P121a Rotation and infall in high-mass hot cores

Fernando Olguin (Kyoto University), Patricio Sanhueza (The University of Tokyo), Yoko Oya (Kyoto University)

High-mass stars (masses larger than 8 solar masses) form at the center of molecular cores fed by the core itself and/or from the larger molecular cloud. Their formation is relatively rapid compared to their low-mass counterparts, hence feedback (e.g. outflows, radiation) set relatively early. Yet they need to continue accreting gas to reach the upper mass limits of known high-mass stars. To alleviate the radiation pressure over the accretion flow, disks are proposed to be important to attain such high masses. The development of instruments with higher angular resolution has allowed us to increasingly find disk-like structures and to trace the gas kinematics closer to massive (proto)stars. In this presentation, we present a study toward 30 fields observed with the ALMA 12m array at 1.3 mm, of which 21 have enough line emission to study their kinematics. These observations with angular resolutions between 0.06" to 0.1" resolve the kinematics of the inner $\sim$1000 au. At these scales, we find gas velocity gradients (42 sources) which can be fit with Keplerian rotation (roughly 11 sources) and rotation with infall (roughly 14 sources) curves, while the kinematics could not be resolved for the remaining sources. Most strikingly, many of the position velocity diagrams show asymmetries. We discuss the origin of these asymmetries, which can be the result of a combination of factors including: clumpy environment, anisotropic collapse (with some sources showing evidence of streamers), or high infall/accretion rates which would not allow the formation of uniform Keplerian disks.