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Enhanced atom interferometry through quantum information science[1] MARK EDWARDS, Georgia Southern University and NIST, BRANDON BENTON, MICHAEL KRYGIER, Georgia Southern University, CHARLES CLARK, Joint Quantum Institute and NIST — New designs for atom interferometers can be inspired by quantum information science (QIS). QIS–inspired atom interferometer (AI) designs have the potential for producing AIs with enhanced sensitivity and robustness. We compare the sensitivity of a standard Mach–Zehnder (M–Z) Bragg AI with an AI whose design is based on the idea of decoherence–free subspaces (DFS).[2] We studied the performance of both atom interferometers using an enhanced version of a previously developed Bragg interferometer prototyping model.[3] This model approximates the effect on the condensate of multiple Bragg pulses separated by time delays using two elements: the effect of a single pulse and condensate evolution between pulses. The overall effect is rapidly approximated by following the steps of the interferometric process. We describe this model and then present the comparison of the performance of the M–Z interferometer with that of the DFS–inspired interferometer.

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[2]D.A. Pushin, M. Arif, and D.G. Cory, Phys.Rev. A **79**, 053635 (2009)
[3]S.E. Simsarian et al., Phys. Rev.Lett. **85**, 2040 (2000).

Mark Edwards
Georgia Southern University

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