

observations

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We present a weak-lensing study of the galaxy cluster SPT-CL J2106-5844 at $z=1.132$ discovered in the South Pole Telescope Sunyaev-Zel'dovich (SPT-SZ) survey. The cluster is claimed to be the most massive system at $z > 1$ in the SPT-SZ survey. The inferred mass ($M_{200c} = (1.27 \pm 0.21) \times 10^{15} M_{\text{sun}}$) is somewhat unusual at such a high redshift given the current Λ CDM prediction. The mass estimates, however, may be biased because the hydrostatic assumption may not hold when the universe was about 40% of the current age. In this work, we reconstruct the dark matter distribution and measure the mass of this interesting cluster using weak-lensing analysis based on the images from the Advanced Camera for Surveys and Wide Field Camera 3 on-board the Hubble Space Telescope. We find that the mass distribution of the cluster is unimodal with no significant substructures. The centroid of the dark matter agrees with both galaxy luminosity and number density distributions, as well as the hot gas centroid. We confirm that the cluster is indeed extremely massive ($M_{200c} = (1.81 \pm 0.47) \times 10^{15} M_{\text{sun}}$) supporting the previous non-lensing measurements. We also discuss the rarity of the cluster in the Λ CDM cosmology, comparing with the expected abundance of similarly massive clusters.

[박 GC-08] KYDISC program: The Impact of Mergers on the Evolution of Galaxies

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In the hope to detect low-surface brightness features ($\mu_r \sim 27$ mag arcsec⁻²), we carried out KASI-Yonsei Deep Imaging Survey for Clusters (KYDISC) targeting 14 local clusters at $0.016 < z < 0.145$ using Magellan/IMACS telescope and CFHT/MegaCam. Out of 1450 cluster galaxies, 18% of galaxies show the signatures of galaxy mergers. We explore merger-driven changes from various point-of-view. We first examine color-magnitude relations, and find that galaxies related to recent mergers are populated more on blue color than their counterparts. Besides, we find the extremely low frequency of mergers on low-mass

red-sequence galaxies, suggesting a migration of red galaxies into the green-valley region through merger-driven star-formation. We also study the mass-size relation of our sample, finding a larger galaxy size in galaxies related to recent mergers. Our results suggest that mergers can simultaneously change properties of galaxies, making outliers on galactic scaling relations.

[구 GC-09] Environmental effects in the stellar populations of Compact Elliptical galaxies

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Compact elliptical (cE) galaxies are in a rare class of stellar systems characterized by high stellar densities, small sizes, high velocity dispersion, and high metallicity corresponding to elliptical galaxies. cE galaxies have been observed around massive galaxies, so they could be formed under strong influences of tidal stripping and truncation. However, the recent discovery of isolated cE galaxies requires the need of new formation scenarios. We aim at finding cE galaxies in various environments using SDSS DR12, and studying stellar population of cEs as function of environments. Based on the typical properties of cE galaxies, we selected cE candidates by restricting that low-luminosity $M_g > 19.5$ mag, small sizes $R_e < 700$ pc, and high velocity dispersions $\sigma > 60$ km s⁻¹. Since effect radii of cE candidates are mostly smaller than the seeing size of SDSS photometry, we calculated the effective radius by fitting a Sersic profile. In addition, we assumed that host galaxies have brightness with $M_r < -21$ mag, and an environmental parameter is computed as distances between cE galaxies and host-galaxies. We found 112 cE galaxies at $z < 0.05$, which have high sersic indices (mean value is 5.2) similar to the typical massive elliptical galaxies. Mgb values of cE galaxies increase as the distances from the host galaxies decrease. Especially, for cEs close to the host galaxies (NcE: $D_{\text{host}} < 300$ pc), the Mgb values are similar to those of massive elliptical galaxies, which is consistent with the previous studies. On the other hand, cE galaxies distant from the host galaxies (DcE: $D_{\text{host}} > 300$ pc) have lower Mgb values than the conventional cE. The Mgb values follow the σ -Mgb relation of elliptical galaxies, and are connected to its faint end. This can be explained as a result of different merger histories for differing