

Abstract Submitted
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Electrically guided continuous supersonic beams of polar molecules from a cryogenic buffer-gas source XING WU, CHRISTIAN SOMMER, SOTIR CHERVENKOV, ANDREAS ROHLFES, MARTIN ZEPPENFELD, LAURENS VAN BUUREN, GERHARD REMPE, Max-Planck-Institut für Quantenoptik — In order to obtain dense samples of internally and translationally cold polar molecules, we use the method of buffer-gas cooling [1], combined with supersonic expansion. We have demonstrated that when the cryogenic buffer-gas cell is operated in a supersonic regime, molecular fluxes are hydrodynamically enhanced by up to two orders of magnitude. Meanwhile, the translational velocity profile of the output molecular beam is cooled to beyond Mach number 6 via supersonic expansion. Due to the cryogenic cell temperature, the forward velocity of the supersonic molecular beam is below 190 m/s. The low-field-seeking molecules in the so-produced continuous supersonic beam are selected via quadrupole electric guiding [2] and transferred to further experiments. Such high-flux guided continuous supersonic beams from a cryogenic reservoir provide a promising source of polar molecules amenable to deceleration and further cooling.

[1] L.D. van Buuren *et al.*, Phys. Rev. Lett. **102**, 033001 (2009)

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

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