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Realizing a High Number of Trapped Hydroxyl Radicals[1]
DAVE REENS, ALEXANDER AEPPLI, HAO WU, PIOTR WCISLO, ANNA MCAULIFFE, University of Colorado Boulder, JUN YE, University of Colorado Boulder/NIST — Ultracold molecules provide a fascinating opportunity to study fundamental physical processes at low energy. We describe recent experimental progress in cooling and trapping hydroxyl radicals(OH). Our apparatus cools OH through supersonic expansion, slows the molecular beam with a Stark decelerator, and traps the cold molecules with a magnetic trap. Building upon our previous work of cooling our molecular beam skimmer, we have implemented a cryogenic hexapole to focus the beam of expanding molecules, dramatically increasing the density by reducing clogging due to the carrier gas. New operational configurations for our Stark decelerator expand its phase space acceptance, increasing the total number of trapped molecules by a significant factor. Finally, a new magnetic trap significantly extends trapping lifetimes. These experimental improvements allow us to more precisely study collisional channels and reach even lower temperatures.

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Alexander Aeppli
Carleton College

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