Abstract Submitted
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Trapped Ion Slow Light JAMES SIVERNS, JOHN HANNEGAN, Joint Quantum Institute, University of Maryland, QUDSIA QURAISHI, Army Research Laboratory — The practical implementation of quantum networks will likely interface different types of quantum systems. Work on photonically-linked quantum systems has typically focused on those with the same photon emission wavelength. Trapped ions and neutral atoms both possess compelling properties as nodes and memories in a quantum network, but have not been photonically linked due to vastly different operating wavelengths. In this talk, I will preset the first interaction between neutral atoms and photons emitted from a single trapped ion [1]. Using slow light in rubidium vapor [2], we delay photons from a trapped barium ion by up to 13.5(5) ns. To overcome the large frequency difference between the two systems, quantum frequency conversion is performed [3]. The delay is tunable and preserves the temporal profile of the photons. This result showcases a hybrid photonic interface usable as a synchronization tool - a critical component in any future large-scale quantum network. [1] J. D. Siverns et al., arXiv:1808.07928 (2018) [2] R. M. Camacho et al., Phys. Rev. A, 73:063812 (2006). [3] J. D. Siverns et al., Phys. Rev. Applied 11, 014044 (2019).

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