

NEUTRAL HYDROGEN ASSOCIATED WITH THE PLANETARY NEBULA NGC 6302

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Observations of HI in absorption made with the Very Large Array towards the thermal radio emission of the planetary nebula NGC 6302 show two velocity components at 6 and -40 km s^{-1} (radial velocity with respect to the local standard of rest). The 6 km s^{-1} component is almost certainly due to a line-of-sight cloud, but the -40 km s^{-1} component is most probably associated with NGC 6302. We interpret this absorption component as coming from the neutral, outer part of an expanding ($\sim 10 \text{ km s}^{-1}$) ring whose inner part is ionized and produces the thermal continuum. The mass in atomic hydrogen of the outer (neutral) part of the ring is $\sim 0.06 M_{\odot}$. NGC 6302 is in an evolutionary stage intermediate to those of protoplanetary nebulae such as GL 2688 and evolved planetary nebula such as NGC 7293. This is the first detection of neutral hydrogen associated with a planetary nebula.

THE KINEMATICAL STRUCTURE OF THE BIPOLAR NEBULAE M2-9 and M1-91

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Both nebulae are of similar appearance consisting of a central core and two highly symmetrical, elongated lobes. Using the large vertical Coude spectrograph of the 2.2-m telescope on Calar Alto, Spain, we obtained long-slit spectra in the red of high spectral (12 km s^{-1} FWHM) and spatial ($2''$) resolution from various positions within the nebulae. Our data indicate high similarity in the kinematical structure of both nebulae. The central cores are dominated by very broad emission lines. The H α profiles (width $\approx 1600 \text{ km s}^{-1}$ at 5% level in M2-9) exhibit an absorption feature blue-shifted by $\approx 20 \text{ km s}^{-1}$ relative to the emission maximum, similar to profiles observed in some Herbig-Bell stars. The (NII) profiles (width $\approx 150 \text{ km s}^{-1}$ at 5%) show some