

Abstract Submitted  
for the DAMOP20 Meeting of  
The American Physical Society

**Towards Optical Dipole Trapping of SrF Molecules with High Capture Efficiency**<sup>1</sup> THOMAS LANGIN, VARUN JORAPUR, YUQI ZHU, QIAN WANG, DAVID DEMILLE, Yale University — The ability to directly cool and trap molecules in conservative traps, such as optical dipole traps (ODT) and magnetic quadrupole traps, has been demonstrated recently for both CaF and SrF molecules. This is a critical step towards further cooling and compression of molecules, as is needed to study molecular collisions in the quantum regime and to potentially reach quantum degeneracy. Currently, only  $N \sim 10^4$  molecules can be collected in magneto-optical traps (MOTs) of  $\sigma \sim 1$  mm in size, which are the starting point for these experiments. Thus, capturing as large a fraction of these molecules as possible into an ODT is critical. As has been demonstrated in CaF (Cheuk et al., PRL 121, 083201 (2018)),  $\Lambda$ -enhanced gray molasses can cool molecules within an ODT, enhancing loading fractions tenfold compared to ‘un-enhanced’ gray molasses cooling. This poster will report on several other methods aimed at efficient loading of SrF molecules into an ODT.

<sup>1</sup>The authors acknowledge support from ONR and the Yale Quantum Institute.

Thomas Langin  
Yale University

Date submitted: 31 Jan 2020

Electronic form version 1.4