Daedeok-daero, Yuseong, Daejeon 34055, Korea

One of the key questions on star formation is how the organic molecules are synthesized and delivered to the planets and comets since they are the building blocks of prebiotic molecules such as amino acid, which is thought to contribute to bringing life on Earth. Recent astrochemical models and experiments have explained that complex organic molecules (COMs: molecules composed of six or more atoms) are produced on the dust grain mantles in cold and dense gas in prestellar cores. However, the chemical networks and the roles of physical conditions on chemistry are not still understood well. To address this question, hot (> 100 K) cores in high mass young stellar objects (M > 8 Msun) are great laboratories due to their strong emissions and larger samples than those of low-mass counterparts. In addition, CH_3OH masers, which have been mostly found in high mass star forming regions, can provide constraints due to their very unique emerging mechanisms. We investigate twelve high mass star forming regions in ALMA band 6 observation. They are associated with 44/95 GHz Class I and 6.7 GHz Class II CH3OH masers, implying that the active accretion processes are ongoing. For these previously unresolved regions, 66 continuum peaks are detected. Among them, we found 28 cores emitting COMs and specified 10 cores associated with 6.7 GHz Class II CH3OH masers. The chemical diversity of COMs is found in cores in terms of richness and complexity; we identified up to 19 COMs including oxygen- and nitrogen-bearing molecules and their isotopologues in a core. Oxygen-bearing molecules appear to be abundant and more complex than nitrogen-bearing species. On the other hand, the COMs detection rate steeply grows with the gas column density, which can be attributed to the effective COMs formation in dense cores.

[구 IS-05] Physical modeling of dust polarization spectrum by RAT alignment and disruption

Hyeseung Lee[1,2], Thiem Hoang[2]
[1]*Ulsan National Institute of Science and Technology*
[2]*Korea Astronomy & Space Science Institute*

Dust polarization depends on the physical and mechanical properties of dust, as well as the properties of local environments. To understand how dust polarization varies with grain mechanical properties and the local environment, in this paper, we model the wavelength-dependence polarization of starlight and polarized dust emission by aligned grains by simultaneously taking into account grain alignment and rotational disruption by radiative torques (RATs). We explore a wide range of the local radiation field and grain mechanical properties characterized by tensile strength. We find that the maximum polarization and the peak wavelength shift to shorter wavelengths as the radiation strength U increases due to the enhanced alignment of small grains. Grain rotational disruption by RATs tends to decrease the optical-near infrared polarization but increases the ultraviolet polarization of starlight due to the conversion of large grains into smaller ones. In particular, we find that the submillimeter (submm) polarization degree at 850μm(P850) does not increase monotonically with the radiation strength or grain temperature (Td), but it depends on the tensile strength of grain materials. Our physical model of dust polarization can be tested with observations toward star-forming regions or molecular clouds irradiated by a nearby star, which have higher radiation intensity than the average interstellar radiation field. Finally, we compare our predictions of the P850-Td relationship with Planck data and find that the observed decrease of P850 with Td can be explained when grain disruption by RATs is accounted for, suggesting that interstellar grains unlikely to have a compact structure but perhaps a composite one. The variation of the submm polarization with U (or Td)can provide a valuable constraint on the internal structures of cosmic dust

[박 IS-06] GG Tauri A: gas properties and dynamics from the cavity to the outer disk

Nguyen Thi Phuong[1,2,3], Anne Dutrey[3], Pham Ngoc Diep[1], Edwige Chapillon[3,4], Stephane Guilloteau[3], Chang Won Lee[1,5], Emmanuel Di Folco[3], Liton Majumdar[6], Jeff Bary[7], Tracy L. Beck[8], Audrey Coutens[9], Otoniel Denis-Alpizar[10], Jean-Paul Melisse[3,4], Vincent Pietu[4], Thierry Stoecklin[11], and Yei-Wen Tang[12]
[1]*Korea Astronomy and Space Science Institute, 776 Daedeokdae-ro, Yuseong-gu, Daejeon, Korea;★tpnguyen@kasi.re.kr*
[2]*Department of Astrophysics, Vietnam National Space Center, Vietnam Academy of Science and Techonology, 18 Hoang Quoc Viet, Cau Giay, Hanoi, Vietnam*
[3]*Laboratoire d'Astrophysique de Bordeaux, Université de Bordeaux, CNRS, B18N, Allée Geoffroy Saint-Hilaire, F-33615 Pessac*
[4]*IRAM, 300 rue de la piscine, F-38406 Saint Martin d'Hères Cedex, France*
[5]*University of Science and Technology, 217 Gajeong-ro, Yuseong-gu, Daejeon 34113, Republic*