HIGH RESOLUTION ^{12}CO AND ^{13}CO IMAGES OF THE CENTRAL REGION OF IC342

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We have observed the ^{12}CO (Ishizuki et al 1990) and ^{13}CO emission of the central 65" region of the galaxy IC342 at the high resolutions of 2.4" for ^{12}CO and 5.1"x4.2" for ^{13}CO using the Nobeyama Millimeter Array. The integrated intensities of ^{12}CO and ^{13}CO emission are shown in Fig.1 and 2, respectively.

The ^{12}CO emission is concentrated in two narrow ridges and a ring. The two ridges are offset and separated by ≈9". The ridges continue into nuclear region and bend to form a ring-like structure with a diameter of ≈6" (110pc at a distance of 3.9 Mpc). The ring-like structure corresponds to the region where 2cm and 6cm raio continuum emission (Turner and Ho 1983) and 10μm emission (Becklin et al 1980) are strong. The results are consistent with the scenario that a molecular gas bar is formed in the central region of a galaxy and causes gas to concentrate in the nuclear region fueling star formation activity.

The distribution of ^{13}CO emission roughly coincides with that of ^{12}CO emission, the ridges and the ring. However, in the ^{12}CO ring-like structure, the distribution of the ^{13}CO emission is rather different from the ^{12}CO distribution; ^{13}CO emission is from the exterior of the ^{12}CO ring which is a site of active star formation. This can be considered to be due to consumption of molecular gas by star formation, photodissociation by UV radiation field, or thermal excitation to upper rotational levels owing to high gas temperature.

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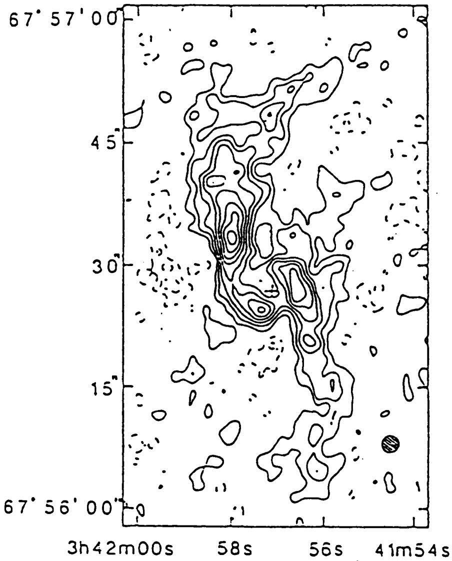

Fig. 1 A map of CO(1–0) integrated intensities. The contours are 89 × (−2, −1, 1, 2, 3, ···) K kms^{-1}. The cross is a 2 μm peak (Becklin *et al.* 1980).

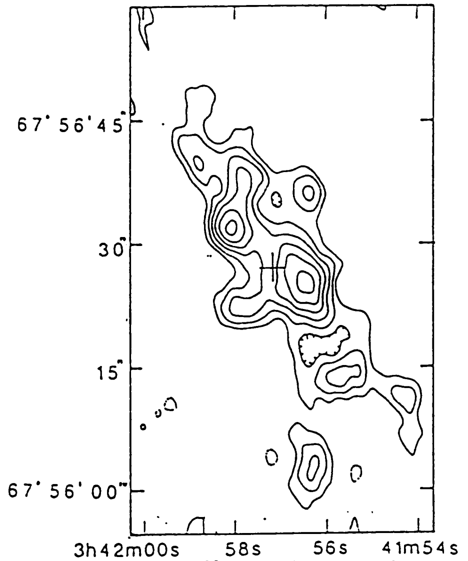

Fig. 2 A map of ^{13}CO(1–0) integrated intensities. The contours are 14 × (−2, 2, 3, 4, 5, 6, 7) K kms^{-1}.

References

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