Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Study of the Anderson localization in real materials using typical medium dynamical cluster approximation YI ZHANG, RYKY NELSON, Louisiana State Univ - Baton Rouge, HANNA TERLETSKA, University of Michigan, CONRAD MOORE, Louisiana State Univ - Baton Rouge, CHINEDU EKUMA, United States Naval Research Laboratory, KA-MING TAM, Louisiana State Univ - Baton Rouge, TOM BERLIJN, Oak Ridge National Laboratory, WEI KU, Brookhaven National Laboratory, JUANA MORENO, MARK JARRELL, Louisiana State Univ - Baton Rouge — We generalize the typical medium dynamical cluster approximation to multi-orbital disordered systems. Combining it with the first principals downfolding and unfolding methods to derive an effective low energy model, we apply our extended formalism to real materials where strong disorder exists. These include, e.g., the iron selenide superconductors $K_xFe_{2-y}Se_2$ with Fe vacancies, $Ga_{1-x}Mn_xN$ and S doped Si. By looking at the typical density of states, we study the mobility edge and the localization effects in these materials, which is useful to understand the mechanism of their insulating behavior. We find for example, that even the disorder associated with 12% vacancies in $K_xFe_{2-y}Se_2$ together with the anisotropy is not sufficient to cause localization.

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Date submitted: 06 Nov 2015 Electronic form version 1.4