Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Typical density of states as an order parameter for the Anderson localization KA-MING TAM, CONRAD MOORE, JUANA MORENO, MARK JARRELL, Louisiana State University — The typical medium theory and its recently proposed extensions for models with off-diagonal disorder and multiple bands are significant progress towards the study of localization phenomenon in real materials. The fundamental assumption of these methods is that the typical density of states can be treated as an order parameter. However, its justifications in lattice model is largely lacking. This is predominantly due to two factors. First, the lattice sizes amenable for exact diagonalization is rather limited. Second, the small lattice sizes lead to a very sensitive dependence on the broadening factor. In this work, we use the kernel polynomial method to perform simulation for large system sizes. By adapting the method for the study of criticality, we find that the typical density of states has a well defined finite size scaling behavior. In particular, from the kurtosis, Binder ratio, of the distribution of the density of states for different lattice sizes, we find a clear crossing to identify the critical point. This provides further support that the typical density of states can be used as an order parameter for the localization transition.

Ka-Ming Tam
Louisiana State University

Date submitted: 14 Nov 2014 Electronic form version 1.4