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## Relations between Quantum Error Correction and Gauge Theory

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We explore relations between quantum error correction and gauge theory. They have a conceptual similarity that quantum error correction provides a redundant description of logical qubits in terms of encoded qubits while gauge theory has a redundancy to describe physical states. Motivated by the conceptual similarity and recent demand for efficient ways to put gauge theories on quantum computers, we aim to identify precise relations between quantum error correction and gauge theory. We demonstrate that some classes of error correcting codes can be interpreted as gauge theories and vice versa.

### Topical area

Quantum Computing and Quantum Information

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