

The large-scale distribution and physical properties of massive star forming regions in the Milky Way

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Abstract. We are conducting a large survey with the Urumqi 25 m radio telescope to study the distribution and physical properties of massive star forming regions in the Milky Way. We will accomplish this by observing the H_{110 α} hydrogen recombination line at 4.874 GHz and the H₂CO absorption line at 4830 GHz. These lines are associated with compact HII regions and dense molecular clouds. As a test of the 6 cm spectral line receiving system, we observed the two spectral lines toward massive star forming regions. We plan to study the large scale distribution and physical properties of massive star forming regions in the Milky way.

Keywords. ISM: HII regions, Galaxy: kinematics and dynamics, Galaxy: structure

1. The spectral system and observational tests

Formaldehyde (H₂CO) was one of the first poly-atomic molecules to be detected in interstellar space and has since been found to be a common constituent of interstellar molecular clouds. H₂CO is associated with HII regions and is therefore a good tracer and probe of regions of star formation. HII regions can be expected to provide crucial evidence for any spiral structure in our Galaxy. This was recognized in the bold attempt by Georgelin & Georgelin (1976) to derive a grand spiral pattern for our Galaxy from studies of HII regions. Valuable additions to the northern hemisphere data were made by Downes *et al.* (1980) and to the southern hemisphere data were made by Caswell & Haynes (1987).

We will measure the line velocities, and hence derive kinematic distances. The kinematic distance ambiguity may partly be resolved by observing the two lines simultaneously in the same band. From the survey we aim to establish the Galactic distribution of massive star forming regions. The study of global star formation will provide important information for the environment of young stars and clusters. However, global star formation still remains poorly understood.

The 25-meter radio telescope of Urumqi Astronomical Station of NAOC, is located at Nanshan Mountain near the south suburb of Urumqi city, Xinjiang province. It is situated 2080 m above sea level, at a very dry site for short centimeter observations. The Urumqi Observatory 25 m radio telescope has a 4096-channel digital correlator as the back end. The correlator, used with a 80 MHz bandwidth, can simultaneously observe the H_{110 α} hydrogen recombination line at 4.874157 GHz and the formaldehyde (H₂CO) absorption line at 4.82966 GHz. In the C band, the 25 m telescope has a spatial resolution of about 10', and a system temperature of about 22 K. This is well suited to observing the two spectral lines simultaneously. We are using this system to survey the large-scale distribution and physical properties of massive star forming regions in the Milky Way.

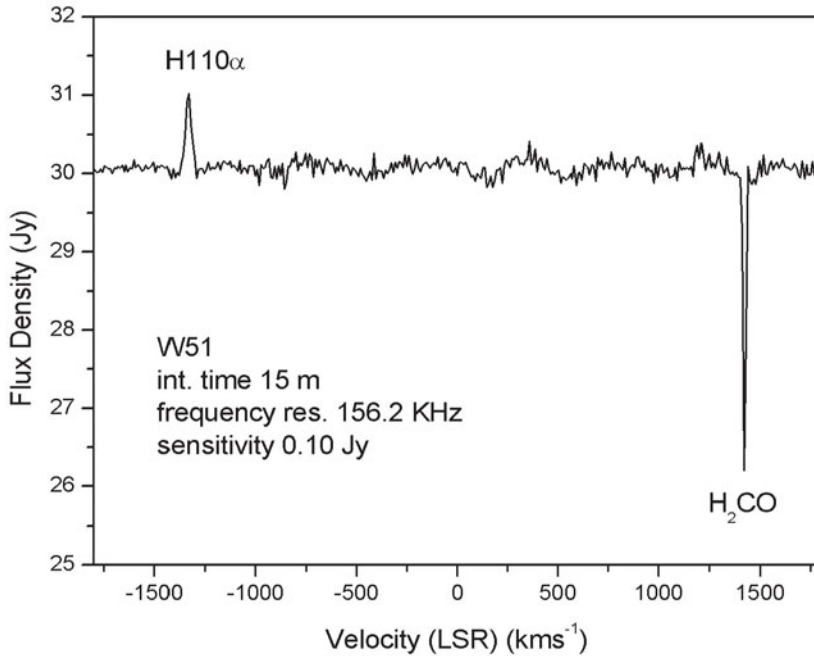


Figure 1. As a testing of 6 cm spectral line receiving system, we observed the two spectral lines toward W51 massive star forming regions, integration times is 15 m, the system temperature was about 22 K.

As a test of the 6 cm spectral line receiving system, we observed the two spectral lines toward massive star forming regions. An example is shown in Figure 1.

Acknowledgements

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