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Towards the Realization of Self-Consistent Effective Medium Theory for Anderson Disorder Model[1] CHINEDU EKUMA, HANNA TERLETSKA, KA MING TAM, ZI YANG MENG, JUANA MORENO, MARK JARRELL, Department of Physics & Astronomy and Center for Computation and Technology, Louisiana State University, Baton Rouge, LA 70803, USA — A mean-field theory that properly characterizes the Anderson localization transition in three dimensions has remain elusive. Here, we present a systematic typical medium dynamical cluster approximation that provides a proper description of this phenomenon. Our method accurately provides a proper way to treat the different energy scales (close to the criticality) such that the characteristic re-entrant behavior of the mobility edge is obtained. This allows us to study the localization in different momenta cells, which renders the discovery that the Anderson localization transition occurs in a *momentum cell-selective fashion*. As a function of cluster size, our method systematically recovers the re-entrance behavior of the mobility edge and obtains the correct critical disorder strength with great improvement on the critical exponent of the order parameter ($\beta > 1.4$).

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