reported that formation of a rotation-supported disk at the earliest young stellar objects (YSOs) is largely suppressed by magnetic fields aligned to the rotational axis of YSOs: magnetic braking. Our recent ALMA observations toward L1448 IRS 2, which has a rotation detected and its magnetic fields aligned to the rotation axis (poloidal fields) in ~500 au scales, show that the fields switch to toroidal at the center in ~100 au scales. This result suggests that magnetic braking may not be so catastrophic for early disk formation even in YSOs with magnetic fields aligned to the rotational axis.

[구 IM-06] FUNS - Filaments, the Universal Nursery of Stars. I. Physical Properties of Filaments and Dense Cores in L1478

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Formation of filaments and subsequent dense cores in ISM is one of the essential questions to address in star formation. To investigate this scenario in detail, we recently started a molecular line survey namely 'Filaments, the Universal Nursery of Stars (FUNS)' toward nearby filamentary clouds in Gould Belt using TRAO 14m single dish telescope equipped with a 16 multi-beam array. In the present work, we report the first look results of kinematics of a low mass star forming region L1478 of California molecular cloud. This region is found to be consisting of long filaments with a hub-filament structure. We performed On-The-Fly mapping observations covering ~1.1 square degree area of this region using C18O(1-0) as a low density tracer and 0.13 square degree area using N2H+(1-0) as a high density tracer, respectively. CS (2-1) and SO (32-21) were also used simultaneously to map ~290 square arcminute area of this region. We identified 10 filaments applying Dendrogram technique to C18O data-cube and 13 dense cores using FellWalker and N2H+ data set. Basic physical properties of filaments such as mass, length, width, velocity field, and velocity dispersion are derived. It is found that filaments in L~1478 are velocity coherent and supercritical. Especially the filaments which are highly supercritical are found to have dense cores detected in N2H+. Non-thermal velocity dispersions derived from C18O and N2H+ suggest that most of the dense cores are subsonic or transonic while the surrounding filaments are transonic or supersonic. We concluded that filaments in L~1478 are gravitationally unstable which might collapse to form dense cores and stars. We also suggest that formation mechanism can be different in individual filament depending on its morphology and environment.

[구 IM-07] Chemical Differentiation of CS and N_2H^+ in Starless Dense Cores

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CS molecule is known to be adsorbed onto dust in cold dense cores, causing its significant depletion in the center region of cores. This study is aimed to investigate the depletion of CS molecule with optically thin $C^{34}S$ molecular line observations, including significance of its differentiation depending on the evolutionary status of the dense cores. We mapped five evolved starless cores, L1544, L1552, L1689B, L694-2 and L1197 using two molecular lines, $C^{34}S$ (J=2-1) and N_2H^+ (J=1-0) with NRO 45 m telescope. The H_2 column density and temperature structures of each targets were obtained by SED fitting for Herschel continuum images and the internal number density profiles by model fitting. All of the integrated intensity maps of $C^{34}S$ show depletion holes and 'semi-ring-like' distribution, indicating that the depletion of CS is clear and general. The radial profiles of CS abundance also show significant decrease towards the core center, while N_2H^+ abundance is almost constant or enhanced. We find that the more evolved cores with higher H_2 density tend to have a stronger depletion of CS. Our data strongly support claims that CS molecule generally depletes out in the central regions of starless dense cores and such chemical differentiation is closely related to their evolution.

[구 IM-08] The ice features of Very Low Luminosity Objects (VeLLOs): Unveiling their episodic accretion history through the spectroscopic observation of AKARI IRC

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