SMA Observations toward the Massive Star-forming Core MM1 of W75N

Y. C. Minh,[1] S.-Y. Liu, [2] Y.-N. Su, [2] and H.-R. Chen [3]

[1]*Korea Astronomy and Space Science Institute (KASI), Daejeon, Korea*
[2]*Academia Sinica, Institute of Astronomy and Astrophysics (ASIAA), Taipei, Taiwan*
[3]*Institute of Astronomy & Department of Physics, Nat'l Tsing Hua Univ., Hsinchu, Taiwan*

The massive star-forming core MM1 of W75N was observed using the Submillimeter Array (SMA) with ~ 1" and 2" spatial resolutions at 230 and 340 GHz, respectively. From the 230 GHz continuum we found that the MM1 core consists of two sources, separated by about 1": MM1a (~0.6 $M_\odot$) and MM1b (~1.4 $M_\odot$), located near radio continuum sources VLA 2/VLA 3 and VLA 1, respectively. Within MM1, two gas clumps have been found to be expanding away from VLA 1 at about ±3 km/s, resulting from the latest star formation of the region. Observed molecular lines show emission peaks at two positions, MM1a and MM1b: sulphur-bearing species have emission peaks toward MM1a, but methanol and saturated species at MM1b. We identified the high temperature (~200 K) gas towards MM1a and the hot core towards MM1b. The SiO molecule is unique in having an emission peak exactly towards VLA 2, probably tracing a shock powered by VLA 2. Observed sulphur-bearing species show similar abundances both in MM1a and MM1b, whereas the methanol and saturated species show significant abundance enhancement toward MM1b, by about an order of magnitude, compared to MM1a.

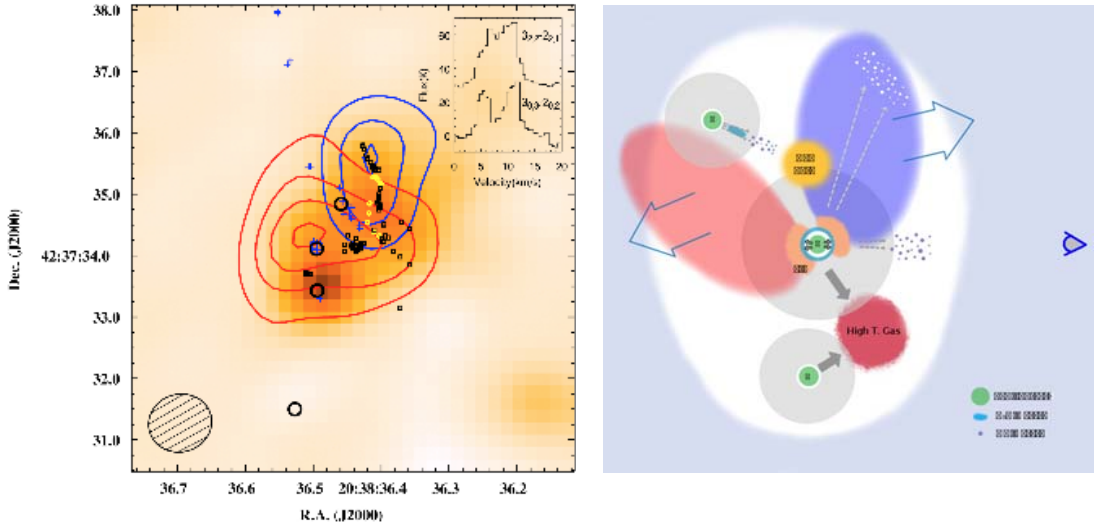

Figure 1: (Left) Integrated intensity map of the H_2CO 3(0,3)-2(0,2) line.Blue contours are for v=2.0-8.5 km/s, andred contours for v=8.5-16.0 km/s.Both contour levels start from 1.2 Jy/beam km/s and increase by 1.5 Jy/beam km/s. (Right) A schematic diagram of the MM1 core.