We focus on galaxy morphology and star formation/nuclear activity, and find the importance of both anisotropic and isotropic environments in determining galaxy properties.

[구 GC-21] A Hydrodynamical Simulation of the Off-Axis Cluster Merger Abell 115

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A merging galaxy cluster is a useful laboratory to study many interesting astrophysical processes such as intracluster medium heating, particle acceleration, and possibly dark matter self-interaction. However, without understanding the merger scenario of the system, interpretation of the observational data is severely limited. In this work, we focus on the off-axis binary cluster merger Abell 115, which possesses many remarkable features. The cluster has two cool cores in X-ray with disturbed morphologies and a single giant radio relic just north of the northern X-ray peak. In addition, there is a large discrepancy (almost a factor of 10) in mass estimate between weak lensing and dynamical analyses. To constrain the merger scenario, we perform a hydrodynamical simulation with the adaptive mesh refinement code RAMSES. We use the multi-wavelength observational data including X-ray, weak-lensing, radio, and optical spectroscopy to constrain the merger scenario. We present detailed comparisons between the simulation results and these multi-wavelength observations.

[구 GC-22] Preprocessing and mass evolution of dark halos in the hydrodynamic zoom-in simulation

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To understand the assembly of the galaxy population in clusters today, it is important to first understand preprocessing, the impact of environments prior to cluster infall. We use 15 cluster samples from YZiCS, a hydrodynamic cluster zoom-in simulation to determine the significance of preprocessing, and focus on the tidal mass loss of dark matter halos. We find ~48% of the cluster member halos were once satellites of another host. The preprocessed fraction depends on each cluster's recent mass growth history. Also, we find that the total mass loss is a clear function of the time spent in a host. However, two factors can increase the mass loss rate considerably. First, if the satellite mass is approaching the mass of its host. Second, when the halo suffers tidal mass loss at a higher redshift. Being in hosts before cluster infall enables halos to experience tidal mass loss for an extended period of time.

성간물질/별탄생/항성

[구 IM-01] 3-D Shock Structure of Orion KL Outflow with IGRINS

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We present the results of high-resolution near-IR spectral mapping toward the Orion KL outflow. In this study, we used the Immersion Grating Infrared Spectrometer (IGRINS) on the 2.7 m Harlan J. Smith Telescope at McDonald Observatory. IGRINS's large wavelength coverage over the H & K bands and high spectral resolving power (R ~ 45,000) allowed us to detect over 35 shock-excited ro-vibrational H2 transitions and to measure directly the gas temperature and velocity of the dense outflows. In our previous study toward the H2 peak 1 region in the Orion KL outflow, we identified 31 outflow fingers from a datacube of the H2 1-0 S(1) 2.122 μm line and constructed a three-dimensional map of the fingers. The internal extinction (ΔAV > 10 mag) and overall angular spread of the flow argue for an ambient medium with a high density (105 cm-3). In this presentation, we show preliminary results of additional mapping toward a remarkable chain of bows (HH 205 - HH 207) farther from the ejection center, and obtain a more clear view of the shock physics of a single isolated bullet that improves on the knowledge gained from observations of the more complex peak 1 region in our earlier study.