

Poster: Two Orion cores close to the onset of star formation

- Kenichi Tatematsu

It is not clear yet how the star formation process starts. If starless cores are stable, it may need to become unstable for the onset. Possible mechanisms include the dissipation of turbulence, mass accretion, and the energy loss in oscillation. To investigate this issue, it is highly desirable to have best targets just before and after the onset of star formation. On the basis of TOP-SCOPE Planck Galactic Cold Clump (PGCC) collaboration, we have selected two very interesting cores having intense N₂D⁺ emission, one is starless and the other is star-forming, in similar environment in the Orion A clouds, from Nobeyama 45 m follow-up observation toward SCUBA-2 cores. By using ALMA ACA 7m Array, we imaged them in N₂D⁺, DCO⁺, DNC, DCN, HCO⁺, CO⁺, CS, etc and 244 GHz continuum with Band 6 receiver. The starless core G211 was detected in DCO⁺, HCO⁺, CO, and continuum. The DCO⁺ linewidth is as narrow as 0.16 km/s, and turbulence is mostly dissipated. The star-forming core G210 was detected in many lines. The N₂D⁺ emission distribution shows symmetrical double peaks centered on the dust continuum peak, and we do not see a velocity gradient. CS, H₁₃CO⁺, H₁₃CN distribution are centrally peaked toward the continuum peak. DCO⁺, DNC, and DCN show double peaks, but the distribution is not symmetrical, and we see a velocity gradient. It seems that what we observe in deuterated molecules is an edge-on pseudo disk around the protostar, and its outer part is more turbulent. Both cores are close to virial equilibrium.

Cores and embedded objects