THE DETECTION OF CO IN M104

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We have observed the early-type galaxy M104 (NGC 4594, Sombrero Galaxy) in the $^{12}CO(1-0)$ transition with the 30-m IRAM telescope. We have detected CO in two positions which coincide with maxima of HI, dust and radio continuum. We failed to detect CO in the nuclear area of M104.

Assuming the conversion $\sigma(H_2) = 6\ I_{CO}[K\ km/s]\ \cos i\ M_\odot\ pc^{-2}$ for the surface mass density of the molecular hydrogen (Young and Scoville, 1982), we derive $\sigma(H_2) = 3.0 \pm 1.0\ M_\odot\ pc^{-2}$ for the eastern position and $\sigma(H_2) = 2.3 \pm 0.5\ M_\odot\ pc^{-2}$ for the western one. The conversion factor corresponds to $N_{H_2}/I_{CO} = 4.10^{20}$ molecules $cm^{-2}/(K\ km\ s^{-1})$, slightly higher than the currently used value for the Galaxy. This value was chosen to account for source-beam coupling typical for the Virgo galaxies (Young, 1988). The total mass of the molecular gas was estimated assuming a reasonable spread in the σ_{H_2}/σ_{HI} ratio to be in the range of $M_{H_2} = 5.4.10^8 - 1.7.10^9\ M_\odot$. The total gas mass then would be $M_{Gas} = 1.8.10^8 - 3.10^9\ M_\odot$. The molecular mass to blue luminosity ratio is at the margin of the observed distribution for early-type disk galaxies (Thronson et al., 1989; Wiklind and Henkel, 1989).

The mass and the morphology of CO (and hence of H_2) is in agreement with that of other Sa/Sb galaxies. This means, however, that the massive bulge of M104 does not contribute any processed CO. The present non-detection of CO in the nucleus may be due to technical limitations of measuring broad spectra.

The CO, HI (Bajaja et al., 1984), radio continuum (Bajaja et al., 1988) and dust emission are all seen in a ring at R ~ 15 kpc.

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