PHYSICAL AND CHEMICAL STRUCTURE OF HIGH MASS STAR FORMING REGIONS

I.I. Zinchenko

Institute of Applied Physics of the Russian Academy of Sciences
46 Uljanov str., Nizhny Novgorod 603950, Russia
zin@appl.sci-nnov.ru

In recent years we surveyed several tens of high mass star forming regions in various molecular lines and in millimeter wave continuum. Basic physical properties of detected clumps and molecular abundances were derived. One of the problems is a selection of the best tracer of mass distribution. In particular, we found that in regions of high mass star formation the CS emission correlates well with the dust continuum emission and is therefore a good tracer of the total mass while the N_2H^+ distribution is frequently very different. This is opposite to their typical behavior in low-mass cores where a freeze-out plays a crucial role in the chemistry. The behavior of other high density tracers varies from source to source but most of them are closer to CS. Radial density profiles in massive cores are fitted by power laws with indices about -1.6, as derived from the dust continuum emission. The radial temperature dependence on intermediate scales is close to the theoretically expected one for a centrally heated optically thin cloud. The velocity dispersion either remains constant or decreases from the core center to the edge. Several cores including those without known embedded IR sources show signs of infall motions. They can represent the earliest phases of massive protostars. There are implicit arguments in favor of small-scale clumpiness in the cores.

Acknowledgements. The work was supported by the Russian Foundation for Basic Research grant 06-02-16317 and by the Program "Extended objects in the Universe" of the Russian Academy of Sciences.