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A rare-earth-magnet ion trap for confining low-Z, bare nuclei SAMUEL M. BREWER[1], UMD College Park, JOSEPH N. TAN, National Institute of Standards and Technology, Gaithersburg, MD 20899 — Simplifications in the theory for Rydberg states of hydrogenlike ions allow a substantial improvement in the accuracy of predicted levels, which can yield information on the values of fundamental constants and test theory if they can be compared with precision frequency measurements.[1] We consider the trapping of bare nuclei (fully-stripped) to be used in making Rydberg states of one-electron ions with atomic number $1< Z < 11$. Numerical simulation is used here to study ion confinement in a compact, Penning-style ion trap consisting of electrodes integrated with rare-earth permanent magnets, and to model the capture of charge-state-selected ions extracted from an electron beam ion trap (EBIT). An experimental apparatus adapted to the NIST EBIT will also be discussed. Reference: [1] U.D. Jentschura, P.J. Mohr, J.N. Tan, and B.J. Wundt, "Fundamental constants and tests of theory in Rydberg states of hydrogenlike ions," Phys. Rev. Lett. 100, 160404 (2008).

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