

Molecular cloud structure and star formation in the W43 complex

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Abstract. The W43 region is one of the most massive star forming regions in our Galaxy. It is subject to a large IRAM 30m project that observes high spectral resolution maps of the complete complex in the ^{13}CO (2–1) and C^{18}O (2–1) lines. We find a variety of different sources of which we calculate excitation temperature, H_2 column density and mass. We find the total mass of dense clouds in the complex to be $1.2 \times 10^6 M_\odot$.

Keywords. ISM: molecules, ISM: structure, ISM: kinematics and dynamics, molecular data

The W43 region is one of the most massive star forming regions in the Galaxy, situated at the junction point of the Galactic bar and the spiral arms. In ATLASGAL (Schuller *et al.* 2009) dust emission two separate clouds can be distinguished at this location, but Nguyen Luong *et al.* (2011) show that both components are indeed connected and thus form one giant complex.

To study the dynamics of the molecular gas in this region a large IRAM 30m has been initiated. The resulting data cubes of ^{13}CO (2–1) and C^{18}O (2–1) line emission show numerous separated sources and filaments thanks to a spectral resolution of $<0.2 \text{ km s}^{-1}$. We find three separated velocity complexes along the line of sight, located in three different spiral arms. An integrated map of the ^{13}CO (2–1) line is shown in Fig. 1.

From these maps we calculate the optical depth of the CO gas, as well as its excitation temperature. Temperatures are in the range from 8 to 20 K. We can also estimate the H_2 column density and the total mass contained in this gas. We find typical masses for single filaments of $10^4 M_\odot$. We calculate a total mass of the dense molecular gas in the W43 region of $1.2 \times 10^6 M_\odot$.

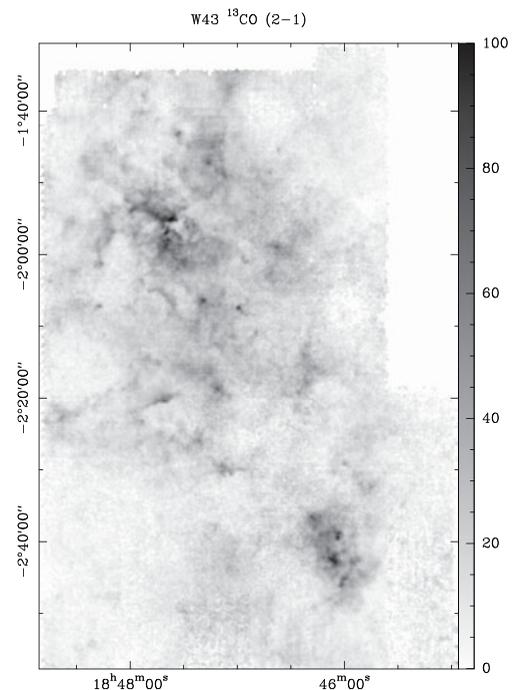


Figure 1. Integrated intensity map of the ^{13}CO (2–1) line.

References

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