Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Ion-Ion Entanglement for Quantum Networking at the Air Force Research Laboratory[1] PAIGE HAAS, Technergetics, LLC., HARRIS RUTBECK-GOLDMAN, DAVID HUCUL, United States Air Force Research Laboratory, Rome, NY, ZACHARY SMITH, Griffiss Institute, MICHAEL MACALIK, Booz Allen Hamilton, JAMES WILLIAMS, United States Air Force Research Laboratory, Rome, NY, JUSTIN PHILLIPS, Northeastern University, CARSON WOODFORD, Griffiss Institute, BOYAN TABAKOV, KATHY-ANNE BRICKMAN-SODERBERG, United States Air Force Research Laboratory, Rome, NY — Quantum networking is a vital area of research that may provide distributed quantum computing capabilities and may ultimately offer tamper-proof and tamper-evident communications. One method to achieve this is to entangle trapped ions in distant network nodes. Ytterbium 171 is a near-ideal candidate for memory due to its internal properties that allow for long-lived quantum bit states. The first step towards a viable network is to reliably entangle two ions trapped in separate vacuum chambers. This poster will focus on the progress to date to entangle two remote ions. In addition, we will discuss the longer-term quantum networking goals towards compact network nodes and distributing entanglement across a multi-node network.

[1]This research was performed while the author was employed by Technergetics, LLC at the Information Directorate of the United States Air Force Research Laboratory.

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Date submitted: 29 Jan 2020 Electronic form version 1.4