

Kinematics of Interstellar Filaments and High Mass Star Formation

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Observations of the interstellar medium (ISM), especially its molecular component, reveal the organization of the dust and gas into complex networks of filaments. In molecular clouds, gravitationally unstable filaments are now identified as the main birthplaces of individual solar-type stars, while the hubs that formed at their intersections are associated with stellar clusters and high-mass stars. Exact mechanism of assemblage of mass to form high mass stars is still not fully understood. Observations suggest several scenarios for accumulation of matter in dense cores that form high-mass stars. These include channeling of matter through molecular filaments towards dense star-forming hubs and ridges, collision between filaments or clouds and interaction between sheet-like extended structures with star-forming filaments.

In this talk I will present some of our recent results on the formation of high-mass stars based on spectroscopic studies of such interstellar filaments using molecular transitions in the (sub)-millimeter wavelengths.