

An upper limit to the molecular density in IC 342

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A search for CS J=7-6 emission from the core of the galaxy IC342 was undertaken with the Caltech Submillimeter Observatory. At the line frequency of 342.883 GHz, the beamsize is 20". An upper limit to $T_{\text{MB}}\Delta v$ of 0.4 K km s⁻¹ was obtained. This upper limit can be compared directly to the CS J=3-2 integrated line flux (3.1 K km s⁻¹; Mauersberger and Henkel 1989), because the beam used for that observation was similar (17"). The J=7-6 to J=3-2 line ratio limit is 0.13 with no correction for the slight difference in beamsize, and ≈ 0.15 with this correction included. Assuming $T_{\text{kin}} = 70$ K (Martin and Ho 1986), this leads to a density upper limit of about 5×10^5 cm⁻³ for this gas.

References:

- Mauersberger, R. and Henkel, C.: 1989, *Astron. Astrophys.*, **223**, 79.
Martin, R.N. and Ho, P.T.P.: 1986, *Astrophys. J.*, **308**, L7.