bulk metallicity or alpha-element abundance of a star, while they are a sensitive function of effective temperature and to a moderate extent of surface gravity of a star.

[포 IM-02] TRAO KSP TIMES: Homogeneous, High-sensitivity, Multi-transition Spectral Maps toward the Orion A and Ophiuchus Cloud with a High-velocity Resolution.

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Turbulence plays a crucial role in controlling star formation as it produces density fluctuation as well as non-thermal pressure against gravity. Therefore, turbulence controls the mode and tempo of star formation. However, despite a plenty of previous studies, the properties of turbulence remain poorly understood. As part of the Taeduk Radio Astronomy Observatory (TRAO) Key Science Program (KSP), "mapping Turbulent properties In star-forming MolEcular clouds down to the Sonic scale (TIMES; PI: Jeong-Eun Lee)", we mapped the Orion A and the Ophiuchus clouds, in three sets of lines (13CO 1-0/C18O 1-0, HCN 1-0/HCO+ 1-0, and CS 2-1/N2H+ 1-0) with a high-velocity resolution (~0.1 km/s) using the TRAO 14-m telescope. The mean Trms for the observed maps are less than 0.25 K, and all these maps show uniform Trms values throughout the observed area. These homogeneous and high signal-to-noise ratio data provide the best chance to probe the nature of turbulence in two different star-forming clouds, the Orion A and Ophiuchus clouds. We present comparisons between the line intensities of different molecular tracers as well as the results of a Principal Component Analysis (PCA).

[포 IM-03] A Variable Protostar, EC 53

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Most of the stellar mass accretes during the early evolutionary stage of protostars. However, the accretion process in protostars is in a veil of the thick envelope. Monitoring the submillimeter emission from the envelope is a way to trace the accretion process in protostars since the submillimeter emission linearly responses to the temperature of the envelope, which is heated by the accretion process at the center. In the JCMT transient Survey, we detected a submillimeter variable, EC 53. EC 53 is a Class 1 protostar that was known to have a periodic variation at NIR. EC 53 has been monitored with United Kingdom InfraRed Telescope (UKIRT), Liverpool telescope, and JCMT/SCUBA-2 since we detected the 850 μ m flux enhancement in the JCMT transient survey. We also adopt the photometric data sets of Wide-field Infrared Survey Explorer (WISE). Over all wavelengths from NIR to submillimeter, we see two modes of variation, a 1.5-years periodic variation and a long-term increase. We present the light curves of EC 53 at multi-wavelengths and discuss the cause of variability in EC 53.

[포 IM-04] Formation of star clusters by cloud-cloud collision

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We present the preliminary results on the formation of star clusters by cloud-cloud collision. For this purpose, we perform sub-parsec scale, radiation-hydrodynamic simulations of giant molecular clouds using a sink particle algorithm. The simulations include photo-ionization, direct radiation pressure, and non-thermal radiation pressure from infrared and Lyman alpha photons. We confirm that radiation feedback from massive stars suppresses accretion onto sink particles. We examine the collision-induced star formation and discuss the possibility on the formation of a globular cluster.

[포 IM-05] Structure of the Galactic Foreground