

# **Suzaku XIS, HXD and XMM-Newton Observations of Thermal and Nonthermal Emission at Large Radii in the Merging Cluster Abell 3667**

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Abell 3667 is the archetype of a merging cluster with radio relics. The NW radio relic is the brightest cluster relic or halo known, and is believed to be due to a strong merger shock. Abell 3667 was observed three times with Suzaku with pointings which covered the center of the cluster, the near NW portion, and the far NW region of the NW radio relic. In this poster and a companion poster (Nakazawa et al.), we present the results of the analysis of these observations, combined with a mosaic of observations with XMM-Newton. The spectra of the NW relic region with the Suzaku HXD PIN, XIS, and XMM-Newton pn detectors are fit simultaneously to determine the thermal and nonthermal X-ray emission from the NW radio relic. We find an upper limit on the nonthermal inverse Compton emission from the NW radio relic, which requires a rather large magnetic field, particularly at this large radius from the cluster center. If the relativistic particles and magnetic field are relatively uniform within the radio relic, this implies a substantial nonthermal contribution to the pressure in this regions. A detailed model for the thermal and nonthermal X-ray emission, radio emission, and dynamics of the cluster will be presented based on the Suzaku and XMM-Newton data. The cluster contains rather hot thermal gas, presumably associated with merger shocks. Thermal X-ray emission is detected out to nearly the virial radius of the cluster. There is a steep gradient in the surface brightness near the radio relic, which may indicate that a merger shock is located there.