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Interferometry of atoms in concentric ring traps[1] RANCHU MATHEW, Joint Quantum Institute, University of Maryland, EITE TIESINGA, Joint Quantum Institute, University of Maryland and National Institute of Standards and Technology — Recently, an interference experiment of a rotating and a stationary Bose-Einstein condensate was conducted in NIST, as a part of efforts to create the atomic analogue of a SQUID. Inspired by this experiment, we model the interference of two atoms after release from a "double-ring" trap. The trap consist of two concentric rings with tight radial and azimuthal confinement, which makes the system before release effectively one-dimensional. One of the rings has a rotating barrier potential, which we model as a δ-function potential. Initially, the particles are in a coherent superposition of being present in either ring. After the trap is released or turned off, the atoms produce a spiral interference pattern. The number of arms of the spiral is determined by the rotation rate of the barrier potential. We investigate numerically and analytically the effect of atom-atom interactions between the atoms and the strength of the barrier on the interference pattern.

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