

Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

Achieving Hong-Ou-Mandel Interference Between a trapped ion and Rydberg ensemble ALEXANDER CRADDOCK, JOHN HANNEGAN, DALIA ORNELAS, JAMES SIVERNS, A.J. HACHTEL, J.V. PORTO, STEVE ROLSTON, University of Maryland, College Park, QUDSIA QURAIISHI, University of Maryland, College Park Army Research Laboratory, Adelphi — Future efforts to build quantum networks are likely to rely on the ability to interface and entangle disparate quantum systems. As a proof-of-concept, we demonstrate near perfect Hong-Ou-Mandel interference between photons generated by a barium ion and a rubidium Rydberg ensemble. To spectrally match the ion photons optical frequency to the that of the neutral atom system, we use quantum frequency conversion [1] to convert the barium ions photon to a wavelength matching the ensemble-produced photon. Our work forms the building blocks of a photonically linked hybrid ion-Rydberg ensemble quantum network. [1] J D. Siverns, J. Hannegan, and Q. Quraishi, Phys. Rev. Applied 11, 014044 (2019).

Alexander Craddock
University of Maryland, College Park

Date submitted: 31 Jan 2019

Electronic form version 1.4