LATTICE 2024

LIVERPOOL

Contribution ID: **67**   Type: **Talk**

Toward tensor renormalization group study of lattice QCD

Tuesday, 30 July 2024 14:45 (20 minutes)

The tensor renormalization group (TRG) method is a powerful tool for studying lattice field theories and quantum many-body systems that is free from the sign problem. In this talk, I discuss two of the recent developments toward the TRG study of lattice QCD. The first is the proposal for incorporating multiple fermion flavors for 2D Abelian gauge theory, using the Grassmann tensor network. The second is the proposal for the reduced tensor network formulation for non-Abelian pure gauge theories in arbitrary dimensions. These two techniques are essential for the efficient computations of non-Abelian gauge theories with multiple flavors, including quantum chromodynamics.

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Session Classification: Algorithms and artificial intelligence

Track Classification: Algorithms and Artificial Intelligence