

## Z103a Possible galaxy evolution through their interactions with the intracluster medium

Liyi Gu (RIKEN), Kazuo Makishima (Department of Physics, University of Tokyo)

Why galaxies evolve differently in- and out-side clusters? The fraction of gas-rich and star-forming galaxies increases with redshift in the core of rich clusters; while such phenomenon is not found in low-density regions. Answering this question requires a fundamental understanding of the interaction between galaxies and the cluster environment, in particular with the hot intracluster medium (ICM).

We will review our discoveries on the galaxy-ICM interaction in mainly two aspects: (1) affected by the ICM ram pressure, gas from galaxies are stripped out, which in turn boosts turbulence in the ICM [1]. (2) by strongly interacting with the ICM, galaxies are falling towards the cluster center, the dynamical energy is dissipated and converted into heating of the ICM on a cosmological timescale [2,3].

New supporting evidence was obtained from the Hitomi observation of the Perseus cluster. The high-resolution X-ray spectroscopy with Hitomi reveals a flat gas motion field of 150-200 km/s in the Perseus core [4], which is roughly consistent with that triggered by accretion of member galaxies [5,6]. However, the Hitomi data alone are not enough to isolate the galaxy contribution, a full understanding of the galaxy-ICM interaction will wait for the future joint X-ray and optical high-resolution spectroscopic study.

References: [1] Gu, L. et al. 2013, ApJ, 777L, 36; [2] Gu, L. et al. 2013, ApJ, 767, 157; [3] Gu, L. et al. 2016, ApJ, 826, 72; [4] Hitomi collaboration 2016, Nature, 535, 117; [5] Makishima et al. 2016 ASJ autumn, T08a; [6] Makishima et al. 2017 ASJ autumn, T02a