

Abstract Submitted
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**Charge Breeding Techniques in an Electron Beam Ion Trap
for High Precision Mass Spectrometry at TITAN**

T.D. MACDONALD, University of British Columbia, TRIUMF, M.C. SIMON, TRIUMF, J.C. BALE, Simon Fraser University, TRIUMF, U. CHOWDHURY, University of Manitoba, TRIUMF, M. EIBACH, Johannes Gutenberg-Universität Mainz, Ruprecht-Karls-Universität Heidelberg, A.T. GALLANT, University of British Columbia, TRIUMF, A. LENNARZ, Westfälische Wilhelms-Universität, TRIUMF, V.V. SIMON, Ruprecht-Karls-Universität Heidelberg, Max Planck Institute, TRIUMF, A. CHAUDHURI, A. GROSSHEIM, A.A. KWIATKOWSKI, B.E. SCHULTZ, TRIUMF, J. DILLING, University of British Columbia, TRIUMF — Penning trap mass spectrometry is the most accurate and precise method available for performing atomic mass measurements. TRIUMF's Ion Trap for Atomic and Nuclear science is currently the only facility to couple its Penning trap to a rare isotope facility and an electron beam ion trap (EBIT). The EBIT is a valuable tool for beam preparation: since the precision scales linearly with the charge state, it takes advantage of the precision gained by using highly charged ions. However, this precision gain is contingent on fast and efficient charge breeding. An optimization algorithm has been developed to identify the optimal conditions for running the EBIT. Taking only the mass number and half-life of the isotope of interest as inputs, the electron beam current density, charge breeding time, charge state, and electron beam energy are all specified to maximize this precision. An overview of the TITAN charge breeding program, and the results of charge breeding simulations will be presented.

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