

Efficient Description of Many-Body Systems with Projected Entangled-Pair States

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Quantum many-body systems are very hard to describe. In this talk I will explain a new theoretical technique which allows to approximate ground and thermal states of short-range interaction Hamiltonians on a lattice in 1 and 2 spatial dimensions. The resulting description is in terms of a single tensor, which extends the notion of mean field theory, and whose mathematical properties directly reflect the physical properties of the quantum system. In particular, the symmetries of the tensor are directly related to the symmetries of the original Hamiltonian.