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Real-space renormalization group approach to the Anderson model

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Real-space renormalization group approach to the Anderson model

Many of the most interesting electronic behaviors currently being studied are associated with strong correlations. In addition, many of these materials are disordered either intrinsically or due to doping. Solving interacting systems exactly is extremely computationally expensive, and moreover approximate techniques developed for strongly correlated systems do not adapt to the inclusion of disorder easily. However a real-space renormalization group (RSRG) approach seems ideally suited for strongly disordered systems. While this approach has been successfully applied to many systems, few applications have been specific to the Anderson model. We present a RSRG study of the Anderson model, benchmarking density of states and inverse participation ratio results against exact diagonalization. Our approach points to the possibility of a RSRG approach to strongly disordered and interacting systems of significantly greater size than currently possible with exact diagonalization

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