

### [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  $\mu$ m band as well as continuous MIR wavelengths sampling by AKARI and WISE (4 to 25  $\mu$ m). 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