Abstract Submitted
for the NEF12 Meeting of
The American Physical Society

A Mathematica Quantum simulator for hybrid qubit -qutrit systems FRANK TABAKIN[1], University of Pittsburgh — QDENSITY[2] is a Mathematica quantum computation simulator. QCWAVE[3] not only updated QDENSITY's treatment of states and operators and included amplitude displays, circuit diagram drawing and Dirac notation features, but also invoked the parallel processing capabilities of Mathematica 8.0 to simulate errors and error correction. Parallel versions of QCWAVE run simultaneously with random errors introduced on some of the processors, with an ensemble average used to represent the real world situation. Within this approach, error correction steps can be simulated and their efficacy tested. This capability allows one to examine the detrimental effects of errors and the benefits of error correction on particular quantum algorithms. Now there is an addition to the codes "QDENSITY" and "QCWAVE," called BTSystem[4], which includes hybrids of binary (B) qubit and triplet(T)qutrit systems. Formation of BT states, density matrices, gates and partial traces are among the many features of BTSystem.

[1]resides in Lenox, MA
[2]Bruno Julia-Diaz, Joseph M. Burdis and Frank Tabakin, Computer Physics Communications 174 (2006) 914
[3]Frank Tabakin, Bruno Julia-Diaz, Computer Physics Communications 182 (2011) 1603
[4]BTSystem is available at http://www.pitt.edu/∼tabakin/QDENSITY/

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Date submitted: 15 Oct 2012 Electronic form version 1.4