ALTERNATE GRADIENT DECELERATION OF LARGE MOLECULES

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Over the last years fascinating progress has been made in the spectroscopy of large (bio-)molecules, e.g. the *building blocks of life*. Meanwhile, our group has been developing methods to decelerate and cool neutral, polar molecules using time varying electric fields. In order to extend these techniques to the deceleration of large or heavy molecules, which have practically only high-field seeking states, or molecules in their absolute ground state, Alternate Gradient focusing must be applied. We showed that this technique can be used to focus and decelerate small molecules in high-field seeking states.[a]

We have set up a modular Alternate Gradient deceleration experiment, which allows to slow polar molecules in both low- and high-field seeking states. Using this setup we have successfully decelerated benzonitrile (C_7H_5N) and OH in different quantum states. The time-of-flight profiles of the molecules from the pulsed nozzle to the laser detection zone is quantum-state-selectively measured using laser-induced fluorescence after excitation with a narrow linewidth ring-dye-laser.

We will present the results on the focusing and deceleration of benzonitrile using an Alternate Gradient decelerator which currently consists of 27 deceleration stages (one module). We will discuss the prospects of decelerating large molecules further using an extended setup of two or three modules (54 or 81 stages) and the possibilities to stop and eventually trap them.

[a] H. L. Bethlem, M. Tarbutt, J. Küpper, D. Carty, K. Wohlfart, E. Hinds, and G. Meijer, *J. Phys. B* **39**, R 263 (2006)