

Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

An Experimental Apparatus for Generation and Isolation of Highly Charged Ions with Low Ionization Thresholds AUNG NAING, Univ of Delaware NIST, DAVID LA MANTIA, Clemson University NIST, JOSEPH TAN, National Institute of Standards and Technology — Access to highly charged ions (HCIs) for various applications has been somewhat limited by the need to use expensive, dedicated facilities such as electron beam ion traps (EBITs). The use of high-field permanent magnets has made it possible to construct smaller EBITs and other ion traps. Such low-maintenance systems will be useful in applications such as the development of x-ray transition-edge-sensors [1]. Other potential uses include creating certain HCIs, such as Pr^{9+} and Nd^{10+} , proposed for the development of next-generation atomic clocks, or the search for variation in the fine-structure constant [2]. At NIST, a miniaturized EBIT using NdFeB magnets has been built as a source of ions with relatively low ionization thresholds (<1000 eV). To isolate ions of interest, we are building a permanent magnet Penning trap with a trap center magnetic field of ≈ 0.75 T. Preliminary ion extraction results with noble gas HCIs are presented. Measurements of the lifetimes in metastable states of Sn-like Pr^{9+} are planned after the laser-ablation-based metal loading system becomes operational. The mobility of the apparatus would facilitate its use in various experiments. [1] P. Szypryt, et al., Rev. Sci. In. 90, 123107 (2019), [2] M. Safronova, et al., PRL 113, 030801 (2014)

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Date submitted: 31 Jan 2020

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