Abstract Submitted
for the APR16 Meeting of
The American Physical Society

The Best Constraints on the Transport Processes in the Intracluster Medium YUANYUAN SU, RALPH KRAFT, PAUL NULSEN, ELKE ROEDIGER, CHRISTINE JONES, WILLIAM FORMAN, Harvard-Smithsonian Center for Astrophysics, EUGENE CHURAZOV , Max Planck Institute for Extraterrestrial Physics, SCOTT RANDALL, MARIE MACHACEK , Harvard-Smithsonian Center for Astrophysics — The intracluster medium, as a magnetized and highly ionized fluid, provides an ideal laboratory to study plasma physics. NGC 1404 is a bright elliptical galaxy falling through the ICM of the Fornax Cluster. The hot, gaseous corona surrounding NGC 1404 is characterized by a sharp upstream edge and a downstream gaseous tail. We resolve the scales of contact discontinuities down to an unprecedented level due to the combination of the proximity of NGC 1404, the superb spatial resolution of Chandra, and a very deep (670 ksec) exposure. For the first time, we observed Kelvin-Helmholtz instability rolls and put limits on the viscosity of hot cluster plasma. We also observed a mixing between the hot cluster gas and the cold galaxy gas in the downstream stripped tail, providing further support of a low viscosity plasma. Across the upstream front, we measured a discontinuity smaller than the mean free path. The magnetic field is strong enough to suppress electron diffusions but weak enough to allow KHI rolls unsuppressed. Our simulation, tailored to the specific scenario, will provide further insight into the details of the merger process.

Yuanyuan Su
Harvard-Smithsonian Center for Astrophysics

Date submitted: 03 Jan 2016 Electronic form version 1.4