multiple populations observed in halo globular clusters. The origin of Helium enhancement in the 2nd generation population (G2), however, is not yet fully understood. Here we investigate the origin of this super-Helium-rich population in the framework of self-enrichment scenario. We find that chemical enrichments and pollutions by asymptotic giant branch stars and winds of massive rotating stars can naturally reproduce the observed Helium enhancement. The Helium to metal enrichment ratio appears to be $\triangle Y/\triangle Z = 6$ for G2, while the standard ratio, $\triangle Y/\triangle Z = 2$, is appropriate for G1, which is probably enriched mostly by typeII supernovae.

[포 GC-09] Near-infrared Polarimetric Study of N159/N160 Star Forming Regions in the Large Magellanic Cloud

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We observed two star forming regions, N159 and N160, in the Large Magellanic Cloud with SIRPOL, the polarimeter of the Infrared Survey Facility (IRSF) in South Africa. The photometric and polarimetric observations are done in three near-infrared bands, J, H, and Ks. We measured Stokes parameters of point sources and calculated their degrees of polarization and polarization angles. The polarization vector map shows complex features associated with dust and gas structures. Overall features of the magnetic field in N159 and N160 regions are different from each other and appear to be related to local environments, such as interior and boundary of shell structure, existence of star-forming HII regions, and boundaries between HII regions and dense dark clouds. We discuss the relation between the structure of magnetic field and the local properties of dust and gas in N159 and N160 regions by comparing our polarization vector map with images of Hα, mid-infrared, and ^{12}CO emissions, respectively by WFI of MPG/ESO telescope, Spitzer IRAC, and NANTEN.

[포 GC-10] Estimating dark matter mass for the most massive high-z galaxy cluster, SPT-CL J2106-5844 using weak-lensing analysis with HST observations

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SPT-CL J2106-5844 is known to be one of the most massive galaxy clusters (M_{200} ~ 1.27 × 10^{15} M_{sun}) ever found at z > 1. Given its redshift (z ~ 1.132), the mass of this cluster estimated by Sunyaev-Zel'dovich effect and X-ray observation is too large compared with the current ΛCDM cosmology prediction. Mass estimation from these methods can be biased because they require assumptions on hydrostatic equilibrium, which are not guaranteed to hold at such high redshift (about 40% of the current age of the Universe). Thus, we need to verify the mass of this interesting cluster using gravitational lensing, which does not require such assumptions. In this work, we present our preliminary result of dark matter mass and its spatial mass distribution of SPT-CL J2106-5844 using weak-lensing analysis based on HST optical/NIR deep imaging data. We compare mass estimates from different sources and discuss cosmological implications.

[포 GC-11] What Shapes Disk Galaxies?: Bar Driven Secular Evolution on Disk Galaxies

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We present evidence of the bar driven secular evolution on disks from z~0.8 to z~0.01. Using 3.6 μ*m* images of nearby galaxies from the *Spitzer* Survey of Stellar Structure in Galaxies (S4G) and images from the Cosmological Evolution Survey (COSMOS), we find that barred galaxies show a light deficit in the disk surrounding the bar within the bar radius. We quantify this light deficit and find that galaxies with a stronger bar (longer, higher Bar/T) show a more pronounced light deficit. We examine snapshots from N-body simulations and confirm that as a barred galaxy

evolves, the bar becomes longer and the light deficit becomes more pronounced. Theoretical studies have predicted that bars evolve by capturing nearby disk stars and employing them to make the bar more elongated and stronger. Therefore the light deficit in the disk is likely produced by bars, and thus bars play a major role in shaping their host galaxies, redistributing not only the gaseous but also the stellar mass within galaxies, with important consequences to their subsequent evolution.

[포 GC-12] Effect of stellar mass blck holes in the globular clusters on the detection rate of binary black hole mergers.

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Binary black hole mergers are one of the important candidate of gravitational wave (GW) emission. Recently a successful GW observation was done by LIGO team, but it is still uncertain how many GW signals will be observable. In this research, we perform simplified N-body simulations containing three mass components, ordinary stars with two kind of stellar mass black holes. Various BH compositions are tested to investigate the effect of BH mass function on binary formation rate. As a result, we find the binary formation rate is not much affected by BH mass function and always around 30 %, but the detectable merging binaries are largely depend on higher mass BH population.

[포 GC-13] REVERBERATION MAPPING OF PG 0934+013 WITH THE SOUTH AFRICAN LARGE TELESCOPE

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We present the variability and time lag measurements of PG 0934+013 based on the photometric and spectroscopic monitoring campaign over two years. We obtained 46 epochs of data from the spectroscopic campaign, which was carried out using the South African Large Telescope with 1 week cadence over two sets of 4 month-long observing period, while we obtained 80 epochs of B band data from the campaign. Due to the six month gap between two campaigns, we separately measured the time lag of the Hβ emission line by comparing the emission line light curve with the B band continuum light curve using the cross-correlation function techniques. We determined the time lags and black hole mass.

[포 GC-14] Environment of Warped Galaxy

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We analyze the dependence of environment of warped galaxies by using the local background density, Tidal Index and projected distance as measures of the environment. we use galaxies with redshift less than z=0.025 from the Sloan Digital Sky Survey (SDSS) DR7. We selected 345 edge-on galaxies using color images provided by the SDSS DR7 and checked it using isophotal maps. This sample contains 136 warped galaxies, 209 non-warped galaxies. Among warped galaxies, there are 18 strongly warped galaxies which have warp angles larger than 7.5o. We calculated the fractional distributions of galaxies as a function of environmental parameters. All of these parameters show little difference between warped galaxies and non-warped galaxies if we include weakly warped galaxies. However, there is a clear difference in the fractional distributions between the strongly warped galaxies and non-warped galaxies. The fraction of warped galaxies increases with decreasing distance to the nearest neighbor galaxy but It increases with increasing background density and Tidal Index. However, the relationships between warp angles and the three environmental parameters are not strong. The effect of Tidal Index is well distinguished in small, bright galaxies whereas the effects of the background density and the distance to the nearest neighbor galaxy are more pronounced in large, bright galaxies.

[포 GC-15] The milli-arcsecond scale radio properties of central AGNs in cool-core and