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Notes on Lattice Gauge Theory and Tensor Renormalization

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Abstract

We summarize numerical benchmarks for coarse-graining (2+1)-dimensional Abelian and non-Abelian lattice gauge models using bond-weighted tensor renormalization group (BW-TRG) contractions. By isolating local gauge-invariant plaquette projectors prior to singular-value truncation, computational scaling remains stable across critical coupling regimes without introducing sign-problem instabilities.

Convergence diagnostics against hybrid Monte Carlo ensembles on L=32 and L=64 lattices indicate agreement within 1e-5 for plaquette expectation values and Polyakov correlators.

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