포 스 터 발 표 소 록

외부은하/은하단

[포 GC-01] Interferometric Monitoring of Gamma-ray Bright AGNs:Measuring the Magnetic Field Strength of 4C+29.45

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We present the results of multi-epoch, multi-frequency monitoring of a blazar 4C +29.45, which was regularly monitored as part of the Interferometric Monitoring of GAmma-ray Bright AGNs program – a key science program of the Korean Very long baseline interferometry Network (KVN). Observations were conducted simultaneously at 22, 43, 86 and 129 GHz during the 4 years from December 2012 to December 2016. We also used additional data from the 15 GHz Owens Valley Radio Observatory (OVRO) monitoring program. From the 15 GHz light curve, we estimated the variability time scales of the source during several radio flux enhancements. We found that the source experiencesd 6 radio flux enhancements with variability time scales of 9-187 days during the observing period, yielding corresponding variability Doppler factors of 9-27. From the multi-frequency simultaneous KVN observations, we were able to obtain accurate radio spectra of the source and hence to more precisely measure the turnover frequencies ν_r of synchrotron self-absorbed (SSA) emission with a mean value of $\overline{\nu_r}$=28.9 GHz. Using jet geometry assumptions, we estimated the size of the emitting region at the turnover frequency. Taking into account these results, we found that the equipartition magnetic field strength is up to two orders of magnitudes higher than the SSA magnetic field strength (0.6-99 mG). This is consistent with the source being particle dominated.

[포 GC-02] The Origin of the Type III Component in the Black Eye Galaxy M64

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The Black Eye Galaxy M64 is an intriguing spiral galaxy with a Type III disk break. To trace the origin of its Type III component, we present HST/ACS F606W/F814W photometry of resolved stars in the outer disk of M64 (2.5' < R < 6.5'). First, we discover a bright extended globular cluster (GC) M64-GC1 at R ~ 5.5', and find that it is an old metal-poor halo GC ([Fe/H] = -1.5 +/- 0.2). Second, we find that there are two distinct subpopulations of red giant branch stars (RGBs). One is an old metal-rich ([Fe/H] ~ -0.4) disk population, and the other is an old metal-poor halo population similar to the resolved stars in M64-GC1. The radial number density profile of the metal-rich RGB follows an exponential disk law, while that of the metal-poor RGB follows a de Vaucouleurs's low. From these results, we conclude that the origin of the Type III component in M64 is a halo, not a disk or a bulge. We will further discuss the results in regards to the formation and evolution of M64.

[포 GC-03] Testing Web Feeding Model for Star Formation in Galaxy Clusters in the COSMOS Field

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It is yet to be understood what controls the star formation activity in high-redshift galaxy clusters. One recently proposed mechanism is that the star formation activity in galaxy clusters are fed by gas and galaxies in large-scale structures surrounding them, which we call as "web feeding model". Using galaxies in the COSMOS2015 catalog, with mass completeness at $\log(M/M_\odot)\geq 9.54$ and reliable photometric redshift data ($\sigma_{\Delta z/(1+z)} \lesssim 0.01$), we study the star formation activities of galaxy clusters and their surrounding environment to test the web feeding model. We first identify the overdense regions with number density exceeding the 4σ -level from photometric redshift data as galaxy clusters, and we find that they are well matched

with clusters identified in the X-ray extended source catalog. Furthermore, we identify galaxy large scale structures, and will present the correlation or anti-correlation between quiescent galaxy fraction, an indicator of star-forming activity, and the prevalence of galaxy large scale structures.

[포 GC-04] NewHorizon: On the Quenching Mechanisms of the Dwarf Galaxies

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Dwarf galaxies are the most abundant objects in the universe. Hence, understanding the dwarfs is important but relatively little is known due to the lack of computing power and limitations in the telescope resolution. We thus use the state-of-the-art NewHorizon simulation, which is a set of cosmological hydrodynamical simulations, to dissect the quenching mechanism working on dwarf galaxies by inspecting the star formation and mass history of individual galaxies. It is known that internal (AGN, SN, stellar feedback) and external (major and minor mergers, ram pressure stripping, strangulation) mechanisms affect the quenching of dwarfs. Because of the combination of these mechanisms, periodicity in the star formation history of the dwarf galaxies is expected. To check for their periodicity, Fourier transform was performed on the star formation history. By comparing the physical timescales and the periodicity, we determine the dominant effect working on the dwarfs. Then, we compare the dominant effects working on the galaxies according to their varying properties.

[포 GC-05] Pure Density Evolution of the Ultraviolet Quasar Luminosity Function at 2 < z < 6

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Quasar luminosity function (QLF) shows the active galactic nucleus (AGN) demography as a result of the combination of the growth and the evolution of black holes, galaxies, and dark matter halos along the cosmic time. The recent wide and deep surveys have improved the census of high-redshift quasars, making it possible to construct reliable ultraviolet (UV) QLFs at $2 < z < 6$ down to M1450 = -23 mag. By parameterizing these up-to-date observed UV QLFs that are the most extensive in both luminosity and survey area coverage at a given redshift, we show that the UV QLF has a universal shape, and their evolution can be approximated by a pure density evolution (PDE). In order to explain the observed QLF, we construct a model QLF employing the halo mass function, a number of empirical scaling relations, and the Eddington ratio distribution. We also include the outshining of AGN over its host galaxy, which made it possible to reproduce a moderately flat shape of the faint end of the observed QLF (slope of ~ -1.1). This model successfully explains the observed PDE behavior of UV QLF at $z > 2$, meaning that the QLF evolution at high redshift can be understood under the framework of halo mass function evolution. The importance of the outshining effect in our model also implies that there could be a hidden population of faint AGNs (M1450 > -24 mag), which are buried under their host galaxy light.

[포 GC-06] GECKO Optical Follow-up Observation of Three Binary Black Hole Merger Events

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We present optical follow-up observation results of three binary black hole merger (BBH) events, GW190408 181802, GW190412, and GW190503 185404, which were detected by the Advanced Ligo and Virgo gravitational wave (GW) detectors. Electromagnetic (EM) counterparts are generally not expected for BBH merger events, however, some theoretical models suggest that EM counterparts of BBH can possibly arise in special environments. To identify EM counterparts of the three BBH merger events, we observed high-credibility regions of the sky with telescopes of the Gravitational-wave EM Counterpart Korean