[구 GC-21] Evolution of late-type galaxies in cluster environment: Effects of high-speed multiple interactions with early-type galaxies

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Late-type galaxies falling into a cluster would evolve being influenced by the interactions with both the cluster and the nearby cluster member galaxies. Most numerical studies, however, tend to focus on the effects of the former with little work done on those of the later. We thus perform numerical study on the evolution of a late-type galaxy falling radially toward the cluster center interacting with neighbouring early-type galaxies, using N-body, hydrodynamical simulations. Based on the information about the typical galaxy encounters obtained by using the galaxy catalog of Coma cluster, we run the simulations for the cases where a Milky Way Galaxy-like late-type galaxy, flying either edge-on or face-on, experiences six consecutive collisions with twice more massive early-type galaxies having hot gas in their halos. Our simulations show that the evolution of the late-type galaxy can be significantly affected by the high-speed multiple collisions with the early-type galaxies, such as on the cold gas content and the star formation activity, particularly through the hydrodynamic interactions between the cold disk and the hot gas halos. By comparing our simulation results with those of others, we claim that the role of the galaxy-galaxy interactions on the evolution of late-type galaxies in clusters could be comparable with that of the galaxy-cluster interactions, depending on the dynamical history.

[구 GC-22] Discovery of an elliptical jellyfish galaxy with MUSE

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We will present a discovery of an elliptical jellyfish galaxy in Abell 2670 (Sheen et al. 2017, ApJL, 840, L7). Our MUSE IFU spectra revealed a rotating gas disk in the center of the galaxy and long ionised gas tails emanating from the disk. Its one-sided tails and a tadpole-like morphology of star-forming blobs around the galaxy suggested that the galaxy is experiencing strong ram-pressure stripping in the cluster environment. Stellar kinematics with stellar absorption lines in the MUSE spectra demonstrated that the galaxy is an elliptical galaxy without any hint of a stellar disk. Then, the primary question would be the origin of the rich gas component in the elliptical galaxy. A plausible scenario is a wet merger with a gas-rich companion. In order to investigate star formation history of the system (the galaxy and star-forming blobs), we derived star-formation rate and metallicity from the MUSE spectra. Photometric UV-Optica-IR SED fitting was also performed using GALEX, SDSS, 2MASS and WISE data, to estimate dust and gas masses in the system. For a better understanding of star formation history and environmental effect of this galaxy, FIR/sub-mm follow-up observations are proposed.

[구 GC-23] Wobbling galaxy spin axes in dense environments

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We investigate the changes of galaxy spin orientation in dense environments using hydrodynamical cosmological zoom-in simulations for 17 galaxy clusters. This study reveals that the spin axes of satellite galaxies become more unstable when the satellites have lower initial V/σ, orbits with smaller pericenter distance, and higher merger rates after infall into the model clusters. The satellite galaxies involved in mergers after infall experience twice larger angular changes of spin axes than those without mergers. We also find that perturbation exerted by environments or neighboring galaxies strongly correlates with the stability of spin orientation and final V/σ. On the other hand, the size or stellar mass density of the satellites are not significantly affected by mergers or perturbation in cluster environments.