

Abstract Submitted
for the DAMOP17 Meeting of
The American Physical Society

Rovibronic spectroscopy of sympathetically cooled $^{40}\text{CaH}^+$
AARON CALVIN, SMITHA JANARDAN, JOHN CONDOLUCI, RENE RUGANGO, School of Chemistry and Biochemistry, Georgia Institute of Technology, ERIC PRETZSCH, School of Physics, Georgia Institute of Technology, GANG SHU, School of Chemistry and Biochemistry, Georgia Institute of Technology, KENNETH BROWN, School of Chemistry and Biochemistry; Physics; Computational Science and Engineering, Georgia Institute of Technology — CaH^+ is an astrophysically relevant molecule with proposed applications in fundamental physics. We use CaH^+ co-trapped with Doppler cooled Ca^+ to perform spectroscopy using two photon photodissociation with a frequency doubled mode locked Ti:Sapph laser. This method was used to measure the vibronic spectrum of the $1^1\Sigma, v = 0 \rightarrow 2^1\Sigma, v' = 0, 1, 2, 3$ transition¹. Measurements of the same transition with the deuterated isotopologue confirmed the assignment and showed a 687 cm^{-1} mismatch with theory². The broad bandwidth of the pulsed Ti:sapph provided an advantage for the initial search for transitions, but did not allow spectral resolution of rotational transitions. Here, we use femtosecond pulse shaping to spectrally narrow the linewidth of the femtosecond laser. This allowed us to obtain rotational constants for the $2^1\Sigma, v' = 0, 1, 2, 3$ and $1^1\Sigma, v = 0$ states³.

¹R. Rugango, *et al.* **Chem. Phys. Chem.** 17, 3764-3768 (2016)

²J. Condoluci, *et al.* article in preparation

³A. Calvin, *et al.* article in preparation

Aaron Calvin
School of Chemistry and Biochemistry, Georgia Institute of Technology

Date submitted: 27 Jan 2017

Electronic form version 1.4