**Matrix Product States for Model Quantum Hall Wavefunctions and Beyond**

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Abstract

We show that the model wave functions used to describe the fractional quantum Hall effect have exact representations as matrix product states (MPS). Due to the deep relationship between these wavefunctions and the conformal field theory describing their edge, the MPSs take on a simple analytic form. These MPSs can be implemented numerically in the orbital basis of both finite and infinite cylinders, which provide an efficient way of calculating arbitrary observables. Next, we present an algorithm for numerically computing the real-space entanglement spectrum starting from an arbitrary orbital basis MPS, which allows us to study the scaling properties of the real-space entanglement spectra on infinite cylinders.

Finally, we outline how the density matrix renormalization group (DMRG) can be used to obtain non-model wavefunctions for a general microscopic Hamiltonian, and the ways to identify a topological phase from just its ground state wavefunctions.

About the speaker

Roger Mong was born in Hong Kong, and raised in Toronto, Canada. He received an undergraduate degree in engineering from the University of Toronto, and a Ph.D. in Physics at the University of California, Berkeley.

He was supervised by Prof. Joel E. Moore, where his works focused on the classification and characterization of topological insulators.