Abstract Submitted
for the OSF07 Meeting of
The American Physical Society

Effects of Depolarizing Noise on the Precision of an Atomic Clock Using GHZ States MATTHEW BRIEL, ANDREW JACOBS, JAMES CLEMENS, Miami University — We consider an atomic clock utilizing a sample of N atoms prepared in a Greenberger-Horne-Zeilinger (GHZ) state. We studied the effects of depolarizing gate noise (caused by the preparation of the GHZ state), on the uncertainty of the detuning from the resonant transition atomic transition. We also studied the uncertainty's functional dependence on the number of atoms N that the GHZ state is prepared with. Having then families of curves for the uncertainty of the detuning as a function of error probability, across different N values, we contrasted these results with the classical limits, finding a lower boundary for the error probability that one must operate under to beat out the classical system.

James Clemens
Miami University

Date submitted: 01 Oct 2007 Electronic form version 1.4