

Hyperdeterminants: A Flexible Wavefunction for Strongly Correlated Quantum Matter

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Strongly correlated systems can host very different phases that are difficult to describe within a single wavefunction framework. I will introduce the hyperdeterminant, a variational generalization of the Slater determinant based on fusing auxiliary fermionic partons into physical particles. Using variational Monte Carlo, we find that this ansatz accurately describes fractional Chern insulators and nearby competing phases. Changes in the optimized fusion structure also provide a possible diagnostic of phase transitions without assuming a conventional order parameter.