Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Rotationally inelastic collisions of He and Ar with NaK: Theory and Experiment[1] K. RICHTER, T.J. PRICE, J. JONES, C. FAUST, A.P. HICKMAN, J. HUENNEKENS, Lehigh University, R.F. MALENDA, Moravian College, A.J. ROSS, H. HARKER, P. CROZET, ILM Université Lyon 1, R.C. FORREY, Penn State Berks — Rotationally inelastic collisions of NaK $A\,^1\Sigma^+$ molecules with He and Ar are studied. At Lehigh, we use pump-probe polarization labeling (PL) and laser-induced fluorescence (LIF) spectroscopy. At Lyon, Fourier transform (FT)-resolved LIF spectra are recorded. In both cases, the pump laser excites a particular ro-vibrational level $A\,^1\Sigma^+(v, J)$. We observe strong direct lines corresponding to transitions from the (v, J) level pumped, and weak satellite lines corresponding to transitions from collisionally-populated levels $(v, J' = J + \Delta J)$. The ratios of satellite to direct line intensities in LIF and PL yield population and orientation transfer information. A strong propensity for $\Delta J =$ even transitions is observed for both He and Ar perturbers. In the FT fluorescence experiment we also observe v-changing collisions. *Ab initio* potential surface and scattering calculations are underway for collisions in the $A\,^1\Sigma^+$ and $X\,^1\Sigma^+$ states. For He-NaK we have calculated potential surfaces using GAMESS and carried out coupled channel scattering calculations of transfer of population, orientation, and alignment. Calculations of v-changing collision cross sections are also in progress.

[1]Work supported by NSF, XSEDE and CNRS (PICS).

Kara Richter
Lehigh University

Date submitted: 30 Jan 2015 Electronic form version 1.4