across a range of Galactic environments; map the star-formation efficiency (SFE) and dense-gas mass fraction (DGMF) in molecular gas as a function of position in the Galaxy and its relation to the nature of the turbulence within molecular clouds; determine Galactic structure as traced by molecular gas and star formation; constrain cloud-formation models; study the relationship of filaments to star formation; test current models of the gas kinematics and stability in the Galactic center region and the flow of gas from the disc. It will also provide an invaluable legacy data set for JCMT that will not be superseded for several decades. In this poster, we will present the current status of the CHIMPS2.

[포 IM-14] Investigation of the apparent α-bimodality among the galactic bulge stars from the APOGEE database

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Recent investigation of the APOGEE bulge stars by Zasowski et al. (2018) shows a fraction of stars enhanced in O, Ca, and Mg abundances. It is not clear, however, that this apparent α-bimodality is reflecting a real feature or an artifact from spectral fitting. We will report our progress in understanding the nature and reality of this phenomenon. We will also discuss the spread in Na abundance among the inner bulge stars with respect to that observed among disk sample.

[포 IM-15] Effects of radiation-modulated cooling on the momentum transfer from stellar feedback

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Strong radiation fields can change the ionization state of metals and hence cooling rates. In order to understand their effects on the momentum transfer from radiation and supernova feedback, we perform a suite of radiation-hydrodynamic simulations with radiation-modulated metal cooling. For this purpose, we pre-tabulate the metal cooling rates for a variety of spectral shapes and flux levels with the spectral synthesis code, Cloudy, and accurately determine the rates based on the local radiation field strength. We find that the inclusion of the radiation-modulated metal cooling decreases the total radial momentum produced by photo-ionization heating by a factor of ~3 due to enhanced cooling at temperature T~10^3-4 K. The amount of momentum transferred from the subsequent SN explosions, however, turns out to be little affected by radiation, as the main cooling agents at T~10^5-6 K are only destroyed by soft X-ray radiation which is generally weak. We further discuss the total momentum budget in various conditions.

[포 IM-16] Dense Core Formation in Filamentary Clouds: Accretion toward Dense Cores from Filamentary Clouds and Gravitational Infall in the Cores

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Understanding how the filamentary structure affects the formation of the prestellar cores and stars is a key issue to challenge. We use the Heterodyne Array Receiver Program (HARP) of the James Clerk Maxwell Telescope (JCMT) to obtain molecular line mapping data for two prestellar cores in different environment, L1544 in filamentary cloud and L694-2 in a small cloud isolated. Observing lines are ^{13}CO and $C^{18}O$ (3-2) line to find possible flow motions along the filament, ^{12}CO (3-2) to search for any radial accretion (or infalling motions) toward the cores of gas material from their surrounding regions, and HCO^+ (4-3) lines to find at which density and which region in the core gases start to be in gravitational collapse. In the 1st moment maps of ^{13}CO and C18O , velocity gradient patterns implying the flow of material were found at the cores and its surrounding filamentary clouds. The infall asymmetry patterns of HCO+ and ^{13}CO line profiles were detected to be good enough to analyze the infalling motions toward the cores. We will report further analysis results on core formation in the filamentary cloud at this meeting.

[포 IM-17] Discovery of a New Mechanism to Release Complex Molecules from Icy Grain Mantles around Young Stellar Objects

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Complex organic molecules (COMs) are increasingly observed in the environs of young stellar objects (YSOs), including hot cores/corinos around high-mass/low-mass protostars and protoplanetary disks. It is widely believed that COMs are first formed in the ice mantle of dust grains and subsequently released to the gas by thermal sublimation at high temperatures (T>100 K) in strong stellar radiation fields. In this paper, we report a new mechanism that can desorb COMs from icy grain mantles at low temperatures (T<100K), which is termed rotational desorption. The rotational desorption process of COMs comprises two stages: (1) ice mantles on suprathermally rotating grains spun-up by radiative torques (RATs) are first disrupted into small fragments by centrifugal stress, and (2) COMs and water ice then evaporate rapidly from the tiny fragments (i.e., radius a <1nm) due to thermal spikes or enhanced thermal sublimation due to increased grain temperature for larger fragments (a>1 nm). We discuss the implications of rotational desorption for releasing COMs and water ice in the inner region of protostellar envelopes (hot cores and corinos), photodissociation regions, and protoplanetary disks (PPDs). In shocked regions of stellar outflows, we find that nanoparticles can be spun-up to suprathermal rotation due to supersonic drift of neutral gas, such that centrifugal force can be sufficient to directly eject some molecules from the grain surface, provided that nanoparticles are made of strong material. Finally, we find that large aggregates (a~ 1-100 micron) exposed to strong stellar radiations can be disrupted into individual icy grains via RAdiative Torque Disruption (RATD) mechanism, which is followed by rotational desorption of ice mantles and evaporation of COMs. In the RATD picture, we expect some correlation between the enhancement of COMs and the depletion of large dust grains in not very dense regions of YSOs.

[포 IM-18] High-Resolution Observations of the Molecular Clouds Associated with the Huge H II Region CTB 102 (거대 수소 이온화 영역 CTB 102와 연관된 분자운의 고분해능 관측)

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We report the first high-resolution (sub-arcminute) large-scale mapping ^{12}CO and ^{13}CO observations of the molecular clouds associated with the giant outer Galaxy H II region CTB 102 (KR 1). These observations were made using a newly commissioned receiver on the 13.7-m radio telescope at the Taeduk Radio astronomy Observatory (TRAO). Our observations show that the molecular clouds have a spatial extent of 60 x 35 pc and a total mass of $10^{4.8}$ – $10^{5.0}$ solar mass. Infrared data from WISE and 2MASS were used to identify and classify the YSO population associated with ongoing star formation activity within the molecular clouds. Moving away from the H II region, there is an age/class gradient consistent with sequential star formation. The infrared and molecular line data were combined to estimate the star formation efficiency (SFE) of the entire cloud as well as the SFE for various sub regions of the cloud.

천문우주관측기술

[포 AT-01] Transient Alert Message Processing System for the LSST era

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We have developed and tested a prototype system to process transient alert messages from the currently working facilities such as Gaia and GCN notices. Our experiments with the prototype focus on developing a platform that can be used in the LSST era with about 10 million alerts per night and helping Korean community members with the automated processing environment to provide auxiliary information for every alert message. The system consists of a message broker implemented by Redis and multiple message subscribers specialized for specific scientific interests. The current implementation of the entire system allows new Korean members to adopt their own processing chains receiving the messages from our local broker. We welcome experimental ideas and opinions from the Korean community about the current message processing system. We plan to test the current system with the ZTF alerts in the near future.

[포 AT-02] Real-Time Reduction Software for Slitless Spectral Image

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