

Abstract Submitted
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Rotation Sensing with Trapped Ions¹ ADAM WEST, RANDY PUTNAM, WES CAMPBELL, PAUL HAMILTON, UCLA — State-of-the-art rotation sensing uses Sagnac interferometers where the rotation-induced phase scales with the angular momentum and the integration time. Using trapped ions affords enhancement of both of these quantities; massive particles provide large momentum and trapped ions in particular permit longer coherence times than with cold atoms. We have built a new apparatus to realize a Sagnac interferometer using a single ^{138}Ba ion [1]. We will extend the recently-developed technique of spin-dependent kicks (SDKs) [2] to entangle the ion's motion with the internal state defined by a pair of Zeeman sublevels. We anticipate rotation sensing precision competitive with other matter-wave interferometers. Implementation of SDKs with Zeeman levels in ^{138}Ba may also provide a versatile technique of achieving large momentum transfer that could be broadly applicable to matter-wave interferometry.

References

- [1] W. C. Campbell and P. Hamilton, J. Phys. B 50, 064002 (2017)
- [2] J. Mizrahi et al., Phys. Rev. Lett. 110, 203001 (2013)

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