CO (J=2-1) OBSERVATIONS OF SEVERAL GALACTIC HII REGIONS

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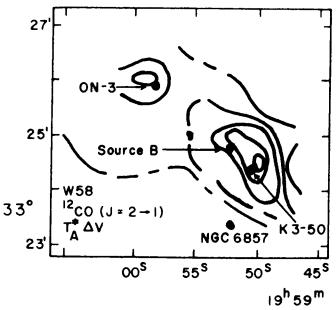
We used the new OVRO 10 meter millimeter telescope together with the Estec heterodyne receiver and backend to observe ^{12}CO (J=2-1) emission in the direction of several galactic HII regions. At a frequency of 230 GHz our angular resolution was 30 arcsec and our velocity resolutions were 0.3 and 1.3 km s^{-1}. We observed the cores of 16 molecular clouds associated mainly with compact and subcompact HII regions: S88, S106, S157, S158 (NGC 7538), S159, S187, S228, S255 (IC 2162), S269, ON-1, G45.5-0.1, W1 (center), W58 (K3-50), Cep A and Mon R2. Observations of all sources were in a cross pattern of at least five points. Four sources - Cep A, Mon R2, S158 and W58 - were mapped in more detail. Results for the latter two are shown in Figures 1 and 2.

We also used the OVRO room temperature 115 GHz receiver to obtain ^{12}CO (J=1-0) and ^{13}CO (J=1-0) observations at selected positions with a resolution of 1 arcmin.

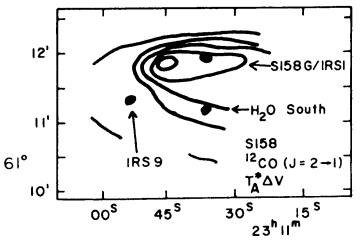
Most of the observed line profiles are simple structures having linewidths of about 5 km s^{-1}. Self-absorption features were observed in ON-1, Cep A and Mon R2, and mapped in the latter two sources. Multiple velocity components appear in the line profiles of G45.5-0.1, and possibly S158 and W58 (see Figures 1b and 2b). Considerable line broadening is seen in W58 at the positions of the compact HII region K3-50 and the ultracompact HII region/OH maser source ON-3 (Fig. 1b). The CO map shows these sources to be associated with different CO maxima. The CO cloud near K3-50 and source B is mainly hot, the one near ON-3 is mainly dense.

Although the CO map of S158 (Fig. 2a) shows a smooth distribution extending over several arcminutes around the compact HII regions and maser sources, the line profile broadens noticeably about one arcmin east of the compact HII regions (Fig. 2b).

B. H. Andrew (ed.), Interstellar Molecules, 115–116.

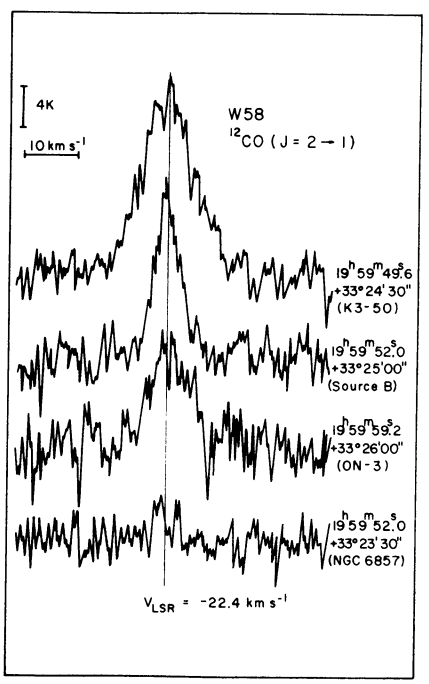


1a

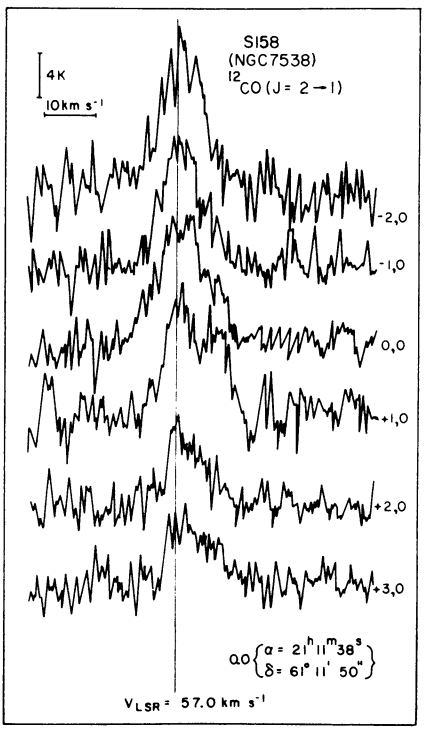


1b

Figure 1. Maps in ^{12}CO (J=2-1) of (a) W58 and (b) S158



2a



2b

Figure 2. ^{12}CO (J=2-1) profiles in (a) W58 and (b) S158. In 2(b) the profiles correspond to positions offset as indicated from the origin. The offsets are given in minutes of arc.

https://doi.org/10.1017/S0074180900072338 Published online by Cambridge University Press