Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Quantifying rovibrational control in a molecular ion[1] SRUTHI VENKATARAMANABABU, PATRICK STOLLENWERK, IVAN ANTONOV, BRIAN ODOM, Northwestern University — The ability to prepare a sample of molecular ions in a known quantum state is useful for studies of state-dependent chemistry, precision measurements, blackbody thermometry among other applications. To take advantage of the long storage times of ion traps, there is a need to sustain control over the prepared states for a long duration. Using the technique of optical pumping with a spectrally pulse-shaped laser we have achieved a non-equilibrium rotational population distribution centered anywhere from N=0 to N=70 with δN $\sim$3 in the ground vibronic state of SiO^+. Furthermore, this technique allows us to sustain the control over an extended period. The fractional population in the target states and the timescale required to achieve state preparation quantify the success of the technique. In this talk, I will discuss our experiments and results to determine the timescale required for pumping into the ground rovibronic state in SiO^+ and to determine the fraction of population in the prepared distribution.

[1]National Science Foundation

Sruthi Venkatarmanababu
Northwestern University

Date submitted: 31 Jan 2020 Electronic form version 1.4