DECELERATION AND TRAPPING OF HEAVY DIATOMIC MOLECULES FOR PRECISION MEASUREMENTS

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We are setting up a novel type of Stark-decelerator optimized for the deceleration and trapping of heavy diatomic molecules. Aim of these experiments is to prepare a trapped sample of ultracold molecules for precision studies of fundamental symmetries. The decelerator uses ring-shaped electrodes to create a moving trapping potential, a prototype of which has been shown to work for CO molecules[a]. Molecules can be decelerated and trapped in the weak-field seeking part of excited rotational states. The alkaline-earth monohalide molecules (currently we focus on the SrF molecule) are prime candidates for next generation parity violation and electron-EDM studies[b]. We plan to combine the Stark deceleration with molecular laser cooling to create a trapped sample of molecules at a final temperature of $\sim 200\ \mu$K.

[a] A. Osterwalder, S. A. Meek, G. Hammer, H. Haak and G. Meijer *Phys. Rev. A* **81** (51401), 2010.
[b] T. A. Isaev, S. Hoekstra, R. Berger *Phys. Rev. A* **82** (52521), 2010