Stars and Protostars in NGC 2024

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Mezger et al. (1988 A&A 191, 44) reported the detection of six "Protostars" in the high density molecular gas *behind* the HII region NGC 2024. We have imaged this region in $J = 1 \rightarrow 0$ $C^{18}O$ and 2.7 mm continuum emission with a resolution of $\sim 10''$ using the Berkeley-Illinois-Maryland Association Array. Continuum emission was detected from dust associated with the sources FIR 3, 5 and 6 (Mezger et al 1988). The 1.3 mm/2.7 mm spectral indices of these dust cores are all ≥ 4. The upper limits for the 2.7 mm continuum flux densities for FIR 1, 2, 4 and 7 indicate similar spectral indices for these cores.

$C^{18}O$ $J = 1 \rightarrow 0$ emission is observed in 3 slightly extended regions. The two southern peaks are offset by $> 15''$ (6000 AU) from the positions of FIR 5 and FIR 6. The northern peak is located $\leq 4''$ (1700 AU) from the position of FIR 2. For the $C^{18}O$ clouds, H_2 column densities based on the virial theorem imply (CO/H_2) ratios of $\sim 10^{-5}$, about 10% of the normally used value. The low value of the CO fractional abundance can be explained if molecules are depleted onto grains; it is surprising that $X(CO)$ is this *high*, because current models suggest greater depletion in such high density regions. Toward most of the dust cores no $C^{18}O$ emission is detected and so depletion may be much more severe. On the other hand, if the dust cores contain stars, then molecules may have been destroyed by energetic stellar winds.

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