

Toward tensor renormalization group study of quantum chromodynamics

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We discuss the recent progress in the application of the tensor renormalization group method toward lattice quantum chromodynamics. In the first half, we discuss the application of the Grassmann tensor network for gauge theories with multiple fermion flavors. With the multilayer tensor network construction, it is possible to compute the two-dimensional abelian gauge theories up to 4 flavors. In the second half, we discuss the novel formulation for non-abelian lattice gauge theory with a significantly reduced tensor size which can be generalized to higher dimensions. Preliminary results for three-dimensional SU(2) and SU(3) gauge theories are presented.

Primary author: YOSPRAKOB, Atis (Niigata University)

Presenter: YOSPRAKOB, Atis (Niigata University)

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