

When Gutzwiller meets DMRG: a microscopic-wavefunction-guided approach to 2D correlated electrons

Two-dimensional (2D) strongly correlated electrons remain one of the central themes in modern physics. In this talk, we address a crucial issue: whether there exists a paradigm for studying 2D strongly correlated electrons by starting from their one-dimensional reduction. We will demonstrate that the newly proposed Gutzwiller-projected wavefunction-guided density matrix renormalization group (DMRG) is a promising method for this topic. This novel method will be illustrated through two examples: (1) Benchmarking the famous Kitaev honeycomb model; (2) Tackling a challenging problem -- determining the ground state of the antiferromagnetic Heisenberg model on a Kagome lattice.

About the speaker:

Yi Zhou is a professor at Institute of Physics, Chinese Academy of Sciences. He received his B.S. degree and Ph. D. in physics from Tsinghua University in 1998 and 2004 respectively. After postdoctoral journey, he became a faculty member in Zhejiang University in 2009 and moved to current position in 2019. His main research interests include quantum many-particle physics and theoretical condensed matter physics.

