Abstract Submitted
for the DAMOP05 Meeting of
The American Physical Society

A Microchip Ring Trap for Cold Atoms PAUL BAKER, Tufts University, MATT CROOKSTON, MIKE ROBINSON, USAF AFRL — We describe a method to create a circular magnetic waveguide for deBroglie waves on a microchip. The guide is a 2-dimensional magnetic minimum for trapping weak-field seeking states of atoms or molecules with a magnetic dipole moment. It is created completely by electric currents in wires that are lithographically patterned on a multi-level chip. We describe the geometry and time-dependent currents of the wires and show that it's possible to wrap the waveguide in a complete circle with minimal perturbations due to the leads or wire crossings. This maximal area geometry is suited for rotation sensing with atom interferometry via the Sagnac effect using either cold thermal atoms and molecules or Bose-condensed systems.

Paul Baker
Tufts University

Date submitted: 03 Jan 2005 Electronic form version 1.4