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Generation of Cold Molecular Beams of CaF and BaF ERIC VYSKOCIL, SUSUMU KUMA, TAKAMASA MOMOSE, University of British Columbia — The field of ultracold molecules continues to generate a large amount of interest with many applications. Significant enhancement of the electric dipole moment of the electron is expected for some molecular systems such as YbF, PbO, and BaF [1]. Here, we report a generation of cold molecular beam of $^{40}\text{Ca}^{19}\text{F}$ and $^{138}\text{Ba}^{19}\text{F}$ using a hexapole velocity filter. The electrostatic velocity filter with a quadrupole guide has been proposed as a source of cold polar molecules [2]. Using an electrostatic hexapole guide combined with laser ablation, we have generated a cold molecular beam of CaF with a longitudinal temperature in the 100 mK range. Target molecules produced by laser ablation of CaF_2 (BaF_2) are cooled by cold pulsed Helium gas and introduced into the hexapole, which filters low field seeking molecules with low longitudinal velocity. The conditions of the cold pulsed Helium beam and hexapole are varied to optimize the mass signal of cold molecules. Further cooling schemes down to the μK range will also be discussed. [1] E. A. Hinds, Phys. Scripta, T70, 34 (1997). [2] S. A. Rangwala et al. Phys. Rev. A67, 043406 (2003).

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