used in this study had been observed with OASIS spectrometer at CFHT 3.6m telescope using O300 grism, MR1. The wavelength coverage is 4760Å -5558Å, which includes emission lines, Hβ4861Å, [OⅢ]4959Å, and [OⅢ]5007Å. We observe that forbidden lines have both narrow and broad components. Radial velocity of NGC 4051 is blue-shifted, perhaps due to the z value derived by the earlier studies, 0.002336. We use the revised z, 0.002099, according to the radial velocity of the central spectrum. NGC 4051 is face-on galaxy without rotation observed. Radial velocity of Mrk 79 shows a rotation characteristic in narrow components, relative to PA = 160˚, red-shifted to north-west, and blue-shifted to south-east. In the [OⅢ] broad components, blue-shifted points are observed at the place at 2 arcsec apart from the center of Mrk 79 to north-west, which are likely to be gas outflow.

[구 GC-07] Spin evolution of Horizon-AGN early-type galaxies

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The differential rotational properties of early-type galaxies (ETGs) revealed by integral field spectroscopy surveys is arguably one of the most exciting findings in the galaxy evolution study during the past decade. Numerical studies have shown that galaxy mergers under various configurations can reproduce the observed distribution of ETG spin. However, we suggest an alternative scenario for the spin evolution of a large fraction of ETGs. Using the Horizon-AGN simulation, we follow the spin evolution of 10037 color-selected ETGs more massive than 1010 Msun that are divided into four groups: cluster centrals (3%), cluster satellites (33%), group centrals(5%), and field ETGs (59%). We find a strong mass dependence of the slow rotator fraction, fSR, and the mean spin of massive ETGs. Although the environmental dependence is not clear in the fSR, it is visible in the mean value of the spin parameter. The environmental dependence is driven by the satellite ETGs whose spin gradually decreases as their environment becomes denser. Galaxy mergers appear to be the main cause of total spin changes in 94% of central ETGs of halos with Mvir > 1012.5 Msun, but only 22% of satellite and field ETGs. We find that non-merger induced tidal perturbations better correlate with the galaxy spin-down in satellite ETGs than mergers. Given that the majority of ETGs are not central in dense environments, we conclude that non-merger tidal perturbation effects played a key role in the spin evolution of ETGs observed in the local (z < 1) universe.

[구 GC-08] On the origin of gas deficient galaxies in galaxy clusters: insights from cosmological hydrodynamic simulations

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Galaxies associated with massive groups/clusters are normally gas deficient in contrast to field galaxies. HI observations on such galaxies have revealed signs of violent gas stripping, the direct evidence of the environmental effect. At the same time, the notable number of passive galaxies at the cluster outskirts indicates the presence of pre-processing that makes galaxies gas-poor before entering clusters. We investigate the possible channels for the production of the gas deficient galaxies using the state-of-the-art cosmological hydrodynamic zoom-in simulations of 16 clusters (Choi&Yi). We find cluster effect and pre-processing together play an important role in producing the gas-poor galaxies and in both cases gas loss qualitatively agrees with the ram pressure stripping description. Among the currently gas-poor cluster galaxies, 34% are pre-processed before the cluster infall. They are mainly satellites that have undergone ram pressure stripping in group halos. 43% deplete quickly after arriving at cluster during their first approach to the center. Some of them are group halo satellites low in the gas at the infall compared to galaxies directly coming from the field. 24% retain gas even after their first pericentric pass mainly because they are falling into low mass clusters and/or they have a circular orbit that minimizes the ram pressure