HC_3N Maps of OMC1

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We have made 3."8 resolution maps of HC_3N (J = 12-11) and 2.7 mm continuum emission in OMC1 using OVRO mm interferometer (Figure 1). The continuum map, which traces dust column density, shows that the Hot Core region consists of several clumps, the densest of which lies 3" SE of IRc2. HC_3N, which traces dense ($n_{H_2} \gtrsim 10^6$ cm^{-3}) gas, shows the velocity structure in the region. There is no simple pattern of rotation or expansion, nor does the emission resemble a disk centered on IRc2. Since the velocity difference between the Hot Core and IRc2 ($\sim$ 2 kms^{-1}) and the velocity dispersion in the hot core ($\sim$ 5 kms^{-1} HWHM) are comparable with the orbital velocity at a distance of 3" from a 20 $M_\odot$ object ($\sim$ 6 kms^{-1}), it is possible that the hot core material is bound to IRc2.

In the channel at 10.4 kms^{-1} V_{LSR}, we detect strong emission from the source 20" NE of IRc2, which confirms indications from continuum and CS (J = 2-1) maps (Mundy *et al.* 1986) that this is a very dense, possibly protostellar, object. This emission is clearly resolved from the hot core and is elongated north-south, along the direction of the ridge emission.

An additional interesting feature in these maps is a compact high velocity source located ~4" SW of IRc2. This source has a velocity dispersion of >20 km/s (FWHM) and is spatially coincident with the "zero-offset" source seen by Pauls *et al.* (1983) and a point source in the near IR images taken by Allen *et al.* (1984). The large localized velocity, dispersion and the highly obscured IR source suggest that this compact source is an outflow from a young stellar companion to IRc2.

References

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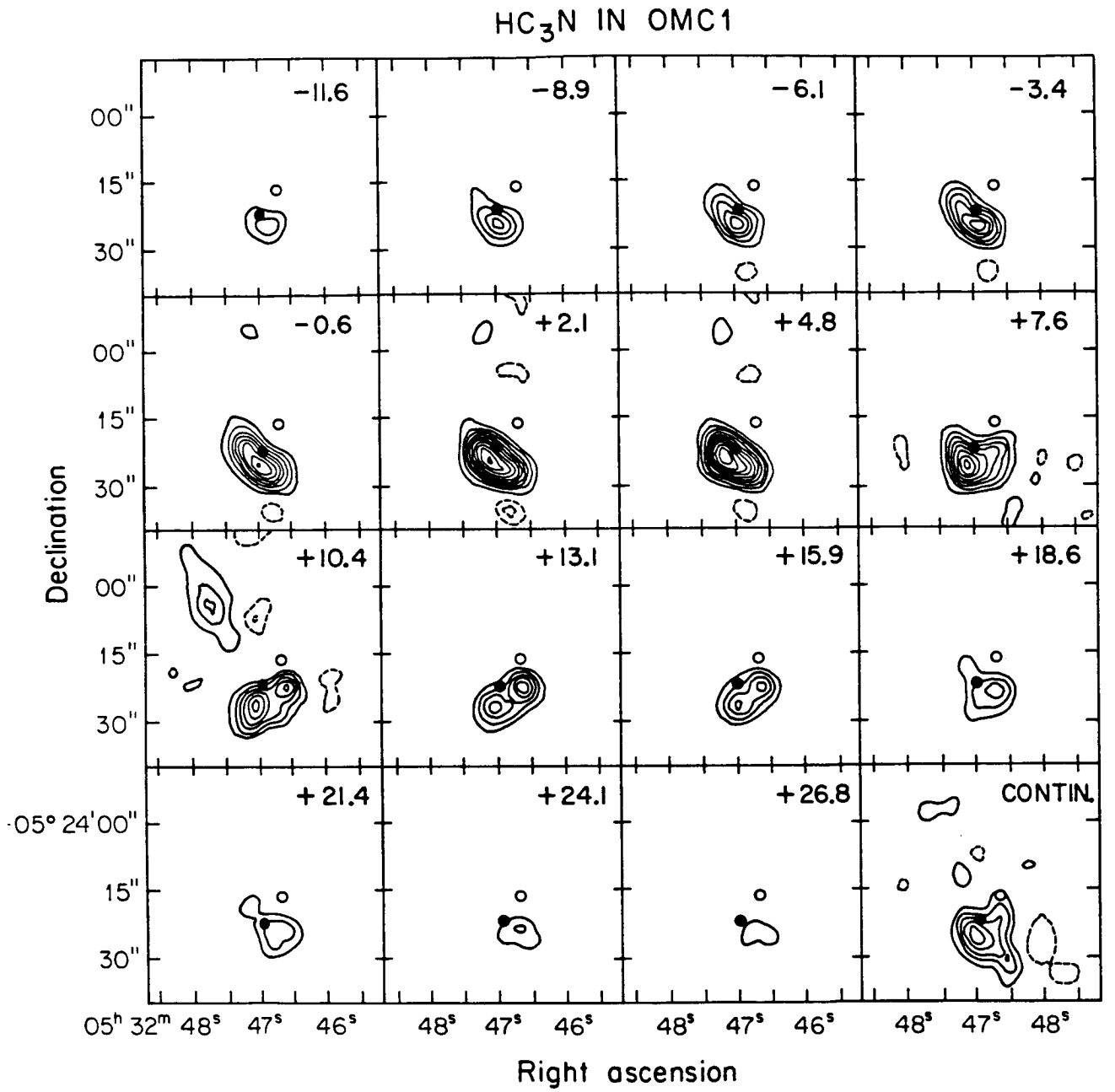
Mundy, L. G., Scoville, N. Z., Baath, L. B., Masson, C. R., and Woody, D. P. 1986, *Ap.J.(Letters)*, **304**, L51.

Pauls, T. A., Wilson, T. L., Bieging, J. H., and Martin, R. N., 1983, *Astr. Ap.*, **124**, 23.

Figure Caption

Fig. 1: Contour maps of HC_3N and continuum emission in OMC1. The numbers in the corners of the maps denote V_{LSR}. The filled circle in IRc2 and the open circle is BN. The contour interval is 1 Jy/beam (6K) for the HC_3N maps and 0.1 Jy/beam for the continuum map.


HC3N IN OMC1
-11.6
-8.9
-6.1
-3.4
-0.6
+2.1
+4.8
+7.6
+10.4
+13.1
+15.9
+18.6
+21.4
+24.1
+26.8
CONTIN.
00"
15"
30"
-05° 24'00"
Declination
05h 32m 48s 47s 46s
48s 47s 46s
48s 47s 46s
48s 47s 48s
Right ascension