

Abstract Submitted
for the APR11 Meeting of
The American Physical Society

Probing gas dynamics in cluster mergers through the SZ effect¹

SIDDHARTH MALU, RAVI SUBRAHMANYAN, Raman Research Institute, Bangalore, India, MARK WIERINGA, ATNF, CSIRO, Australia, D. NARASIMHA, TIFR, Mumbai, India — We present 12mm observations of the bullet cluster from the Australia Telescope Compact Array; in particular, a high angular resolution measurement of the substructure in Sunyaev-Zel'dovich Effect (SZE). We report the first discovery of multiple compact SZ features in a galaxy cluster, as also their peculiar displacement from the X-ray brightness centres. None of these SZ feature centres corresponds to any bright spot in X-ray, optical or lensing maps. This implies that the gas pressure distribution differs significantly from the distributions in gas emission measure, galaxy and dark matter distributions. This has implications for the gas physics and evolution in the cluster merger event. SZE displaced from X-ray centres implies that modeling cluster dynamics is non-trivial; our observations indicate that our current lack of understanding cluster merger astrophysics may be a limitation in modeling cluster SZE contribution to small-angle CMB anisotropy and the cause for difficulties in reconciling recent observations of such anisotropy with structure formation models.

¹Observing visits sponsored by the Raman Research Institute.

Siddharth Malu
Raman Research Institute, Bangalore, India

Date submitted: 10 Jan 2011

Electronic form version 1.4