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Manipulation of Ultracold Atoms using Double-Loop Microtraps
WILLIAM VAN WIJNGAARDEN, BIN JIAN, ANDREI MOURAVIEV, York University — Ultracold atoms created using microtraps are being used in an increasing number of diverse applications. This talk discusses exciting work demonstrating a double-loop microtrap which consists of two concentric circular wire loops carrying oppositely oriented currents. This generates a magnetic field configuration that traps a magnetic dipole in three dimensions. The position of the trapped atoms relative to the atom chip surface containing the microwire loops, can be precisely controlled by applying different currents in the two lops or alternatively using a so called bias magnetic field oriented perpendicular to the chip surface. An important advantage of the double-loop microtrap is that it can be daisy chained in series to create a one or two dimensional microtrap array. Future possibilities are presented as to how atoms can be transferred between adjacent microtraps as well as the use of an additional micro sized Ioffe coil to create a trap having a nonzero magnetic field minimum to reduce atom loss by suppressing Majorana transitions.

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