Abstract Submitted
for the DAMOP16 Meeting of
The American Physical Society

Optical Bichromatic Force on CaF Molecules[1] L. ALDRIDGE, S.E. GALICA, D. SHEETS, E.E. EYLER, University of Connecticut — The optical bichromatic force (BCF) is a coherent optical force which can be much stronger than saturated radiative forces. BCF has been experimentally demonstrated in atomic systems and has recently drawn attention as an option for deflecting or decelerating neutral molecular beams. We have devised a realistic numerical model for calcium monofluoride (CaF), including the full 16-level hyperfine structure of two rovibrational states and magnetic-field destabilization of coherent dark states. We show that BCF illumination of this system produces a force two orders of magnitude stronger than that achieved by radiative forces, and we find that the required parameters are experimentally realistic and are robust against small variations. A simplified simulation scheme that saves computational time at little expense to accuracy is also presented. Experimental tests on the $B \leftrightarrow X$ transition in CaF are underway in our laboratory, starting with transverse deflection of a supersonic molecular beam. In collaboration with the group of John Doyle, we are also looking into BCF on the triatomic SrOH molecule.

[1]Supported by the National Science Foundation and the University of Connecticut

Leland Aldridge
University of Connecticut

Date submitted: 29 Jan 2016 Electronic form version 1.4