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Precise finite-temperature properties of disordred strongly-correlated electronic systems

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The interplay between disorder and electronic interactions in quantum many-body systems is not well understood. Experiments with ultracold atoms on optical lattices hold a great promise for exploring the different competing phases that arise in these systems by simulating disordered quantum lattice models in the presence of interactions. However, these experiments often rely on precise and approximate-free results from numerical calculations for various static and dynamic properties of these models in order to characterize the experimental systems. In this talk, I will present recently obtained data for the thermodynamic properties and magnetic correlations of the disordered three-dimensional Hubbard model using the determinant quantum Monte Carlo. I will also discuss new techniques within the numerical linked-cluster expansions that allow for fast and precise calculation of finite-temperature properties of disordered systems in the thermodynamic limit.