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Engineering autonomous error correction in stabilizer codes at finite temperature C. DANIEL FREEMAN, University of California - Berkeley, CHRIS HERDMAN, University of Waterloo, BIRGITTA WHALEY, University of California - Berkeley — We present an error correcting protocol that enhances the lifetime of stabilizer code based qubits which are susceptible to string-like error modes at finite temperature, such as the toric code. The primary tool employed is dynamic application of the CSWAP operator, a local, unitary operator which exchanges defects and thereby translates quasiparticles. Crucially, the protocol does not require any information about the locations of quasiparticles, and can be used to enhance the lifetime of an encoded qubit in the absence of stabilizer measurement. This work was supported by the NSF grant DGE-1106400.

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