Abstract Submitted
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Towards Experimental Realization of an Atom Transistor[1] EVAN SALIM, DANA ANDERSON, Department of Physics and JILA, University of Colorado at Boulder, HO-CHAIO(RICK) CHUANG, VICTOR BRIGHT, Department of Mechanical Engineering, University of Colorado at Boulder, ALEX ZOZULYA, Worcester Polytechnic Institute, JEFFREY DENATALE, ROBERT MIHAILOVICH, Teledyne Scientific and Imaging, LLC — We present theoretical and experimental progress towards an atom transistor using ultra-cold Rb87 atoms. Our transistor system will use a three well potential where tunneling between the two outside wells is controlled by the number of atoms in central well. In order to achieve realistic tunneling rates in the device, we create the potentials less than 1 micrometer away from an atom chip patterned with sub-micron wires. This scheme presents a host of technical challenges, including fabrication of chip features with adequate resolution and managing surface effects due to the proximity of the chip and the atoms. Noise limits of the system are discussed for both field fluctuations and atom number noise.

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