Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Entanglement Purification of Any Stabilizer State SCOTT GLANCY, EMANUEL KNILL, Mathematical and Computing Science Division, National Institute of Standards and Technology, Boulder, Colorado 80305, HILMA VASCONCELOS, Department of Physics, University of Notre Dame, Notre Dame, Indiana 46556, USA — We present a method for multipartite entanglement purification of any stabilizer state shared by several parties. In our protocol each party measures the stabilizer operators of a quantum error-correcting code on his or her qubits. The parties exchange their measurement results, detect or correct errors, and decode the desired purified state. We give sufficient conditions on the stabilizer codes that may be used in this procedure and find that Steane's seven-qubit code is the smallest error-correcting code sufficient to purify any stabilizer state. An error-detecting code that encodes two qubits in six can also be used to purify any stabilizer state. We further specify which classes of stabilizer codes can purify which classes of stabilizer states.

Scott Glancy
Mathematical and Computing Science Division,
National Institute of Standards and Technology, Boulder, Colorado 80305

Date submitted: 30 Nov 2006 Electronic form version 1.4