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Generating a double-well on an atom chip VIOLETA PRIETO, JASON ALEXANDER, CHRISTOPHER ROWLETT, WILLIAM GOLDING, PATRICIA LEE, Sensors and Electron Devices Directorate, US Army Research Laboratory, Adelphi, MD — We report on recent experimental progress towards developing a compact atom interferometer on an atom chip using a double-well potential. The interferometer uses 87Rb atoms magnetically confined in an atomic waveguide produced by wires on the surface of a lithographically patterned chip. The double-well potential can be created by dynamically changing the current configuration on our atom chip, as well as by combining radio-frequency and static magnetic fields. We model combinations of different current configurations with various external bias fields that could offer the means to coherently split the atomic cloud through dynamically adjusting the currents and bias fields. We also study the splitting created by using a combination of RF applied through the chip wires or external wire loops and a static magnetic field produced by a z-wire and bias coils. Depending on the polarization of the RF field, the orientation and the shape of the induced dressed-state potential can be manipulated, creating double-well configurations with different sensitivities to gravity. We consider real-time transformations between different double-well configurations adiabatically and non-adiabatically, and study their effects on the initially trapped atoms.

Violeta Prieto
US Army Research Laboratory

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