Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **522** Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

(G*) Towards a Radioactive Barium Atomic Source for an Open-access Trapped Ion Quantum Information Processor

Wednesday 9 June 2021 17:07 (4 minutes)

Trapped ions for quantum information processing has been an area of intense study in the past twenty years due to the extraordinarily high-fidelity operations that have been achieved experimentally, and the recent microfabricated traps that offer a potential path to scaling the technology. Specifically, the Barium-133 trapped ion has been shown to have some of the highest fidelity operations of any qubit. Barium-133 is readily available as a salt, which can be ablated by a low pulse-energy (< 1 mJ) 532 nm nanosecond laser. We present progress towards a method for preparing and testing barium salt atomic sources that will be used for loading different barium isotopes. The impact of different heat treatments applied to the ablation targets are investigated and the efficiency and longevity of the source are estimated by collecting barium neutral atom fluorescence from the ablation plume after nanosecond pulses. Furthermore, a mechanical design is presented, which will produce a highly collimated atomic beam, reducing contamination on current chip-trap architectures.

Author: GREENBERG, Noah (University of Waterloo)

Co-authors: Mr WHITE, Brendan (University of Waterloo); Mr VIDENOV, Nikolay (University of Waterloo); Mr RADEMACHER, Richard (University of Waterloo); Mr BINAI-MOTLAGH , Ali (University of Waterloo); Dr DAY, Matthew (University of Waterloo); Prof. ISLAM, Rajibul (University of Waterloo); Prof. SENKO, Crystal (University of Waterloo)

Presenter: GREENBERG, Noah (University of Waterloo)

Session Classification: W4-1 Quantum Information: Experiments (DAMOPC) / Information quantique: expériences (DPAMPC)

Track Classification: Atomic, Molecular and Optical Physics, Canada / Physique atomique, moléculaire et photonique, Canada (DAMOPC-DPAMPC)