Abstract Submitted
for the DAMOP09 Meeting of
The American Physical Society

Positioning and measuring atomic gases in a Atom Chip/Cavity QED apparatus DANIEL BROOKS, THOMAS PURDY, THIERRY BOTTER, DAN STAMPER-KURN, UC Berkeley — A Fabry-Perot cavity QED system exhibits a standing-wave cavity mode resulting in spatially-varying atom-light interactions. By confining atoms to less than a half wavelength of the mode, in the Lamb-Dicke regime, the effects of spatially-dependent coupling can be mapped out. For example, measurement backaction induced heating is minimized at anti-nodes whereas position sensitivity is greatest at the maximal gradient of the standing wave. These effects are of interest in contexts of cavity Optomechanics and squeezed interferometry. Here we present our experimental results on long-distance transport of atoms on chips and on measuring quantum motion of atoms strongly coupled to cavities.

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Date submitted: 23 Jan 2009 Electronic form version 1.4