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Towards Velocity Map Imaging from an Ion Trap[1] ELIZABETH WEST, GRANT MITTS, PRATEEK PURI, ERIC HUDSON, University of California, Los Angeles — Velocity map imaging (VMI) is a versatile tool for studying molecular structure and chemical reaction dynamics by mapping the kinetic energy distributions of charged particles onto position space. In standard ion VMI, experiments (e.g. gas-phase collisions with a reaction partner) are performed on initially neutral species. The species are then ionized in the presence of uniform static electric fields which accelerate them towards an imaging detector. Starting with neutrals provides immunity to fields in the VMI acceleration region during the initial experiment. However, the ability to expand the technique to trapped cations would open up new realms of interesting chemistry and bring to bear the many well established advantages of ion traps, including long interaction times, single-particle addressability, and the possibility of laser and sympathetic cooling to the ultracold regime. We describe progress towards realizing a new type of VMI apparatus, in which the species of interest are initially ionic. These ions are trapped in a linear quadrupole trap before being ejected towards the detector by carefully controlled high-voltage pulses applied to the trap rods.

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