Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

A Centrifuge Decelerator: Slowing down Continuous Beams of Polar Molecules by an Inertial Force SOTIR CHERVENKOV, XING WU, JOSEF BAYERL, ANDREAS ROHLFES, MARTIN ZEPPENFELD, GERHARD REMPE, Max Planck Institute of Quantum Optics, 85748 Garching, Germany — We present the concept of and show compelling experimental results from a novel and versatile decelerator for continuous beams of neutral polar molecules, which employs the centrifugal potential in a rotating frame. A beam of polar molecules is injected at the periphery and electrically guided [1] to the center of the rotating frame along a spiral-shaped electrostatic quadrupole guide. Thus the molecules climb up the centrifugal potential hill and get decelerated as they propagate. In proof-of-principle experiments we demonstrate the deceleration of continuous beams of neutral CF_3H, CH_3F, and CF_3CCH from a liquid-nitrogen cooled effusive source, yielding continuous output intensities exceeding $10^8\,\mathrm{molecules\,mm^{-2}\,s^{-1}}$ with velocities below $20\,\mathrm{m\,s^{-1}}$.

[1] S.A. Rangwala et al., Phys. Rev. A **67**, 043406 (2003)

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Date submitted: 25 Jan 2013 Electronic form version 1.4