이 따랐다. 현재 YAM은 본 모임의 온라인 소식지인 <하늘사랑> 제 9호 발간 및 온라인 모임을 준비함으로써 직접 만나기 어려운 회원들의 소식을 공유하고자 한다. 본 포스터에서는 2020년 상반기 활동을 보고하고 하반기 활동 계획에 대해 논의하고자 한다.

[포 AE-02]Projecting and Researching GNSM's Online Programs of Astronomical Contents(국립과천과학관 천문컨텐츠 온라인 프로그램 기획·연구)

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The pandemic of COVID-19 has made it difficult to gather participants in offline astronomical programs since March, 2020. For this reason Gwacheon National Science Museum has developed online programs of the partial solar eclipse and the Asteroid Day event in June, the celebration for launching Mars 2020 in July and Perseids in August. In this poster, we present how to plan each of them and research on methods that deliver astronomical contents to viewers effectively. In addition, we introduce preparing a couple of online programs in the rest of this year.

성간물질/별생성/우리은하

[포 IM-01] Two distinct types of dust polarization in the disk and its vicinity around the protostar TMC-1A

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We observed the Class I protostar TMC-1A in polarized dust emission at 1.3 mm at a spatial resolution of ~40 au using ALMA. Previous observations revealed a disk (r~100 au), surrounded by an infalling envelope, and a CO outflow going in the north-south direction in TMC-1A. Our observations detected polarized dust emission in a central region (r~50 au) and ~100 au north and south of the central protostar. The former polarization is likely due to self-scattering because of the polarization direction along the disk minor axis, the polarization fraction independent of Stokes I, and a high optical thickness. The latter polarization is roughly in the outflow region. The position and direction, particularly in the north, imply multiple possible mechanisms: magnetically or mechanically aligned dust grains in the outflow or in an accretion flow.

[포 IM-02] Disentangling the Assembly History of the Galactic Halo

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The chemical and kinematic properties of stars in the Galactic halo provide crucial information on the origin of the Galactic halo as well as the assembly history of the Milky Way. In this study, we present metallicity distribution functions (MDFs) in different regions of the Galactic halo as well as the kinematic characteristics in each region. The different MDFs and kinematic properties of stars in investigated regions allow us to associate them with the possible progenitor dwarf galaxies discovered to date; hence the assembly history of the Galactic halo.

[포 IM-03] BISTROs and Varying Magnetic Fields with Density in Serpens Main

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The B-fields in Star-forming Region Observations (BISTRO) is a large program of the James Clerk Maxwell Telescope (JCMT) to study the roles of magnetic fields in molecular clouds on intermediate scales (a few thousands au or larger scales), in which a large number of researchers over the world are involved. This project was initiated in 2016 with polarimetric observations of nearby star-forming regions and has been extended toward massive and farther regions (BISTRO-2) and various evolutionary stages and environmental conditions (BISTRO-3). The current status of the BISTRO projects is reported. In addition, we discuss magnetic fields in the Serpens Main molecular cloud, which is one of the BISTRO star-forming regions. Utilizing the Histogram of Relative Orientations method, which compares polarization directions with density gradients, we show that magnetic fields are parallel to filaments in less dense filamentary structures but

perpendicular to dense ones. Furthermore, the magnetic field directions with respect to density gradients vary again with density in denser core regions, which is understood by core formation and pinched fields.

Note: (PI) D. Ward-Thompson, (co-PIs) P. Bastien, T. Hasegawa, W. Kwon, S. Lai, and K. Qiu

[포 IM-04] MIRIS Paα Galactic Plane Survey: The results in l = 276°-296°

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The Multipupose InfraRed Imaging System (MIRIS) Paα Galactic Plane Survey (MIPAPS) covers the whole Galactic plane with the latitude range of $-3° < b < +3°$. Next to the first result in l = 96°-116° (Cepheus), we present the results in l = 276°-296° (Carina). This region with the direction toward the inner Galaxy, has much higher extinction but much more Paα-emitting sources than Cepheus. We list up the detected Paα sources, and compare them with the WISE H II region catalog (there are 308 H II regions and candidates in this region) and VPHAS+ Hα image. By detecting the Paα and Hα recombination lines, 71 H II region candidates are newly confirmed as definite H II regions, out of which 53 H II regions are detected at Paα. For the Paα-detected sources, we measure the Paα and Hα fluxes and estimate the E(B-V) color excesses for the extended sources.

[포 IM-05] Determination of Nitrogen Abundance Ratio from Low-Resolution Stellar Spectra

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We present a method for determining the abundance ratio of nitrogen to iron ([N/Fe]) from low-resolution (R~2000) stellar spectra from large spectroscopic surveys such as Sloan Digital Sky Survey (SDSS) and Large Sky Area Multi-Object Fiber Spectroscopic Telescope (LAMOST). The basic idea of the method is to match a grid of synthetic spectra with an observed spectrum in the CN band region around 3883 Å. To calibrate our estimate of [N/Fe], we make use of the giants observed in Apache Point Observatory Galaxy Evolution Experiment (APOGEE), which are also observed in the SDSS. This method will be applied to the Galactic halo stars to determine [N/Fe], and the measured nitrogen abundance ratios will be used to investigate the C-N anti-correlation, which is observed in globular clusters, to trace their origin with their kinematic properties.

[포 IM-06] Spatial Variations of Chemical Abundances in The Galactic Disk

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We present spatial variations of chemical abundances ([Fe/H] and [α/Fe]) in the Galactic disk, using a large number of dwarfs and giants from Large Sky Area Multi-object Fiber Spectroscopic Telescope (LAMOST). Specifically, we investigate how the metallicity distribution function (MDF) and the alpha abundance distribution function (ADF) change with the distance from the Galactic center to understand the chemical evolution history of the Galactic disk. We also study the difference (if any) in the MDF and ADF between dwarfs and giants to provide valuable clues to the formation history of the Galactic disk.

[포 IM-07] On the properties of six cores in the λ Orionis cloud: triggered or non-triggered star formation?

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We present preliminary results of 1.1 and 1.3 mm dust continuum and ^{12}CO (J=2-1) line data obtained with the Submillimeter Array toward six cores harboring Class 0/I objects in the λ Orionis cloud. They are located in bright rimmed clouds, which are exposed to the far-ultraviolet radiation field by the O-type star λ Ori. Compact dust continuum emission is observed from all six cores. Among the six cores, only one core G196.92-10.37 shows a signature of binarity with separation of 4000 AU. The numbers of singles and binaries in our sample are five and one, respectively and the derived multiplicity frequency (MF) is 0.17. This value is lower than those found in the binary surveys toward Class 0/I objects, which may be a hint for negative feedback by the nearby massive