Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Decoherence-enhanced measurements DANIEL BRAUN, University Paul Sabatier Toulouse, JOHN MARTIN, University de Liege — The idea of quantum-enhanced measurements (QEM) is to use quantum-engineered states, such as squeezed light, as probes of classical system properties, such as the length of an optical cavity. These methods promise to beat the standard quantum limit (SQL), in which the uncertainty of the measured quantity scales as the inverse square root of the number of quantum constituents N of the probe (such as the number of photons), and to potentially achieve the Heisenberg limit, where the scaling is 1/N. However, experimental progress has been slow, as the highly non-classical quantum states required are in general very prone to decoherence. In this talk we show that decoherence itself can be exploited to reach the Heisenberg limit, without the need to produce highly entangled states. We will discuss this new method of "Decoherence-enhanced measurements" in detail for the example of the measurement of the length of an optical cavity.

Daniel Braun
University Paul Sabatier Toulouse

Date submitted: 22 Jan 2009 Electronic form version 1.4