

Degree scale high resolution mapping of CO J=2-1 and 3-2 in giant molecular clouds

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Abstract. We present the first results from a project to map Giant Molecular Clouds (GMCs) in the ¹²CO J=2-1, ¹³CO J=2-1, and ¹²CO J=3-2 lines using the Heinrich Hertz Submillimeter Telescope (HHT) at the University of Arizona. We mapped nearly 2.5 sq. deg of W3 and 1.0 sq. deg of W51 in the J=2-1 lines. We have begun mapping in the J=3-2 line. We achieve angular resolutions of 33" and 24" in the J=2-1 and J=3-2 lines with 1.3 and 0.9 km s⁻¹ resolution.

Keywords. ISM: clouds, ISM: molecules, submillimeter

W3 and W51 are GMC's with active star forming regions in the Perseus Arm and Sagittarius arms, respectively. The greatest activity in W3 takes place in the part of the cloud that has recently formed OB stars in large numbers. The radiation from these stars has ionized part of the GMC making a large H II region complex dominated by W3 Main. In other areas are found filaments and cometary clouds that have presumably been sculpted by the radiation and/or stellar winds of these OB stars.

The brightest CO emission in W51 is in the area of the cloud that also has strong infrared and radio continuum emission indicating that O stars and H II regions are located there. Another area of W51 exhibits an especially high rate of star formation possibly triggered by a spiral density wave shock.

These and other maps of the observations reveal in some detail the structures associated with the ongoing star formation in these GMC's. We will apply multiline analysis tools to derive the physical conditions in them.

Figure 1 shows the most active portion of the W3 GMC as an integrated intensity map in the ¹²CO J=3-2 line (made with the **DesertStar** 7-beam, 345 GHz array receiver). Superimposed on it are contours of the 21 cm continuum emission which traces the associated H II regions. The green circle marks the position of OB association IC1795.

Figure 2 is a 1 square degree integrated intensity map in the ¹²CO J=2-1 line of W51.

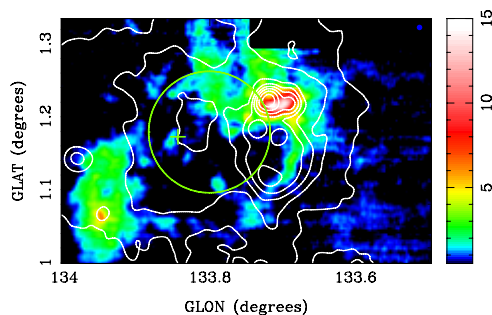


Figure 1. DesertStar 7-beam array map of W3 ¹²CO(3-2)

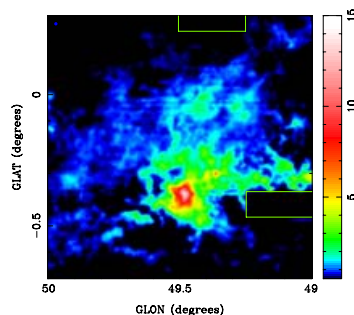


Figure 2. W51 ¹²CO(2-1)

The whole poster is available at mira.as.arizona.edu/~jbieging/IAUsymp237/GMCmaps.pdf