Abstract Submitted
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Optimisation of a cryogenic buffer-gas cell for maximum molecule flux MANUEL KOLLER, FLORIAN JUNG, JINDARATSAMEE PHROMPAO, THOMAS GANTNER, ISABEL M. RABEY, MARTIN ZEPPENFELD, GERHARD REMPE, Max-Planck-Institute of Quantum Optics — Cold polyatomic molecules provide fascinating research possibilities in physics and chemistry. The workhorse for producing cold molecules is buffer-gas cooling. Here, we present a comprehensive theoretical and experimental study of molecule flux from a buffer-gas cell, operating in the effusive regime. Technical details of improvements to the cell design and temperature are shown. In addition, an investigation into both molecule-molecule boosting and helium boosting effects is also presented. By decreasing the cell length [1], reducing boosting into the cell and improving the temperature of our system, we have increased our signal by more than a factor two. In combination with our centrifuge decelerator, these molecule fluxes are now sufficient to study cold collisions between trapped polyatomic molecules. [1] Gantner et al., arXiv:2001.07759

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