

High Resolution Observations of Orion-KL: Insight into its Chemical Complexity

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Orion-KL is the closest region of massive star formation and is one of the most chemically interesting and complex regions in the galaxy. It has been known for over two decades that the N bearing and O bearing species are not co-spatial in this region (e.g. Blake et al., 1987). The traditional view is that the N bearing species originate in the Hot Core, a warm (200+ K) dense ($>10^7$ cm $^{-3}$) site of massive star formation, and that the O bearing species originate in the Compact Ridge, where the molecules are ablated off grain surfaces by an outflow.

A recent study has shown that this view is not entirely correct, but that the N and O bearing species originate in several compact regions near known infrared sources (Friedel & Snyder, 2008). We have conducted a follow-up study including both higher and lower resolution observations of Orion-KL at $\lambda = 3$ mm to further investigate this chemical differentiation. These observations were conducted with the Combined Array for Research in Millimeter-Wave Astronomy (CARMA) and provide the most detailed observational study of this source to date. We observed the rotational transitions of numerous molecular species including ethyl cyanide [C $_2$ H $_5$ CN], dimethyl ether [(CH $_3$) $_2$ O], methyl formate [HCOOCH $_3$], formaldehyde [H $_2$ CO], formic acid [HCOOH], acetone [(CH $_3$) $_2$ CO], SO $_2$, and 34 SO. We will present the results of these observations, with a particular focus on the chemical properties of the many sources in the region and their implications on astrochemical models.

