T03a Thermal Conditions at the Central Regions of non-cD Clusters (3)

○ Ozden Sengul, Liyi Gu, Kazuo Makishima (University of Tokyo)

In the previous ASJ Meetings, September 2010 (T07a) and March 2011 (T08a), we presented our results on the XMM-Newton data of a non-cD cluster, Abell 2147 (z=0.035), which is a nearby cluster and chosen for better understanding of the properties of ICM at the central region of non-cD clusters. In fact, the ICM of non-cD clusters are known to be more isothermal than those of cD clusters at their centers, but non-cD clusters have been studied poorly. The obtained radial temperature and abundance profiles for A2147 were up to r∼0.21r200∼481 kpc and approximately constant within errors (H0=70 km/s/Mpc).

Previously we used only MOS2 data and in this study, we also added MOS1 and PN data and successfully measured the temperature and abundance up to larger radii, r∼0.25r200∼ 600 kpc, we obtained temperature and abundance profiles with higher accuracy as 4.20 (±) 0.087 keV and 0.27 (±) 0.045 $Z_{\odot}$, respectively and the errors were halved. We determined the radial surface brightness profile by modeling with " single Beta (β) model "and derived its beta (β) and core radius (rc) values as β =0.38 (±) 0.04 and rc= 2.6 '(±) 0.6 '=112 (±) 26 kpc. The measured core radius is in between the two typical core radii, 60 kpc and 220 kpc, found by ASCA results of 95 clusters (Ota & Mitsuda 2002). We also examined the relation between the velocity dispersion of galaxies in A2147 and the ICM temperature. Finally, we compared A2147 with Abell 1060 (z=0.0114), which is the best-studied non-cD cluster. Although A1060 is hotter (∼3.4 keV) at the center with an outward temperature decrease by 30% (Sato et. al. 2007), A2147 has a nearly flat temperature profile.