Abstract Submitted
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A Strontium^{87} Ion Interferometer[1] CHRISTOPHER J. ERICKSON, JAMES L. ARCHIBALD II, JAROM JACKSON, DEAN ANDERSON, MICHAEL HERMANSEN, MARK CUNNINGHAM, DALLIN S. DURFEE, Brigham Young University — We describe a matter-wave interferometer based on Sr^{87+}. The ions are generated from a laser-cooled strontium beam that is photo-ionized using a two-photon transition to an auto- ionizing state in the continuum. The ionization occurs between two electrodes, allowing us to accelerate the ions to any desired energy from a few meV to 20 keV. Each ion's quantum wave is split and recombined using stimulated Raman transitions between the hyperfine ground states of Sr^{87+}. The two required optical frequencies for this transition are created by frequency-shifting a master laser in opposite directions by half of the 5 GHz ground-state hyperfine splitting. We can then determine the interferometer phase from the fluorescence of one of the ground states. We will discuss the theory of operation, experimental methods, and potential applications of the device.

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