Abstract Submitted
for the APR09 Meeting of
The American Physical Society

Galaxy Mergers with Adaptive Mesh Refinement: Star Formation and Hot Gas Outflow[1] JI-HOON KIM, Kavli Institute for Particle Astrophysics and Cosmology, Stanford University, JOHN WISE, Laboratory for Astronomy and Cosmology, NASA GSFC, TOM ABEL, Kavli Institute for Particle Astrophysics and Cosmology, Stanford University — In hierarchical structure formation, galaxy mergers are frequent and known to affect galaxy properties dramatically. Because of the non-linear coupling between pc and Mpc scales, high-resolution simulations are indispensable to comprehend galactic interactions. To this end, we present the first adaptive mesh refinement (AMR) simulation of two merging, low mass, initially gas-rich galaxies ($2.0 \times 10^{10} M_{\odot}$ each), including star formation and feedback. With galaxies resolved by $\sim 2 \times 10^{7}$ total computational elements, we achieved unprecedented resolution of the multiphase interstellar medium, finding that a widespread starburst occurs in the merging galaxies via shock-induced star formation. Using the high dynamic range of AMR we also follow the interplay between the galaxies and the embedding medium depicting how galactic outflows and a hot metal-rich halo form. These results demonstrate that AMR provides a powerful tool in understanding interacting galaxies.

[1]This work was partially supported by William R. and Sara Hart Kimball Stanford Graduate Fellowship.

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Date submitted: 05 Jan 2009 Electronic form version 1.4