Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Metastable qubits in trapped Calcium-43 ions ISAM MOORE, JEREMY METZNER, ALEXANDER QUINN, DAVID WINELAND, DAVID ALLCOCK, University of Oregon — While all of the basic primitives required for universal
quantum computing (QC) have been demonstrated in trapped-ion qubits with high fidelity, it is currently not possible to simultaneously realize the highest achieved fidelities in a single ion species. This can be a serious impediment to the development of practical quantum computers. However, there are possibilities for achieving high-fidelity and full functionality in a single species with the use of multiple internallevels: augmenting existing species with new functionality. Specifically, essential dual-species capabilities can be developed in the Calcium-43+ ion through novel encoding schemes in metastable states, functions on demand (e.g. storage, coupling to motion, cooling, and state preparation and measurement). I will present simulation results and progress towards experimental implementation of high-fidelity preparation and readout procedures in metastable states of Calcium-43+.

Isam Moore
University of Oregon