Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Double-loop Microtrap for Ultracold Atoms BIN JIAN, WILLIAM A. VAN WIJNGAARDEN, York University — A microtrap consisting of two concentric circular loops having radii of 300 and 660 μm, respectively, is demonstrated. The microtrap is formed using the magnetic field generated by the current passing through the double-loop wire pattern superposing a small external bias magnetic field perpendicular to the wire pattern plane. The double-loop wire pattern is fabricated on an atom chip device. The maximum three dimensional trap depth exceeds 1 mK when using an atom chip current of 2.6 Amps. The trap position below the atom chip surface can be adjusted over a distance of 100 microns by varying the bias field. Experimentally, more than 10^5 ^{87}Rb atoms were loaded into the microtrap from a quadrupole magnetic trap and remained trapped for several hundred milliseconds which was limited by the background pressure. The loading of a linear array of three microtraps is also demonstrated. The trap dimensions are readily scaled to micrometer size, which is of interest for creating a one and two dimensional array of neutral atom traps on a single atom chip.

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Date submitted: 17 Dec 2012 Electronic form version 1.4