Contribution ID: **211** Type: **Poster**

Quantum frequency conversion of Ba-138 single photons for long-distance quantum networking

Tuesday, 26 September 2023 19:30 (2 hours)

While prime candidates as nodes in long-distance quantum networks, trapped ions do not typically emit photons at telecommunications wavelengths. Quantum frequency conversion (QFC) allows trapped ions to connect with other nodes of a long-distance quantum network by frequency downconverting ion-emitted visible and near-IR photons to telecommunications wavelengths [1-3]. Polarization-preserving QFC has previously been used to convert near-IR single photons from a trapped Ca-40 ion to the telecommunications O-band [4]. Here, we report our progress towards a two-stage, polarization-preserving QFC setup to convert 493-nm single photons from a trapped Ba-138 ion to the telecom O-band. We separately transmit converted photons over 11 km of in-ground optical fiber.

[1] Craddock, A. N. et al.. Phys. Rev. Lett. 123, 213601 (2019).
[2] Krutyanskiy, V. et al.. npj Quantum Information 5, 72 (2019).
[3] Hannegan, J., Siverns, J.D., and Quraishi, Q. Phys. Rev. A 106, 042441 (2022).
[4] Bock, M., Eich, P., Kucera, S. et al. Nat Commun 9, 1998 (2018).

Primary author: KWAN, Michael (University of Maryland, College Park)

Co-authors: Dr HANNEGAN, John; Dr SAHA, Uday; Dr SIVERNS, James D.; Dr QURAISHI, Qudsia; Dr WAKS, Edo

Presenter: KWAN, Michael (University of Maryland, College Park)

Session Classification: Tuesday Poster