

Abstract Submitted  
for the DAMOP08 Meeting of  
The American Physical Society

**Selective Manipulation of Degenerate Interferometer Loops by an Atom-Optics Kicked Rotor**<sup>1</sup> ALEXEY TONYUSHKIN, MARA PRENTISS, Harvard University — We experimentally demonstrate that an atom-optics kicked rotor can lift the degeneracy in a four-pulse de Broglie wave atom interferometer. The interferometer output is dominated by two degenerate spatial loops: the non-reciprocal “trapezoid” loop and the reciprocal “figure-8” loop. By applying the kicked rotor sequence at a particular time we can greatly reduce the contribution of the trapezoid loop to the interferometer signal while preserving the contribution due to the “figure-8” loop. When the degeneracy is present, the interferometer is sensitive to both rotation and linear acceleration. When the degeneracy is lifted the interferometer is insensitive to linear acceleration, but still sensitive to rotation. The suppression of non-reciprocal loops in an atom interferometer is valuable for rotation sensing [1].

[1] T. L. Gustavson *et al.*, Phys. Rev. Lett. **78**, 2046 (1997); S. Wu *et al.*, Phys. Rev. Lett. **99**, 173201 (2007).

<sup>1</sup>Supported by DARPA gBECi, Draper lab.

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Date submitted: 02 Feb 2008

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