P125b ALMA-IMF: ALMA Transforms our View of the Origin of Stellar Masses

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The study of massive protoclusters is a requirement to investigate the origin of the initial mass function (IMF) in the typical, extreme environments where high-mass stars are born.

Recent ALMA imaging of a young massive protocluster revealed the first definitive case of a core mass function (CMF) whose shape is different from the IMF. In contrast, the CMF shape in more evolved but still embedded massive clusters more closely resembles the IMF. This raises the intriguing possibility of CMF evolution with time. We aim to determine when and by which physical processes the CMF of massive protoclusters is reconciled with the canonical IMF.

We will investigate the CMF evolution of massive protoclusters with the 15 most massive pc^2 clouds at distances < 6 kpc. We present here the overall strategy and the early results on the dust continuum emission and the complex kinematics revealed by a network of filaments traced by N_2H^+ J=1-0 and $C^{18}O$ J=2-1.