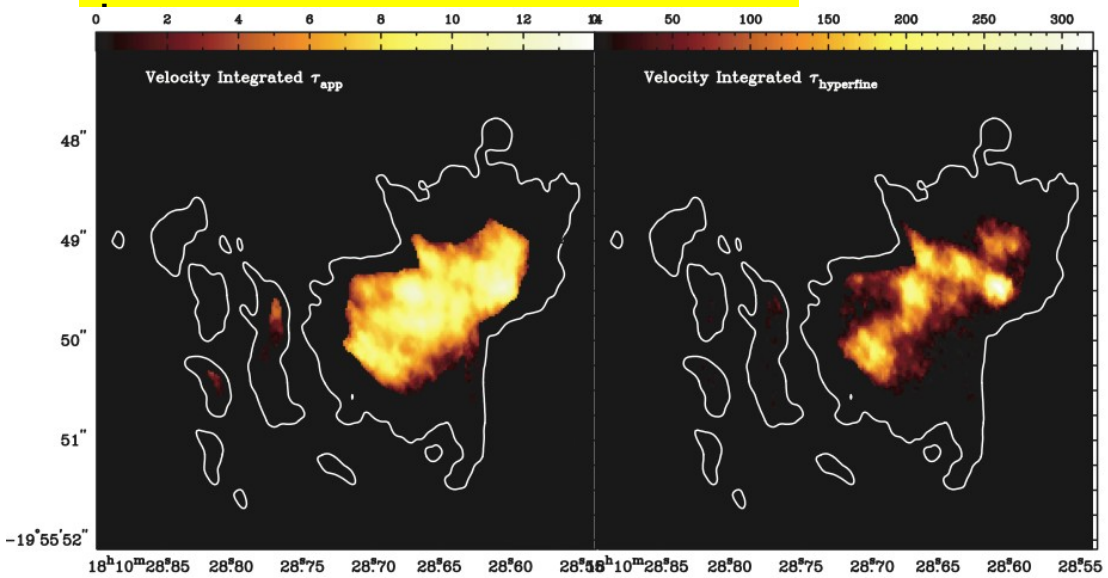
High Angular Resolution Observations of Molecular Line Absorption Against Background UC HII Regions

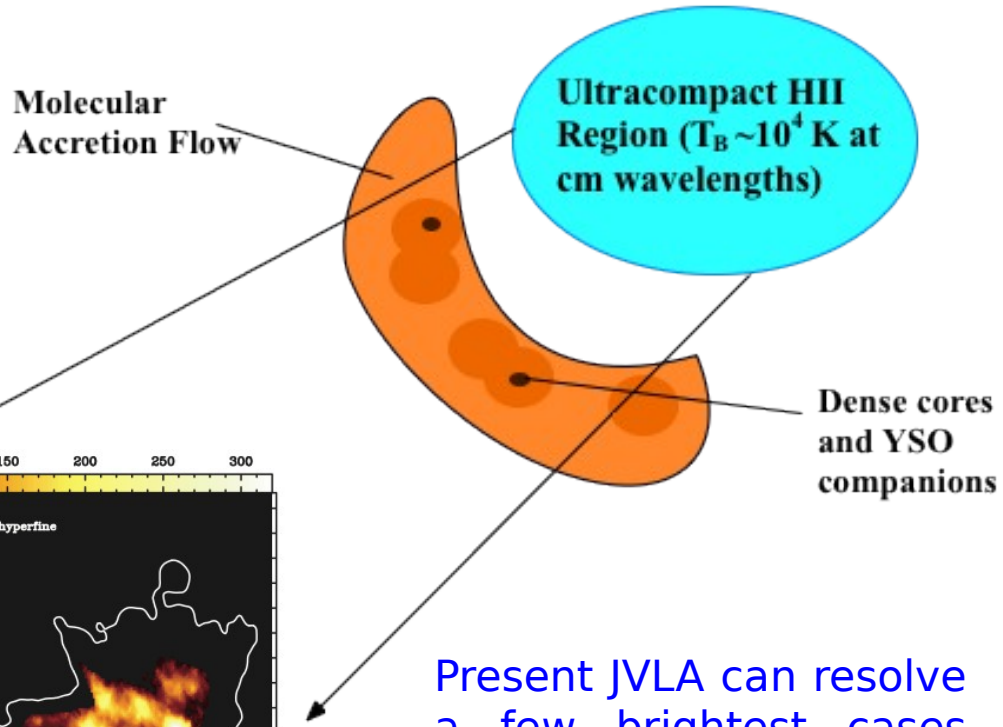
Advantage/Uniqueness:

1. May be the only way to probe small scale structures surrounding the OB cluster-forming regions, without being obscured by dust.
2. Can diagnose gas accretion without ambiguity.
3. These cases are likely self-calibratable. Not difficult to achieve high dynamic range images.

Centimeter Absorption Line



VLA observations of NH_3 main and satellite hyperfine line absorption, with up to ~120 mas resolution (Sollins, P. et al. 2005; Liu, H. B. et al. 2010)



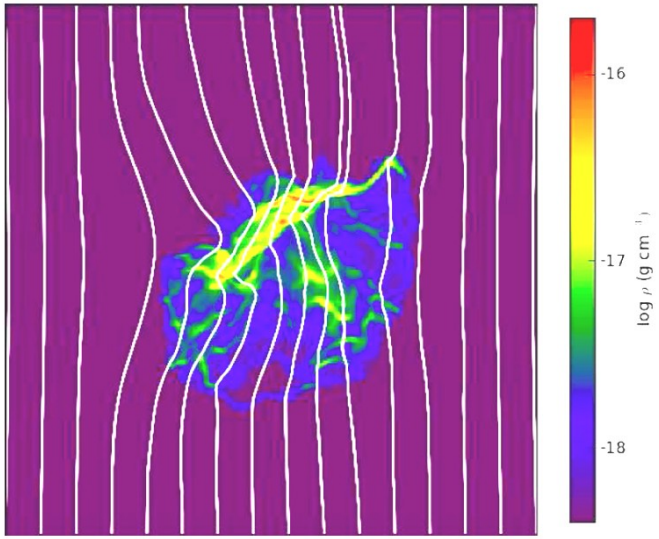
Present JVLA can resolve a few brightest cases with ~100 mas angular resolution. NGVLA can provide 10 times higher resolution and can probe gas accretion towards fainter (i.e. lower stellar mass) sources.

Polarized Dust Emission and B-Field in OB Cluster-Forming Cores

The combined effect of radiative feedback and magnetic field may be the key to suppress fragmentation and regulate star-formation.

Advantage/Uniqueness:

1. Dust is optically thin at centimeter wavelengths. The polarization and de-polarization because of scattering can be ignored.
2. Simultaneously obtain high quality Stokes-I image for diagnosing fragmentation.



Numerical simulation of 300 Msun OB cluster-forming core (Myers et al. 2013)