Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

$^{138}Ba^{+}$ and $^{171}Yb^{+}$ Dual Species Modular Quantum Network[1]
ALLISON CARTER, MARTIN LICHTMAN, KSENIA SOSNOVA, CLAYTON CROCKER, SOPHIA SCARANO, CHRISTOPHER MONROE, Joint Quantum Institute and University of Maryland — Trapped ions are a leading platform for quantum computing, with long coherence times and high fidelity operations. To address the challenge of scaling such systems, we utilize a modular architecture consisting of separate traps with photonic links for remote entanglement. In our experiment, each of two traps contain a $^{171}Yb^{+}$ memory qubit and a $^{138}Ba^{+}$ communication qubit. We report progress in the development of this system, including improvements in light collection, higher purity of the single photons generated for remote entanglement, increased fidelity in our ion-photon entanglement, and the construction of the second module. The outlook toward a three trap system and entanglement protocols for that system are discussed.

[1]This work is supported by the ARO with funding from the IARPA LogiQ program, the AFOSR, the ARO MURI on Modular Quantum Circuits, the AFOSR MURI on Quantum Transduction, the AFOSR MURI on Interactive Quantum Computation and Communication Protocols, and the ARL Center for Distributed Quantum Information.

Allison Carter
Joint Quantum Institute and University of Maryland

Date submitted: 01 Feb 2019 Electronic form version 1.4