A new picture of the formation of cooling cores via cluster mergers

J. O. Burns, P. M. Motl (*University of Missouri*), C. Loken (*CITA*), M. L. Norman (*UCSD*), G. Bryan (*MIT*)

Abstract

Recent state of the art simulations of structure formation with the effects of radiative cooling properly accounted for have suggested a new understanding of cooling cores in rich galaxy clusters. We find that cores of cool gas, material that would be identified as a classical cooling flow, are built from the accretion of discrete, stable subclusters. This hypothesis of hierarchical assembly of cool gas naturally explains the high frequency of cooling cores in rich galaxy clusters despite the fact that a majority of these clusters show evidence of substructure which is believed to arise from recent merger activity. Our simulations were computed with a coupled N-body, Eulerian AMR hydrodynamics code using seven levels of refinement (corresponding to 15.6 h^{-1} kpc resolution within a volume of 256 h^{-1} Mpc on a side) and assuming a standard ΛCDM cosmology.

CATEGORY: CLUSTERS OF GALAXIES