Abstract Submitted
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A trapped-atom Sagnac interferometer using reciprocal circular trajectories[1] EDWARD MOAN, CASS SACKETT, ZHE LUO, UVA — We describe progress towards an atomic Sagnac interferometer using a circular trajectory in a cylindrically symmetric harmonic trap. The atoms are split and recombined using off-resonant Bragg laser pulses. An initial pulse splits the atoms into packets with momenta $\pm 2\hbar k$. These packets move in the harmonic potential until they come to rest at the classical turning point. An orthogonally oriented Bragg laser then further splits the atoms into four packets, which make nearly circular orbits about the potential center. After an integer number of orbits the packets can be recombined, forming two reciprocal interferometers whose phase difference is sensitive to rotations but rejects other common-mode noise sources. We have observed closed circular trajectories with a diameter of 0.6 mm, corresponding to a Sagnac phase of 1500 s times the rotation rate. This corresponds to about 0.1 rad for an Earth-rate rotation.

[1]NASA, NSF

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