Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Characterization of Trapped Ion Slow Light JOHN HANNEGAN, JAMES SIVERNS, Joint Quantum Institute, QUDSIA QURAISHI, Army Research Laboratory — Building future hybrid quantum networks will require interfacing different types of quantum systems. We present our work demonstrating slow light in a rubidium vapor using photons from a single trapped barium ion [1]. Using a simplified single beam path approach [2] we obtain tunable single photon delays. Using quantum frequency conversion we bridge the spectral gap between barium ion photons and neutral rubidium [3]. We discuss the signal-to-noise, tunability of conversion, vapor cell coating, and current limitations. This work constitutes the first demonstration of an interaction between photons emitted from a single trapped ion and neutral atoms, laying the groundwork for future ion-neutral hybrid photonic interactions. [1] J. D. Siverns, J. Hannegan and Q. Quraishi, arXiv:1808.07928 (2018). [2] R. M. Camacho, M. V. Pack and J. C. Howell, Phys. Rev. A, 73:063812 (2006). [3] J. D. Siverns, J. Hannegan and Q. Quraishi, Phys. Rev. Applied 11, 014044 (2019).

John Hannegan
University of Maryland, College Park

Date submitted: 01 Feb 2019 Electronic form version 1.4