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[145] Characterizing fractional quantum Hall states using isometric tensor networks

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The simulation of strongly-correlated quantum many-body systems is a long-standing numerical challenge. Although the ground-state properties of one-dimensional systems may be efficiently distilled using the density matrix renormalization group, now understood in the framework of matrix product states, generalizing this procedure to higher dimensions is problematic, since the exact evaluation of tensor network states becomes exponentially expensive. In this talk, we remedy this by employing isometric tensor networks (isoTNS), a recently-proposed restriction of the projected entangled pair state ansatz. We evaluate isoTNS algorithms for bosons and fermions, and present current progress in applying them to characterize fractional quantum Hall states.

Theoretical Work

Theory

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