Abstract Submitted
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Trapping of Stark-decelerated neutral molecules STEVEN HOEKSTRA, J.J. GILIJAMSE, S.Y.T. VAN DE MEERAKKER, G. MEIJER, Fritz-Haber-Insitut der Max-Planck Gesellschaft, Berlin, Germany — Stark-decelerated and trapped molecules can be used for cold collision studies, the measurement of metastable lifetimes and high resolution spectroscopy. We have trapped OH, OD, NH and CO molecules an electrostatic trap, at typical temperatures of ~ 50 mK and densities of $\sim 10^7$ cm^{-3}. The trapping time is typically a few seconds, limited by excitation due to room-temperature blackbody radiation. The deceleration and trapping of NH molecules will be discussed in detail. NH molecules in the long-lived metastable $a^1\Delta(v = 0, J = 2)$ state are ideally suited for Stark deceleration experiments because of their relatively large Stark shift and low mass. Following the deceleration and trapping, the metastable NH molecules are detected by the excitation of a spin-forbidden transition, resulting in spontaneous decay to the electronic ground state ($X^3\Sigma^-$). The electronic ground state has a negligible Stark shift, but can be trapped magnetically. First experiments towards the accumulation of ground state NH molecules in a magnetic trap will be presented.
S.Hoekstra et al, Phys. Rev. Lett. 98 133001 (2007)
S.Hoekstra et al, Phys. Rev. A 76 063408 (2007)

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