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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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For slitless spectroscopy, we have installed the Volume Phase Holographic (VPH) gratings in the filter wheel of the SQUEAN on the 2.1m telescope at McDonald Observatory in Texas, United States. This system can effectively take spectra and monitor the variabilities of many sources, such as quasi-stellar objects, supernovae, and active galactic nuclei. On the single image frame, there are many spectra of the point sources. Therefore, a target extraction needs to trace along the tilted dispersion and to minimize the confusions by other sources. We present a real-time reduction software that has the functions with spectra extraction and wavelength calibration.

[포 AT-03] Demonstration of Modeling Process using Giant Magellan Telescope Software Development Kit

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The Giant Magellan Telescope Organization (GMTO) is developing the GMT Software Development Kit (SDK) for the Observatory Control System (OCS). The SDK models a subsystem of the GMT using a Domain Specific Language (DSL) which can generate a skeleton code and validates the availability of the model automatically. The OCS includes a Device Control System (DCS) and all the devices are connected with the DCS via EtherCAT. The DCS has a component (Hardware Adapter) to communicate with EtherCAT slaves. In this presentation, we demonstrate the modeling process and describe the importance and usage plan of the SDK.

[포 AT-04] Identification of OH emission lines from IGRINS sky spectra and improved sky subtraction method

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KASI

The hydroxyl radical (OH) sky emission lines arise from the Earth's mesosphere, and they serve as a major source of the sky background in the infrared. With IGRINS, the observed line strength show non-negligible variation even within a few minutes of time scale, making its subtraction difficult. Toward the aim better sky subtraction in the IGRINS pipeline, we present 1) improved identification of sky lines in H and K band and 2) improved method of subtracting sky background. Using the recent line list of Brooke et al. (2015), we have detected ~500 OH doublets from upper vibrational level between 2 and 9 and maximum upper J level of 25. In particular, we found that a significant fraction of unidentified lines reported by Oliva et al. (2015) are indeed OH lines resulting from transitions between different F levels. With the extended line identification, we present an improved method of sky subtraction. The method, based on the method of Noll et al. (2014), empirically accounts non-LTE level population of OH molecules.

[포 AT-05] Kyung Hee University Automatic Observing Software for 10 cm Telescope (KAOS10)

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The observation of transient objects such as supernovae or variable stars requires a survey of the wide sky and quickly extracting the results. In accordance with this purpose, we have been developing an automatic observing software, KAOS (Kyung Hee University Automatic Observing Software) as a series. KAOS30 was the first series of KAOS and it was applied to the 30-inch platform at the McDonald Observatory in the United States of America. KAOS76 controls the 76-cm telescope at Kyung Hee Astronomical Observatory. In this poster, we introduce KAOS10 for controlling a portable telescope with a small aperture size attaching a guiding camera as QHY-5L II. Kyung Hee University auto-guiding package which includes the auto-guiding function for small aperture size telescope was also developed. Additionally, the Telescope Control Package(TCP) can communicate with the main server to do astrometry for pointing and identifying targets efficiently. KAOS10 has a universal interface that will be useful for the research of both amateurs and professionals.