$^{+}$ **mixture in an ion-atom hybrid trap**

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Cold interaction studies in K-Ca JYOTHI SARALADEVI, KISRA EGODAPITIYA[1], KENNETH BROWN, Duke University — Laser cooled and trapped ion-atom mixtures enable the study of cold collisions including elastic collisions, charge exchange interactions and creation of molecular ions. To facilitate these studies, we have developed an apparatus incorporating a spatially overlapped atom trap (magneto optical trap, MOT) and an ion trap (a linear Paul trap). Our ion- atom hybrid apparatus is integrated with a high resolution time of flight mass spectrometer for the identification of the reaction products. We present our initial experimental results on interactions between cold potassium (K) atoms and calcium (Ca^{+}) ions and compare with the theoretical predictions. The prospects for rotational cooling of CaH^{+} molecular ions by interaction with laser cooled potassium atoms will be discussed.

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