CO OBSERVATIONS OF THE CENTRAL REGION OF NGC4258

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ABSTRACT. $^{12}CO(J = 1-0)$ observations of the central region of NGC4258 at a resolution of 17" revealed a high-density concentration of molecular gas toward the center. The molecular clump lies on a central depression in the HI bar. No clear interaction of the molecular gas with the continuum anomalous arms has been found.

The SBb type spiral galaxy NGC4258 is known by its anomalous radio continum arms (van der Kruit et al 1972; van Albada 1980). The anomalous arms may be some ejection from the galactic center. The central activity responsible for such an energetic ejection may be occuring in a dense, compact gaseous disk with high accretion rate. Dynamics of the gas in such a very inner region is better investigated in the molecular line than in the HI, and we have undertaken $^{12}CO(J = 1-0)$ line observations of the central region using the Nobeyama 45-m telescope.

The ob servations covered the central $1' \times 2'$ approximately along the HI bar. The CO intensity of about $T_A^* \sim 0.1$ K has been detected near the center. Fig.1 shows the integrated CO intensity superposed on the HI emission distribution obtained by van Albada (1980). The CO-bright region is confined in a small area of 20" × 30", while the intensity decreases steeply outside this area, composing a high-density clump of molecular gas. This clump is elongated in the direction of the major axis of the HI bar. The clump has the H_2 mass of about $10^{10} M_\odot$, which makes up a few percent of the total dynamical mass involved in the same region. Although the CO clump is located near the center of the HI bar, the CO intensity distribution along the bar seems to be anti-correlated with the HI intensity (Fig. 2).

Fig.3 shows a comparison of the CO intensity distribution with the radio continuum emission (van Albada and van der Hulst 1982). The CO clump is bout 5" off set from the continuum center. The eccentric CO distribution seems to be correlated with the asymmetric intensity distribution of the anomalous arms: the brighter arm appears to extend toward the north-west where the CO intensity is weaker compared to the south-east side of the center. However, there is no indication that the molecular gas is interacting with the anomalous arms. This is not inconsistent with the suggestion that the arms are not located in the galactic plane but the ejection is into the halo out of the nuclear disk (Sofue 1980; Sanders 1980).

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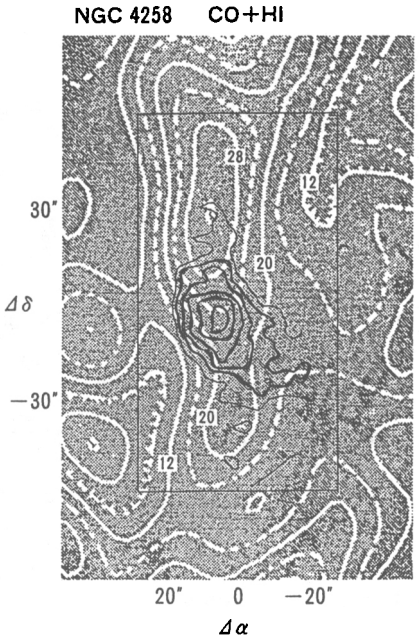


Fig.1: Distributions of the integrated CO (black contours) and HI (white cotours: van Albada 1980) intensities of the central region of NGC4258. The contour interval of the CO intensity is 5 K km s^{-1} and the lowest contour is 10 K km s^{-1}.

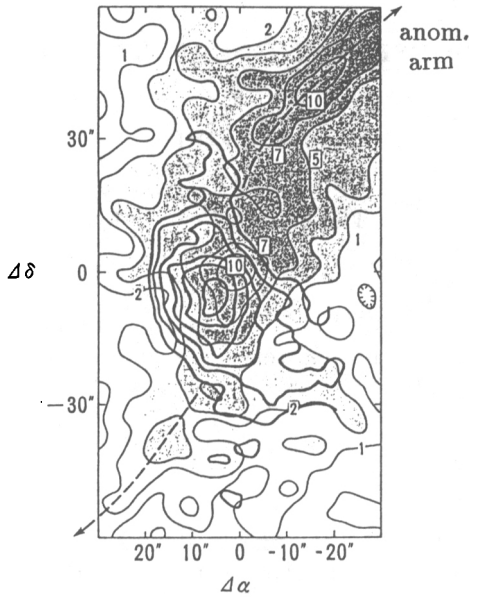
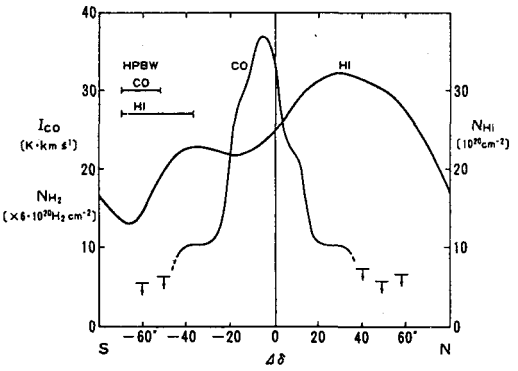


Fig.2: Cross sections of the CO and HI intensities along the HI bar. Note the anticorrelation of the two emissions, or the depression of HI near the peak of the CO emission.

Fig.3: CO intensity distribution superposed on the radio continuum emission distribution. Note the eccentric distribution. No clear interaction between the CO and continuum features is found.



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