Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

The Impact of B Site Disorder in the Manganites[1] KALPATARU PRADHAN, Harish-Chandra Research Institute, Chhatnag Road, Jhusi, Allahabad 211019, India and Virginia Commonwealth University , Richmond, VA 23284, USA, PINAKI MAJUMDAR, Harish-Chandra Research Institute, Chhatnag Road, Jhusi, Allahabad 211019, India — One can generate highly inhomogeneous phase coexistent states in the manganites $A_{1-x}A'_xMnO_3$ by dilute substitution on the Mn site. On suitable choice of the reference manganite state, and the valence and magnetic character of the dopant, a cluster coexistent state of two competing phases can be created. There is a wealth of data on such 'B site' substitution on the $x = 0.5$ charge ordered manganites, as well as the $x \sim 0.33 - 0.40$ ferromagnetic metal. The results of substitution vary widely, depending on x, the bandwidth of the manganite, and the choice of dopant. While some choice of dopants lead to a phase coexistent state, others lead to a nanoscale correlated glassy phase. We provide a minimal model for B site impurities in manganite hosts, and solve this disordered strong coupling problem through a real space Monte Carlo technique. In addition to the detailed numerical results on the spatial organisation we are able to identify the hierarchy of physical effects that control the impact of B dopants on the manganites.

[1]We acknowledge use of the Beowulf clusters at HRI

Kalpataru Pradhan
Harish-Chandra Research Institute, Chhatnag Road, Jhusi, Allahabad 211019, India and Department of Physics, VCU , Richmond, VA, 23284, USA

Date submitted: 01 Dec 2009 Electronic form version 1.4