Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

**The $^{133}Ba^{+}$ Ion Platform**[1] Z. S. SMITH, United States Air Force Research Lab (AFRL); Griffiss Institute, D. HUCUL, AFRL, W. T. GRANT, AFRL; SUNY Polytechnic Institute, P. HAAS, AFRL; Technergetics, H. J. RUTBECK-GOLDMAN, B. TABAKOV, J. A. WILLIAMS, AFRL, C. F. WOODFORD, AFRL; Griffiss Institute, K.-A. BRICKMAN-SODERBERG, AFRL — Laser cooled and trapped atomic ions are well isolated quantum systems, making them promising platforms for quantum sensing, information processing, and networking. Different ion species bring different advantages: hyperfine qubits in species with nuclear spin $I = 1/2$ have long coherence times together with robust qubit manipulation. Other ion species have electronic excited states with a long lifetime, allowing shelving schemes for high-fidelity qubit state measurement. $^{133}Ba^{+}$ is the only ion species to combine these properties, making it an ideal candidate for trapped ion quantum information science. Additionally, all required laser wavelengths are in the visible, eliminating the need for difficult-to obtain power at ultraviolet wavelengths. We will discuss recent work at AFRL with photoionization, laser cooling, and trapping of this isotope of barium, and discuss milestone experiments including background-free state readout and other future work. Distribution A. Approved for public release Case Number 88ABW-2020-0253

[1]This research was performed while the author held a postdoc at the Information Directorate of the United States Air Force Research Laboratory.

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Date submitted: 04 May 2020 Electronic form version 1.4