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Typical Medium Dynamical Cluster Approximation For Disordered Superconductors¹ ELISHA SIDDIQUI, HANNA TERLETSKA, CHINEDU EKUMA, Louisiana State University, N.S. VIDHYADHIRAJA, Jawaharlal Nehru Centre for Advanced Scientific Research, JUANA MORENO, MARK JARRELL, Louisiana State University — We study the effect of disorder on a three-dimensional attractive Hubbard model using the typical medium dynamical cluster approximation with the Bogoliubov-de Gennes approach as a cluster solver. We explore the effect of disorder for a fixed interaction strength on the diagonal and the off-diagonal typical density of states. As the disorder strength is increased, the pairing parameter or the off-diagonal typical density of states decreases and vanishes at a critical disorder strength while the spectral gap remains finite. This indicates the transition from a superconducting to a super-resistive phase. Also, we find that the critical disorder increases as the interaction strength decreases. A further increase in the disorder strength causes the diagonal typical density of states to vanish. This indicates the transition from a super-resistive to the Anderson insulator phase. Finally, using this analysis for various parameter regimes, we are able to construct a complete disorder vs. interaction strength phase diagram where the three different phases are identified.

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