

THE SAGITTARIUS C REGION MAPPED IN CS(2→1) AND (3→2) WITH THE IRAM 30M TELESCOPE

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We study the interaction of a dense giant molecular cloud with the HII region Sagittarius C, and a prominent nonthermal filament (NTF). For this purpose, we mapped the CS(2→1) and (3→2) transitions simultaneously with the IRAM 30m radio telescope, using the on-the-fly observing mode, and covering a 20pc×37pc (8' × 15') region. The high spatial resolution, 0.7pc (16'') at 147 GHz, allows for the first time to analyze in detail the morphology and kinematics of the molecular material and its relation to the ionized gas.

Figure 1 shows a map of integrated CS(3→2) emission at velocities of radio recombination lines found in the direction of the HII region (Liszt & Spiker 1995, hereafter LS95). The extended emission in the south-east of our map belongs to the massive GMC M359.5-0.15. Overlaid is the radiocontinuum emission (LS95) showing the Sagittarius C HII region and the NTF which extends over 17 pc, less than 0.6 pc wide, and roughly perpendicular to the Galactic plane, presumably tracing strong magnetic field lines. The selected rotational transitions of CS trace dense molecular gas of $n \sim 10^{5-6} \text{ cm}^{-3}$. Clearly, confirming earlier findings (LS95), the HII region is lying in a cavity of the molecular material. The ratio of integrated CS(3→2)/CS(2→1) intensities rises from ~ 0.8 in the GMC to values of 2 at the edges of the molecular gas lying next to the HII

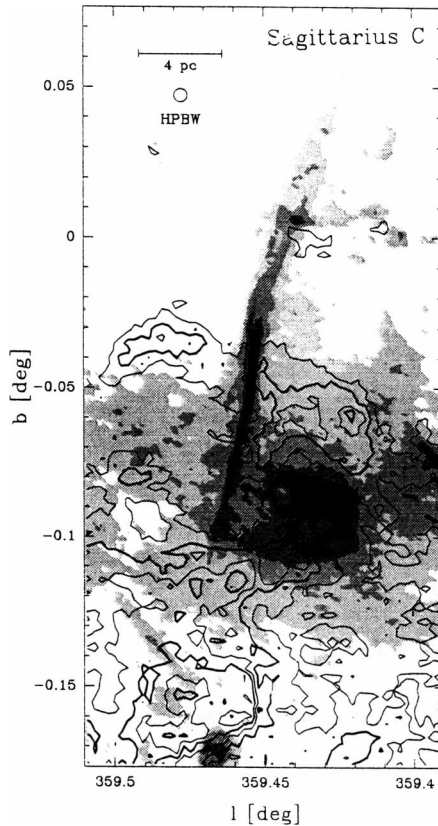


Figure 1. The radio continuum emission at 1616 MHz (Liszt & Spiker 1995) in greyscales superimposed on the integrated CS(3→2) emission in contours. Levels of the radio continuum are 2,4,8,12,16,32 mJy/beam and the resolution is $4.0'' \times 7.5''$. The integration interval of the CS(3→2) emission is 25 km s^{-1} centered on -62.5 km s^{-1} , the velocity of the H70 α radio recombination line of the HII region (LS95). The CS data are shown at their original resolution of $16''$.

region, indicating compression and/or heating by the expanding thermal, ionized material. The NTF is brightest and slightly changes its direction at $l, b = 359.45^\circ, -0.05^\circ$, where it appears to interact with a ridge of molecular material extending over $\sim 12 \text{ pc}$ roughly perpendicular to the NTF. A more detailed analysis, especially of the kinematic structure, will reveal whether these features are only chance superpositions of unrelated objects along the line-of-sight, or whether our observations indeed reveal in detail the interaction between dense, neutral, molecular material with the ionized thermal and non-thermal gas.

References

Liszt H.S., Spiker R.W., 1995, *ApJS*, 98, 259 (LS95)