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Momentum Space Signatures of Anderson Localization[1] CONRAD MOORE, CHINEDU EKUMA, Louisiana State University, HANNA TERLETSKA, Brookhaven National Laboratory, ZIYANG MENG, JUANA MORENO, MARK JARRELL, Louisiana State University — The ensemble averaged density of states is commonly used as an order parameter to distinguish between a metal and insulator. However, for disordered electronic systems this is not the case: the disorder averaged density of states exhibits no singular behavior as the mobility edge between extended and localized states is crossed. In addition, recent work on rare events in the Anderson model further complicate this characterization with "resonant states" becoming significant in the tails of the density of states. In this work, we present exact diagonalization results of the Anderson model and review two quantities that measure the localization transition: the inverse participation ratio and the typical (geometrically averaged) density of states. We also examine the log-normal distribution of the local density of states in real and momentum space. In particular, the results in momentum space provide a justification for the systematic extension of the single site typical medium theory to a momentum coarse grained Dynamical Cluster Approximation where the non-local effects can be included systematically.

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Conrad Moore
Louisiana State University

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