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Progress towards a MOT for CaF BOERGE HEMMERLING, EUNMI CHAE, GARRETT K. DRAYNA, NICHOLAS R. HUTZLER, AAKASH RAVI, Harvard University, WOLFGANG KETTERLE, Massachusetts Institute of Technology, ALEJANDRA COLLOPY, MATTHEW HUMMON, BENJAMIN STUHL, MARK YEO, JUN YE, JILA, University of Colorado, JOHN M. DOYLE, Harvard University — We report on progress toward a magneto-optical trap (MOT) of CaF molecules. While following the same essential approach as that used to laser cool SrF and YO [1,2], we are developing direct MOT loading from a 2-stage cryogenic buffer gas beam (CBGB) source [3]. This source has a lower forward velocity compared to the hydrodynamic CBGB source that was employed with SrF and YO. We report the creation of the first CBGB loaded MOTs, without the use of a Zeeman slower, for Ho, Yb, Er, and Tm [4]. The slower initial beam velocity of the two-stage CBGB should aid in MOT loading of molecules, which have inherently low MOT capture velocities ($\sim 10\,\mathrm{m/s}$). We plan to implement an AC-MOT for CaF, and report on theoretical studies and experimental progress toward that goal.

[1] E. F. Shuman, et al., Nature 467, 820 (2010)
[2] M. T. Hummon, et al., Phys. Rev. Lett. 110, 143001 (2013)
[3] N. R. Hutzler, et al., Chem. Rev. 112, 4803 (2012)
[4] B. Hemmerling, et al., arXiv:1310.3239

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