often used for describing the density structure of the youngest sources in the low mass star formation process. A Bonnor-Ebert sphere fits very well the observed SED at λ > 10 μm, suggesting that L1527 IRS might collapse from an unstable Bonnor-Ebert sphere rather than a singular isothermal sphere.

[포 IM-04] A dust continuum radiative transfer module

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We have developed a module for the dust continuum radiative transfer calculation as part of "Packages of Unified modeling for Radiative transfer, gas Energetics, and Chemistry (PUREC)". PUREC will be applied to interprete observations of protoplanetary disks. When a disk is under the hydrostatic equilibrium condition, the dust temperature and the vertical density structure should be calculated simultaneously. This module calculates the dust temperature by using the method of mean intensity (Lucy et al. 1999). In the very optically thick mid-palne, the Monte-carlo method is not efficient, thus, we apply "modified random walk" and "Partial Diffusion Approximation" to the module. The module has been verified by bechmark tests.

[포 IM-05] Self-Regulation of Star Formation Rates: an Equilibrium Vieww

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In this talk, I will present a theoretical and numerical framework for self-regulation of the star formation rates (SFRs) in disk galaxies. The theory assumes (1) force balance between pressure support and the weight of the interstellar medum (ISM), (2) thermal balance between radiative cooling in the ISM and heating via FUV radiation from massive young stars, and (3) turbulent energy balance between dissipation in the ISM and driving by momentum injection of SNe. Numerical simulations show vigorous dynamics in the ISM at all times, but with proper temporal and spatial averages, all the expected balances hold. This leads to a scaling relation between mean SFRs and galactic gas and stellar properties, arising from the fundamental relationship between SFR surface density and the total midplane pressure.

[포 IM-06] Photometry of MIRIS Paschen-α blobs detected in Cepheus

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By comparing MIRIS Paschen-α (Paα) Galactic Plane Survey (MIPAPS) data with Anderson's H II region catalog (the most complete Galactic H II region catalog up to date), we confirmed Paα detections from ~50% of the H II region candidates in Cepheus (Galactic longitude from +96° to 116°). The detection of the hydrogen recombination line identifies these candidates as clear H II regions. If we extend this result to the whole plane, more than 1000 candidates are expected to be identified as H II regions. In this contribution, we present the results of quantitative estimations (brightness, size, etc.) for the Paα blobs detected in Cepheus. To obtain intensity of Paα emission line, we perform background and point spread function (PSF) matching between two filter images (line and continuum filters) as well as flux calibration.

[포 IM-07] Outburst signatures of Class I source, IRAS 16316-1540

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Kyung Hee University

We observed 10 Class I sources as part of the IGRINS (Immersion GRating INfrared Spectroscoph) Legacy Program, "IGRINS Survey of Protoplanetary Disks (PI: Jeong-Eun Lee)". Unlike other Class I sources, IRAS 16316-1540 shows broad absorption features in the near-infrared spectra (H and K bands). The broadened absorption features have been detected toward FU Orionis-type objects. Boxy or double-peaked absorption profiles can be produced by a Keplerian disk that has the hot mid-plane heated by a burst mass accretion. We could fit the broad absorption features of IRAS 16316-1540 with a K5 V template stellar spectrum convolved with a disk rotation profile of 45 km s-1. Therefore, rotationally broadened absorption features detected in this Class I source suggest that the episodic accretion process occurs from the early stage of star formation.

[포 IM-08] Statistical Analysis for Turbulence