Abstract Submitted
for the DAMOP08 Meeting of
The American Physical Society

Bose-Einstein Condensate "Level": a tool box for precesion measurement[1] SATYAN BHONGALE, Rice University, EDDY TIMMERMANS, Los Alamos National Laboratory — A trapped, phase separated, two component Bose-Einstein condensate (BEC) can be configured to give a single BEC bubble that floats freely in the surrounding BEC. We point out that this system gives a unique template to carry out mesoscopic quantum studies and to detect weak forces. We demonstrate the detection capabilities by proposing and studying a "Quantum Level" for fundamental quantum fluctuation studies and for mapping the potential energy landscape near a surface with exquisite accuracy. The above method open up a new avenue for research where the quantum state of a trapped ultra-cold gases such as a BEC is cast as a measurement-tool rather than a system-under-investigation.

[1]W. M. Keck Program in Quantum Materials, Rice University & LANL.

Satyan Bhongale
Rice University

Date submitted: 31 Jan 2008 Electronic form version 1.4