[석 SA-02] Migration of Radiative Gas Giants with GIZMO

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A gas giant formed in a massive protoplanetary disk via gravitational instability migrates inward due to its gravitational interaction with the disk. Planet migration occurs in various ways depending on the disk structure and internal processes, but previous studies only considered quantitative radiative feedback resulting from mass accretion onto the planet. Allowing for accretion feedback, we perform three-dimensional hydrodynamic simulations with GIZMO to investigate orbital evolution of giant planets in a protoplanetary subject to -cooling. This work shows a planet gains mass due to accretion and gradually opens a gap as it moves inward. The migration in the end halts when the planet clears the gas around its orbit. A more massive planet grows its mass faster and migrates more rapidly, stalling at an orbit farther away from the protostar. Models with a cold disk readily construct a circumplanetary disk and result in high mass growth of the planet. Accretion feedback, in general, reduces the rate of the planet growth and delays migration. We discuss our results with GIZMO in comparison with the previous results with different codes.

[구 SA-03] A pilot study of the two OB associations Cygnus OB2 and Carina OB1 using the *Gaia* data

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We present a kinematic study of the two young OB associations Cygnus OB2 and Carina OB1 using the recently released Gaia astrometric data. The unimodal distributions of parallaxes of stars indicate that these associations are real stellar systems, rather than line-of-sight coincidences. The associations are found to comprise dense star clusters and a sparse halo which have different proper motions. Clusters have small spatial sizes with small dispersions in proper motion, while the haloes extending to tens of parsecs have a large dispersion in proper motion. We speculate that this aspect is related to that found in molecular clouds, the so-called "line width-size" relation. In this talk, the formation process of these associations is discussed, based on our findings.

[구 SA-04] Discovery of new open cluster by the Gaia DR2 (Gaia DR2를 이용한 새로운 산개성단의 발견)

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We discovered 722 open clusters within 1 kpc using Gaia DR2 data. These clusters are detected in the proper motion space and confirmed on the spatial distribution with parallax information. We divided the 3628 regions and visually searched using python program. Among 722 open clusters, 430 clusters are previously unknown clusters. Catalogue of discovered clusters is unloaded on the online catalogue at https://radio.kasi.re.kr/project/shlee/. Owing to the good membership criteria, we could see the halo structure of the clusters. In that reason, the average size of the discovered cluster is about 9 times than that of previously known clusters.

[구 SA-05] New implications on the analysis of stellar populations based on the close link between globular clusters and their host galaxies

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Recent observations on the double red clumps in the bulge validate the close connection in stellar populations between Galactic globular clusters (GCs) and the Milky Way (MW) bulge. Intriguingly, diverse phenomena observed in early-type galaxies (ETGs) and their GC systems are also indicating the similarities with Galactic GCs with multiple populations. Here, we present the population synthesis for the Galactic bulge and ETGs using stellar populations observed in the Galactic GCs with multiple populations. Our new models well explain observations of both the MW bulge and ETGs. Also, the inclusion of GC-originated population to the population synthesis model shows substantial impacts on the age-dating of stellar populations. The implication of this result for the interpretation of the formation history and the age-dating of ETGs will be discussed in detail.