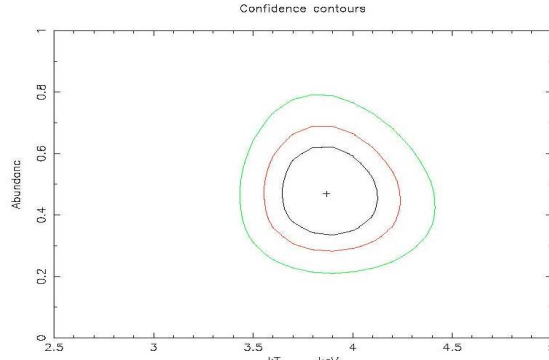
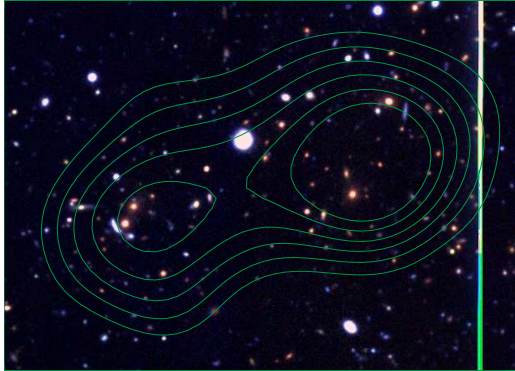
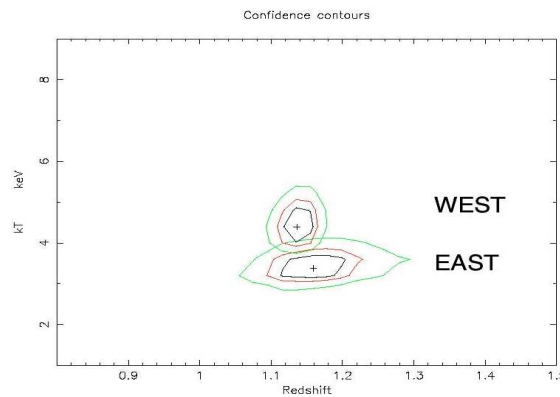
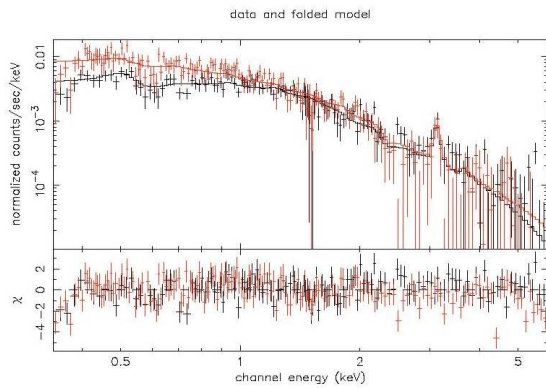


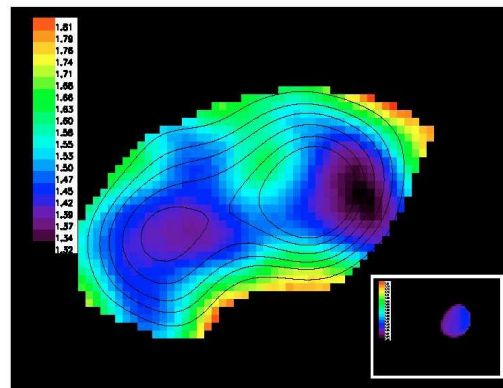
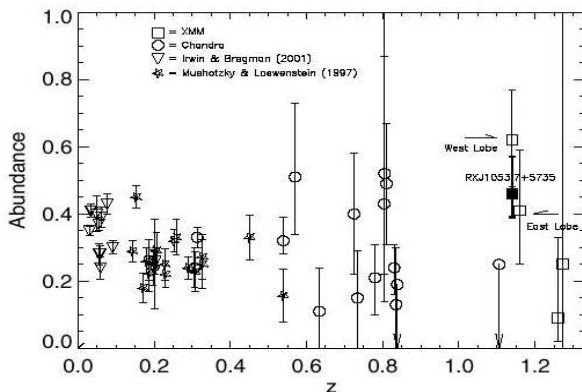
The cluster RXJ1053.7+5735 in the Lockman Hole shows an unusual double-lobed X-ray morphology, indicative of a possible equal-mass cluster merger. We combined all XMM Lockman Hole EPIC observations to date (PV, AO-1 & AO-2 phases), totaling effective exposure times ~ 648 ks, 738 ks, and 758 ks for pn, MOS1, and MOS2, respectively. With this ‘deep’ dataset, we could detect the Fe K line and obtain a strong constraint on cluster metallicity, which is difficult to achieve for clusters at $z > 1$. The Fe line also allows us to directly estimate the redshift of diffuse emission, with a value $z = 1.14^{+0.01}_{-0.01}$. This is one of the first clusters whose X-ray redshift is directly measured prior to the secure knowledge of cluster redshift by optical/NIR spectroscopy.



Left: XMM contour on top of a Subaru color image made from R , I , & Z band. The image is 2×1.5 arcmin. North is up and East is left. **Right:** Two-dimensional χ^2 contours at 68.3, 90, and 99% confidence levels for the temperature kT and the abundance Z/Z_{\odot} of the cluster.



Left: Rebinned spectra, residuals, and best-fit models for the cluster with MOS1+2 (lower spectrum), and pn (upper spectrum). **Right:** Two-D. χ^2 contours at 68.3, 90, and 99% confidence levels for the temperature kT and the redshift of the eastern and western lobes of the cluster.



Left: New XMM abundance and its 1σ error for the cluster plotted with high- z clusters from Tozzi et al. (2003). For comparison, the low- z samples from Mushotzky & Loewenstein (1997), and Irwin & Bregman (2001) are also plotted. **Right:** The X-ray hardness ratio map (1-8 keV)/(0.2-1 keV). The full-band (0.2-8 keV) contours are overlaid on the hardness ratio map.