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Decoherence and Dynamics in a Continuous Atom Interferometer

JONATHAN KWOLEK, United States Naval Research Laboratory (NRC), MARK BASHKANSKY, ADAM BLACK, United States Naval Research Laboratory — We present new measurements studying an atomic beam source for continuous, cold atom interferometry. The atomic beam is prepared with an off-axis two-dimensional magneto-optical trap (MOT) as well as an on-axis, far detuned three-dimensional moving molasses stage. This method provides a beam of atoms with temperatures comparable to pulsed-atom interferometers with far less near-resonant light. We will quantify the reduction in near-resonant scattered light from the atom source by exploring decoherence and light induced phase-shift mechanisms in a simple atom interferometer. Additionally, we quantify the theoretical performance of this system as a cold-atom gyroscope under platform dynamics.

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