wide and deep multi-wavelength data. We newly found galaxy cluster candidates at 0.2 < z < 1.4 and a LSS spanning over 100Mpc at z~0.9 in the ELAIS-N1 field which is one of the IMS (Infrared Medium-deep Survey; Im et al. 2019, in preparation) fields. Thanks to K-GMT science program, we performed spectroscopic follow-up observation for a z~1 galaxy cluster candidates with GMOS of Gemini North and for z~0.9 supercluster candidates with Hectospec of MMT in 2018A and confirmed the large scale structures. We present the newly discovered galaxy overdensities from the observation and the analysis result.

[구 GC-20] Unveiling Quenching History of Cluster Galaxies Using Phase-space Analysis

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We utilize times since infall of cluster galaxies obtained from Yonsei Zoom-in Cluster Simulation (YZiCS), the cosmological hydrodynamic N-body simulations, and star formation rates from the SDSS data release 10 to study how quickly late-type galaxies are quenched in the cluster environments. In particular, we confirm that the distributions of both simulated and observed galaxies in phase-space diagrams are comparable and that each location of phase-space can provide the information of times since infall and star formation rates of cluster galaxies. Then, by limiting the location of phase-space of simulated and observed galaxies, we associate their star formation rates at z ~ 0.08 with times since infall using an abundance matching technique that employs the 10 quantiles of each probability distribution.

Using a flexible quenching model covering different quenching scenarios, we find the star formation history of satellite galaxies that best reproduces the obtained relationship between time since infall and star formation rate at z ~ 0.08. Based on the derived star formation history, we constrain the quenching timescale (2 - 7 Gyr) with a clear stellar mass trend and confirm that the refined model is consistent with the "delayed-then-rapid" quenching scenario: the constant delayed phase as ~ 2.3 Gyr and the quenching efficiencies (i.e., e-folding timescale) outside and inside clusters as ~ 2 - 4 Gyr ($\propto M_*^{-1}$) and 0.5 - 1.5 Gyr ($\propto M_*^{-2}$), Finally, we suggest: (i) ram-pressure is the main driver of quenching of satellite galaxies for the local Universe, (ii) the quenching trend on stellar mass at z > 0.5 indicates other quenching mechanisms as the main driver.

[구 GC-21] Cosmological QUOKKAS: A new method for measuring distances using an extended KVN to Australia

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Measuring distances at cosmological scales is one of the most important, yet most difficult to acquire astronomical quantities, allowing astronomers to determine the expansion rate of the universe. Typically, astronomers have sought to find ``standard candles'' that have a known intrinsic brightness in order to determine their distance. The most well known standard candles are Type 1a supernova and Cepheid variable stars making the so-called ``distance ladder''. Here we present a method for determining cosmological distances via light travel-time arguments, which can be extended from nearby sources to very high redshift sources.

[박 GC-22] On the Global and Local Environmental Dependence of Type Ia Supernova Luminosity from the Analysis of SALT2 and MLCS2k2 Light-Curve Fitters

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There is growing evidence for the dependence of Type Ia supernova (SN Ia) luminosities on the environments. The origin of this correlation, however, is under debate. In order to explore the physical origin of the trend in detail, we analyze SN Ia light-curves by combining a sample of 1231 SNe Ia over a wide redshift range (0.01 < z < 1.37) in various SN surveys and employing two independent light-curve fitters of SALT2 and MLCS2k2. Although SALT2 is the most widely used fitter in the SN community, MLCS2k2 has a novelty in the context of an investigation of the luminosity evolution of SNe Ia. For this reason we use both fitters and analyze them separately. We also determine a stellar mass and a star formation rate (SFR) for a sample of ~600 host galaxies. In addition, because recent low-redshift studies suggest that this dependence manifests itself most strongly when using the local SFR at the SN location, we introduce a new method to infer the local environments by restricting the SN Ia sample in globally star-forming host galaxies to a low-mass host galaxy subset (≤ 10^{10} $M_{\odot}$). We find that SNe Ia in low-mass and star-forming host galaxies are fainter than those in high-mass and passive hosts, after light-curve corrections. Especially, for the first time in host studies, we show that SNe Ia in locally star-forming environments are 0.081±0.018 mag fainter (4.5σ) than those in locally passive environments from the sample including SNe at the high-redshift range. Considering the significant difference in the mean stellar population age between these environments, the result would suggest that the origin of the environmental dependence is the luminosity evolution of SNe Ia.

[석 GC-23] Constraints on scalar field models of dark energy.

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We consider dynamical dark energy models based on a minimally coupled scalar field with three different potentials: the inverse power-law, SUGRA and double exponential potentials. For each model, we derived perturbation initial conditions in the early epoch and performed the Markov Chain Monte Carlo (MCMC) analysis to explore the parameter space that is favored by the current cosmological observations like Planck CMB anisotropy, type Ia supernovae, and baryon acoustic oscillation data. The analysis has been done by using the modified CAMB/COSMOMC code in which the dynamical evolution of the scalar field perturbations are fully considered. The MCMC constraints on the cosmological as well as potential parameters are derived. In the talk we will present a progress report.

성간물질

[구 IM-01] BISTRO: Magnetic Fields in Serpens Main

Woojin Kwon (권우진) on behalf of the BISTRO team
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The B-fields In STar-forming Region Observations (BISTRO 1 and 2) is a large program of the James Clerk Maxwell Telescope (JCMT) using SCUBA-2 and POL-2, starting in 2016. We aim to study the roles of magnetic fields in star formation by observing 32 fields of nearby low-mass and high-mass star forming regions. The angular resolution and the wavelength provided by JCMT (14 arcsecond at 850 micrometer) are ideal to investigate the intermediate scales of magnetic fields (1000-20000 au) associated in cold dense cores and filaments. We report the current status of this project and discuss the magnetic fields of the Serpens Main molecular cloud in which several filaments with various physical properties have been identified.

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

[구 IM-02] AKARI/IRC spectroscopic survey for interstellar ice study

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Ices in interstellar environments are well traced mostly by their absorption features in the near- to mid-infrared spectrum. The infrared camera (IRC) aboard AKARI provides us the near-infrared spectroscopic data which cover 2.5-5.0 ㎛ with a spectral resolution of R ~ 120. Our AKARI spectroscopic survey of young stellar objects (YSOs), including low-luminosity protostars and background stars, revealed the absorption features of H_2O, CO_2, CO, and XCN ice components. We present near-infrared spectra of the observed targets and compare their ice abundances with those previously derived from various YSOs and the background stars behind dense molecular clouds and cores. In addition, we suggest possible science cases for SPHEREx, NASA's new near-infrared space observatory, based on the results from our AKARI IRC spectroscopic study.