[포 GC-05] Connection between the gamma-ray outbursts and the jet activity of BL Lacertae

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We present our observational results of BL Lacertae(2200+420) obtained at 22, 43, 86, and 129 GHz simultaneously during 27 months(2013.Jan ~ 2015.Mar) which includes their two gamma-ray outbursts(2013.Oct & 2015.Mar) to study a connection between the gamma-ray outbursts and the radio activity. We mainly use a Korean VLBI monitoring program, IMOGABA(Interferometric Monitoring Of Gamma-ray Bright AGNs) which is a monthly monitoring program with the KVN(Korean VLBI Network). Overall, our KVN image shows two components in the map, a stationary core at the center and one moving jet component to the south, but almost core only at 86, 129 GHz. The location of the moving jet component in the maps depend on the frequencies that 22, 43, 86, and 129 GHz. We have checked light curves, spectral index, kinematics, and radio structure to find differences before and after the gamma-ray outbursts, but there was no significant correlation. We also have derived a decay time scale of ~9 months for the major radio outburst by applying an exponential decay fitting.

[포 GC-06] What Makes Red Quasars Red?

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Red quasars have been suspected to be an intermediate population between merger-driven star-forming galaxies and normal quasars. In this scenario, red quasars are expected to have dusty red color coming from the dust extinction by dust and gas in their host galaxy. However, several studies have proposed different explanation of the red color of red quasars, which are i) a moderate viewing angle between type 1 and 2 quasars, ii) an unusual covering factor of dust torus, and iii) an anomalous synchrotron emission with a peak at NIR wavelength. In this study, we investigate the factor leading to the red color of red quasars by using the line luminosity ratios of the hydrogen Balmer to Paschen series of 11 red quasars. We find the Pb/Hb luminosity ratios of the red quasars are significantly higher than those of normal quasars. Moreover, we compare the Pb/Hb luminosity ratios of the red quasars to the theoretically expected line luminosity ratios computed from the CLOUDY code. We find the line luminosity ratios of the red quasars cannot be explained by the theoretical line luminosity ratios with any physical conditions. We conclude that red color of red quasars comes from dust extinction by their host galaxy. This result is consistent with the picture that red quasars are an intermediate population between the merger-driven star-forming galaxies and normal quasars.

[포 GC-07] Herschel/SPIRE Galaxies in the NEP-Wide Field - Preliminary Results

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We report preliminary results from our analyses on the star-forming galaxies in the Herschel/SPIRE survey data over the AKARI/NEP-Wide Field. In this work, we utilize a combination of the SPIRE point source catalogue containing ~ 4,800 sources distributed over the wide (5.6 sq. deg) field and the spectroscopic redshift (zSPEC) data for 1790 selected targets obtained by MMT/Hectospec and WIYN/Hydra. Our analyses take advantages of multi-wavelengths photometric data (28 bands at most) covering from u* to 500 μm band as well as continuous MIR wavelengths sampling by AKARI and WISE (4 to 25 μm). Various physical properties such as total infrared luminosity (LTIR), star formation rate (SFR), and luminosity functions (LFs) will be presented.

[포 GC-08] On the origin of super-Helium-rich population in the Milky Way bulge

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Our recent investigation (Lee et al. 2015) suggests that the presence of double red clump in the Milky Way bulge is another manifestation of

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