

T03a

## 衝突初期の銀河団に付随する衝撃波と広がった電波放射の発見

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We present the results of *Suzaku* and *XMM-Newton* X-ray observations of the cluster pair 1E2216.0-0401 and 1E2215.7-0404. We discover a significant X-ray bridge between the clusters. *Suzaku* and *XMM-Newton* observations revealed that each cluster hosts hot gas with moderate temperature of  $kT = 4.8 \pm 0.1$  keV and  $kT = 5.8 \pm 0.2$  keV, respectively. On the other hand, the bridge region shows a remarkably high temperature ( $kT = 6.6 \pm 0.5$  keV). Furthermore we detected an enhancement in the wavelet-decomposed soft-band *XMM-Newton* image with 3 sigma significance, which is most likely compressed intracluster medium (ICM) due to the merging activity. These features can not be explained by late phase cluster merger and are in agreement with the predictions by numerical simulations of the early phase merger. From the temperature jump, the Mach number is estimated to be  $\mathcal{M} = 1.4 \pm 0.1$ , which gives us the shock velocity of about 1560 km/s. From the shock properties, we estimate the core-passage will occur after 0.3–0.6 Gyr and the age of the shock structure is about 50–100 Myr. Based on the measured properties of the ICM at the bridge and simple calculations, we find indications for non-equilibrium ionization. We also discover possible diffuse radio emission in VLSS, NVSS and GMRT data which are located between the clusters. Combining the radio, X-ray, and optical image data, we speculate that the detected radio sources are most likely related to the merger event. Thus, 1E2216.0-0401 and 1E2215.7-0404 is a new example of an early phase cluster merger with remarkable characteristics.