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The M81 Group is the nearest among the known groups of galaxies. HI maps show that all main galaxies of this group are interacting, indicating that this group is in the active phase of formation. On the other hand, wide field imaging shows that globular cluster candidates are found not only in the member galaxies but also between the galaxies in this group. In this study we present preliminary results based on MMT/Hectospec spectroscopy of the globular cluster candidates in this group. We find that the intragroup globular clusters have mostly low metallicity, while the globular clusters in M81 have mostly high metallicity. We will discuss the implication of this result and the kinematics of the globular clusters in relation with the formation history of the M81 Group.

[구 GC-04] Intensive Monitoring Survey of Nearby Galaxies

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SNe light curves have been used to understand the expansion history of the universe, and a lot of efforts have gone into understanding the overall shape of the radioactively powered light curve. However, we still have little direct observational evidence for the theorized SN progenitor systems. Recent studies suggest that the light curve of a supernova shortly after its explosion (< 1 day) contains valuable information about its progenitor system and can be used to set a limit on the progenitor size, R^* . In order to catch the early light curve of SNe explosion and understand SNe progenitors, we are performing a ~ 8 hr interval monitoring survey of nearby galaxies ($d < 50$ Mpc) with 1-m class telescopes around the world. Through this survey, we expect to catch the very early precursor emission as faint as $R=21$ mag ($\sim 0.1 R_{\text{sun}}$ for the progenitor). In this talk, we outline this project, and present a few scientific

highlights, such as the early light curve of SN 2015F in NGC 2442.

[구 GC-05] The Contribution of Mergers on Star Formation Activities in Nearby Galaxies.

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We present our study of the correlation between the UV luminosity and the merging activities of nearby galaxies ($d < 300$ Mpc). Our study uses ~ 600 UV-selected galaxies with deep optical imaging data, where the UV selection is made using the GALEX Atlas of Galaxies (Gil de Paz et al. 2007) and the updated UV catalog of nearby galaxies (Yu Bai et al. 2015). Deep optical images allow us to classify merger features using visual inspection, and we also estimate unobscured SFR using UV continuum luminosity. The fraction of galaxies with merger features in each UV luminosity bins are obtained to see if how the fraction of galaxies with merging features changes as a function of UV luminosity. Finally, we will show, above what UV luminosity (or SFR), the merging mechanism becomes an important process in enhancing star formation of galaxies.

[구 GC-06] The Vertical Disk Structure and Star Formation in Nearby Edge-On Galaxies

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We present the radial variations of the scale heights and the vertical velocity dispersions in a sample of nearby edge-on galaxies using BIMA/CARMA ^{12}CO ($J=1\rightarrow 0$), VLA/EVLA HI, and Spitzer $3.6 \mu\text{m}$ data. Both the disk thicknesses and the velocity dispersions of gas and stars vary with radius, contrary to assumptions of previous studies. We investigate how the interstellar gas pressure and the gravitational instability parameter differ from values derived assuming constant velocity dispersions and scale heights. Using the

measurement of the disk thicknesses and the derived radial profiles of gas and stars, we estimate the corresponding volume densities. The gravitational instability parameter Q follows a fairly uniform profile with radius and is ≥ 1 across the star-forming disk. The star formation law has a slope that is significantly different from those found in more face-on galaxy studies. The midplane gas pressure appears to roughly hold a power-law correlation with the midplane volume density ratio ($\rho_{\text{H}_2}/\rho_{\text{HI}}$).

[ㄱ GC-07] The Virial Relation and Intrinsic Shape of Elliptical Galaxies

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Early-type galaxies (ETGs) are supposed to follow the virial relation $M \sim \sigma^2 * R_e$, with M being the galaxy mass, σ being the stellar velocity dispersion, and R_e being the (2D) effective radius. I apply this relation to (a) the ATLAS3D sample and (b) the sample of Saglia et al. (2016). The two datasets reveal a statistically significant tilt of the empirical relation relative to the theoretical virial relation such that $M \sim (\sigma^2 * R_e)^{0.92}$ with zero intrinsic scatter. This tilt disappears when replacing R_e with the semi-major axis of the projected half-light ellipse, a . Accordingly, a , not R_e , is the correct proxy for the scale radius of ETGs. By geometry, this implies that early-type galaxies are axisymmetric and oblate in general, in agreement with recent results from modeling based on kinematics and light distributions.

[ㄱ GC-08] KOREAN VLBI NETWORK CALIBRATOR SURVEY (KVNCS): 1. SINGLE DISH FLUX MEASUREMENT IN THE K AND Q BANDS

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We present the catalog of the KVN Calibrator Survey (KVNCS). This first part of the KVNCS is a single dish radio survey conducted at 22 (K band) and 43 GHz (Q band) simultaneously using the Korean VLBI Network (KVN) from 2009 to 2011. A total 2045 sources selected from the VLBA Calibrator Survey (VCS) with an extrapolated flux limit of 100 mJy at K band. The KVNCS contains

1533 sources in the K band with a flux limit of 70 mJy and 553 sources in the Q band with a flux limit of 120 mJy; it covers the whole sky down to $-32.^\circ 5$ in declination. Five hundred thirteen sources were detected in the K and Q bands, simultaneously; $\sim 76\%$ of them are flat-spectrum sources ($-0.5 \leq \alpha \leq 0.5$). From the flux-flux relationship, we anticipated that the most of the radiation of many of the sources comes from the compact components. Therefore, the sources listed in the KVNCS are strong candidates for high frequency VLBI calibrators.

[ㄱ GC-09] MASK: Multi-frequency AGN Survey with the KVN

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Available VLBI sources at high frequencies (e.g. $>22\text{GHz}$) are very limited - mainly due to atmospheric fluctuations that degrade coherence time and a power-law energy distribution of particles in case of AGNs. However, simultaneous multi-frequency VLBI receiving system of the Korean VLBI Network (KVN) and its powerful VLBI phase calibration technique offer benefits in finding more weak sources at millimeter wavelengths. Based on this aspect, multi-frequency AGN survey with the KVN (MASK) project, which aims to densify an existing a VLBI catalog of extragalactic radio sources at 22/43/86/129GHz is proposed as a KVN legacy program.

We selected 1220 sources of AGNs that include known VLBI sources and new fringe-detected sources using the KVN at K-band (22GHz). Among them, 138 sources were observed as pilot experiments at 22/43/86/129GHz simultaneously and excellent VLBI detection results are achieved. Therefore, we expect that MASK will open a new era in VLBI science at millimeter wavelengths by providing unprecedented number of available sources in the Universe.

[ㄱ GC-10] Discovery of Sub-pc Scale Plasma Torus in the Nearby Radio Galaxy 3C 84 with the KVN and VERA Array (KaVA)