Galaxy clusters contain a diffuse component of stars outside galaxies, that is observed as intracluster light (ICL). Since the ICL abundance increases during various dynamical exchanges of galaxies, the amount of ICL can act as a measurement tool for the dynamical stage of galaxy clusters. There are two prominent ICL formation scenarios; one is related to the brightest cluster galaxy (BCG) major mergers, and the other to the tidal stripping of galaxies. However, it is still under debate as to which is the main ICL formation mechanism. In this study we improve on earlier observational constraints of the ICL origin, by investigating it in a massive fossil cluster at z~0.47.

Fossil clusters are believed to be dynamically matured galaxy clusters which have dominant BCGs. Recent simulation studies imply that, BCGs have assembled 85~90% of their mass by z~0.4 (e.g., Contini et al. 2014). Thus our target is an optimal test bed to examine the BCG-related scenario. Our deep images and Multi-Object Spectroscopic observations of the target fossil cluster (Gemini North 2018A) allow us to extract the ICL distribution, ICL color map and ICL fraction to cluster light. We will present a possible constraint of the ICL origin and discuss its connection to the BCG and the host galaxy cluster.

[구 GC-10] Color Dispersion as an Indicator of Stellar Population Complexity for Galaxies in Clusters

Joon Hyeop Lee (이준협)[1,2], Mina Pak (박민아)[1,2], Hye-Ran Lee (이혜란)[1,2], Sree Oh (오슬희)[3,4,5]
[1]Korea Astronomy and Space Science Institute, [2]University of Science and Technology, [3]The Australian National University, [4]ARC Centre of Excellence for All Sky Astrophysics in 3 Dimensions, Australia, [5]Yonsei University

We investigate the properties of bright galaxies with various morphological types in Abell 1139 and Abell 2589, using the pixel color-magnitude diagram (pCMD) analysis. The 32 bright member galaxies (Mr ≤ -21.3 mag) are deeply imaged in the g and r bands in our CFHT/MegaCam observations, as a part of the KASI-Yonsei Deep Imaging Survey of Clusters (KYDISC). We examine how the features of their pCMDs depend on galaxy morphology and infrared color. We find that the g - r color dispersion as a function of surface brightness (μr) shows better performance in distinguishing galaxy morphology, than the mean g - r color does. The best set of parameters for galaxy classification appears to be a combination of the minimum color dispersion at μr ≤ 21.2 mag arcsec-2 and the maximum color dispersion at 20.0 ≤ μr ≤ 21.0 mag arcsec-2: the latter reflects the complexity of stellar populations at the disk component in a typical spiral galaxy. Moreover, the color dispersion of an elliptical galaxy appears to be correlated with its WISE infrared color ([4.6]-[12]). This indicates that the complexity of stellar populations in an elliptical galaxy is related to its recent star formation activities. From this observational evidence, we infer that gas-rich minor mergers or gas interactions may have usually occurred during the recent growth of massive elliptical galaxies.

[구 GC-11] KYDISC: Galaxy Morphology, Quenching, and Mergers in the Cluster Environment

Sree Oh[1,2,3] (오슬희), Keunho Kim[4] (김근호), Joon Hyeop Lee[5,6] (이준협), Yun-Kyeong Sheen[5] (신윤경), Minjin Kim[5,6] (김민진), Chang H. Ree[5] (이창희), Jaemann Kyeong[5] (경재만), Eon-Chang Sung[5] (성언창), Byeong-Gon Park[5,6] (박병곤), Sukyoung K. Yi[3] (이석영)
[1]The Australian National University, [2]ARC Centre of Excellence for All Sky Astrophysics in 3 Dimensions (ASTRO 3D), [3]Yonsei University, [4]Arizona State University, [5]Korea Astronomy and Space Science Institute, [6]University of Science and Technology

We present the KASI-Yonsei Deep Imaging Survey of Clusters targeting 14 clusters at 0.015 ≤ z ≤ 0.144 using the IMACS on the 6.5 m Magellan telescope and the MegaCam on the 3.6 m CFHT. We introduce a catalog of 1409 cluster galaxies that lists magnitudes, redshifts, morphologies, bulge-to-total ratios, and local density. We highlight our findings on galaxy morphology, color, and visual features generated by galaxy mergers. We see a clear trend between morphological content and cluster velocity dispersion. However, a fraction of lenticular galaxies is nearly constant over cluster-centric distance implying that the major morphological transformation from spirals to lenticulars would be pre-processed before the galaxy accretion into the cluster environment. Passive spirals are preferentially found in a highly dense region, indicating that they have gone through environmental quenching. We find that 20% of our sample shows signatures of recent mergers. Our results support a scenario that the merger events that made the features have preceded the galaxy accretion into the cluster