

Abstract Submitted
for the DAMOP14 Meeting of
The American Physical Society

Construction of next generation Yb Bose-Einstein condensate interferometer¹ BENJAMIN PLOTKIN-SWING, ALAN JAMISON, ANUPRIYA JAYAKUMAR, KATHERINE MCALPINE, BRENDAN SAXBERG, RYAN WEH, SUBHADEEP GUPTA, University of Washington — We are building a new apparatus for interferometry using Yb Bose-Einstein condensates. In our first generation contrast interferometer we measured h/m , where h is Planck's constant and m is the mass of an ytterbium atom, in order to determine the fine structure constant α . Based on our findings, we present our plans for increasing the precision of our α measurement in the new apparatus to the level of one part in ten billion. We also observed that the interferometer signal is sensitive to the condensate critical temperature, and we propose BEC interferometry as a tool for studying phase transitions. In addition, we present a novel vapor cell with a short and a long path through the vapor, with independently adjustable optical densities. This single cell can be used for frequency stabilization on the two cooling transitions in Yb, which are separated by two orders of magnitude in strength.

¹This work is supported by NSF and NIST.

Benjamin Plotkin-Swing
University of Washington

Date submitted: 31 Jan 2014

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