us to understand the hierarchical star formation and recent evolution of M33.

[포 GC-11] NIR Spectroscopic Observation of Ultra-Long GRB 111209A and The Early Afterglow

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We observed Ultra-Long GRB 111209A using NASA's 3m InfraRed Telescope Facility (IRTF). The observation was started around 40 min later than T0 = 07:12:08 UT of Swift's BAT, lasted for 24 min. The spectrum was extracted using Spextool package. The NIR SEDs show power law distribution indicating afterglow emission from the GRB according to the fireball model with beta ~ 1.2. Also they do not show thermal emission component compared to the SED of "Christmas burst" GRB 101225A. Because there is no other NIR data with this observation epoch, this data can be compared only with TAROT-R band. It seems NIR data has the same flare which exists in R band as an optical flare.

[포 GC-12] Search for Ultra-faint Dwarfs in the Halo of M60, Giant Elliptical Galaxy in Virgo

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One of the well-known problems in the lambda cold dark matter (ΛCDM) models is a missing satellite problem. The slope of the mass function of low mass galaxies predicted by ΛCDM models is much steeper than that based on the luminosity function of dwarf galaxies in the local universe. This implies that the model prediction is an overestimate of low mass galaxies, or that the current census of dwarf galaxies in the local universe may be an underestimate of dwarf galaxies. Previous studies of galaxy luminosity functions to address this problem are based mostly on the sample of galaxies brighter than Mv ~ -10 in the nearby galaxies. In this study we try to search for ultra-faint galaxies (UFDs), which are much fainter than those in the previous studies. We use multi-field HST ACS images of M60 in the archive. M60 is a giant elliptical galaxy located in the east part of the Virgo cluster, and hosts a large population of globular clusters and UCDs. Little is known about the dwarf galaxies in this galaxy. UFDs are much fainter, much smaller, and have lower surface brightness than normal dwarf galaxies so HST images of massive galaxies are an ideal resource. We present preliminary results of this search.

[포 GC-13] A Gemini/GMOS-IFU Spectroscopy of E+A Galaxies in the Mid-infrared Green Valley: On the Spatial Distribution of Young Stellar Population

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We present the two-dimensional distribution of stellar populations in five E+A galaxies from GMOS-N/IFU spectroscopy (GN-2015B-Q-15). Numerical simulations demonstrated that E+A galaxies formed by major mergers contain young stellar populations (e.g. A-type stars) that are centrally-concentrated within scales of 1 kpc. However, several IFU studies reported that A-type stars are widely distributed on ≫ 1kpc scales. In contrast, Pracy et al. (2013) found a central concentration of A-stars and strong negative Balmer absorption line gradients within 1 kpc scales for local ($z < 0.03$) E+A galaxies. They claimed that previous studies failed to detect the central concentration because the E+A galaxy samples in previous studies are too far ($z \sim 0.1$) to resolve the central kpc scales. To verify Pracy et al.'s argument and the expectation from simulations, we selected five E+A galaxies at $0.03 < z < 0.05$. Furthermore, we selected the targets in the mid-infrared green valley (Lee et al. 2015). Thanks to good seeing (~ $0.4'' \simeq 0.33$ kpc) of our observation, we are able to resolve the central 1 kpc region of our targets. We found that all five galaxies have negative Balmer line gradients, but that three galaxies have flatter gradients than those reported in Pracy et al. We discuss the results in relation with galaxy merger history.

[포 GC-14] Mass inflow history of satellite systems around a dwarf galaxy

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