC2346, M2-9 and NGC6720 (the Ring nebula in Lyra). The observations were carried out by using the IRAM 30-m dish at Pico Veleta (near Granada, Spain).

In NGC2346 the dense gas appears to constitute the walls of a cavity or tube with clumpy structure. The more prominent clumps are concentrated on a kind of expanding ring which surrounds the central star. The kinematical age of this ring is about 1600 years. Emission in lines of ^{13}CO , HCN, HNC and HCO^+ has been detected toward one of these clumps. In M2-9 the molecular emission is concentrated in a region smaller than 10" around the central star. In the Ring nebula, the emission extends over a region of 100"x80", indicating that the molecular mass is about 0.1 solar masses, i.e. much higher than values estimated before. Our observations demonstrate that the CO is not distributed in a close spheroidal shell, but in a cylindrical or barrel-like structure. Its youngness (age = 3000 yr) and the moderate luminosity of its stellar progenitor during the AGB phase, explain why CO remains abundant in the Ring nebula.

More detailed reports on our work can be found in the papers by Bachiller et al. (1988, *Astron. Astrophys.*, 196, L5 ; 1989, *Astron. Astrophys.*, 210, 366 ; 1989, *Astron. Astrophys.*, in press ; 1989, *Astron. Astrophys.*, submitted)