Contribution ID: **83** Type: **not specified**

Tensor Network Renormalization and its Applications

Tuesday, 26 March 2024 10:00 (1 hour)

The tensor-network renormalization group is known for its profound implications for understanding and solving correlated quantum systems. I will explore sophisticated tensor-network techniques for assessing dynamical excitations in low-dimensional quantum lattice models:
1. Introduce a matrix-product representation for low-energy excited states and present methods for their precise determination. [1]
2. Employ the triangular antiferromagnetic model to investigate the dynamical spectra of two-dimensional quantum lattice modes within the single-mode approximation. [2]
3. Discuss the kicked Ising problem, previously utilized to showcase the benefits of noisy quantum computing through error mitigation on the NISQ quantum computing platform, as a case study for efficiently and accurately calculating the time evolutions of two-dimensional tensor-network states. [3]

[1] X. Li, Z. Zhou, G. Xu, R. Chi, Y. Guo, T. Liu, H. Liao, T. Xiang, Accurate determination of low-energy eigenspectra with multi-target matrix product states, Phys. Rev. B 109, 045115 (2024).
[2] R. Chi, Y. Liu, Y. Wan, H. J. Liao, T. Xiang, Spin excitation spectra of anisotropic spin-1/2 triangular lattice Heisenberg antiferromagnets, Phys. Rev. Lett. 129, 227201 (2022)
[3] H.-J. Liao, K. Wang, Z.-S. Zhou, P. Zhang, T. Xiang, Simulation of IBM39;s kicked Ising experiment with Projected Entangled Pair Operator, arXiv:2308.03082

Primary author: XIANG, Tao (Institute of Physics, Chinese Academy of Sciences)

Presenter: XIANG, Tao (Institute of Physics, Chinese Academy of Sciences)

Session Classification: Invited talks

Track Classification: Invited talk