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Typical medium dynamical cluster approximation applied to Migdal-Eliashberg theory[1] ZHOU LI, Department of Physics & Astronomy and Center for Computation and Technology, Louisiana State University, HANNA TERLETSKA, Department of Physics & Astronomy and Center for Computation and Technology, Louisiana State University, currently at Ames lab, ELISHA SIDDIQUI, JUANA MORENO, MARK JARRELL, Department of Physics & Astronomy and Center for Computation and Technology, Louisiana State University — We use the recently developed typical medium dynamical cluster approximation (TMDCA) to study Anderson localization and the superconductor-insulator transition. In our analysis both phonons and disorder are treated on equal footing. For phonons we use the Holstein model Hamiltonian and perform analysis for different types of disorder distributions, i.e. binary or box distribution. It is of interest to see how phonons and disorder compete in fine-tuning of this phase transition by re-normalizing the gap parameter. For weak disorder we find that the size of the gap depends on the phonon frequency. Since for large phonon frequencies the Holstein model maps onto an attractive Hubbard model, we focus on the region where the phonon frequency is small and intermediate for both weak and strong disorders.

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