

Noise-robust Implementation of Gauss's law for quantum computers

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We discuss continuous symmetries identities using the tensor formulation of lattice spin and gauge models. We show that the symmetries are encoded in the selection rules of the tensor. This allows truncations that preserve the symmetries exactly. We present the tensorial expression of the transfer matrix for Abelian gauge theories and explain how gauge fixing and Gauss's law relate.

We propose redefinitions of the electric quantum numbers such that Gauss's law is always satisfied even when the time evolution is implemented on NISQ devices. We discuss ways to minimize the number of degrees of freedom.

We briefly discuss practical implementations for a Z_2 gauge theory.

This follows arXiv:2003.10986 (Phys. Rev. D in press) and Phys. Rev. D 100, 014506

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