

Abstract Submitted
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TYPICAL MEDIUM DYNAMICAL CLUSTER APPROXIMATION FOR DISORDERED SUPERCONDUCTORS¹ ELISHA SIDDIQUI, Louisiana State University, HANNA TERLETSKA, University of Michigan, CHINEDU EKUMA, Naval Research Laboratory, NS 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 effects of disorder for a fixed interaction strength (U) on the diagonal and off-diagonal typical density of states. Using our results we construct a complete phase diagram in the disorder vs interaction (U) parameter space. 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. We observe that at small U the superconductor to super-resistive phase line bends down in the disorder vs interaction (U) parameter space. Also, we find that the superconducting order parameter first rises and then falls with increasing disorder in the small U regime. A further increase in the disorder strength causes the diagonal typical density of states to vanish at a critical value, indicating a transition from a super-resistive to the Anderson insulator phase.

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