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**Fault-Tolerant Storage of Quantum Information by Large Block Codes** CHING-YI LAI, TODD BRUN, University of Southern California, USC TEAM — An important issue in the implementation of a quantum computer is to protect quantum information from decoherence. Concatenated quantum codes and topological quantum codes are extensively studied for fault-tolerant quantum computation. However, there is not much research on large block codes in any fault-tolerant scheme. Here we propose a method for storage of quantum information by a large block code, which has a high code rate and high distance. To access or protect the quantum information stored in a large block code requires only the fault-tolerant implementation of the gates from the Clifford group. We derive the lifetime of the quantum information stored in a large block code by CSS code construction.

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