

Abstract Submitted
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Monte-Carlo simulation and acceptance calculation on NSCL charge breeder electron beam ion trap KRITSADA KITTIMANAPUN, GEORG BOLLEN, ALAIN LAPIERRE, STEFAN SCHWARZ, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, MI 48824, USA — The NSCL charge breeder electron-beam ion trap (NSCL-EBIT) is constructed as the first part of the post acceleration ReA project at the National Superconducting Cyclotron Laboratory (NSCL) to study the key reactions in nuclear astrophysics and Coulomb excitation. The NSCL-EBIT is designed to operate with 6-T maximum magnetic field strength in the trap center and provide high electron beam current density up to 10^4 A/cm² for fast charge breeding. To reach maximum efficiency, acceptance calculations have been done and charge evolution by electron impact ionization based on Monte-Carlo method is implemented. Optimization of electric potential distributions and different magnetic-field configurations are investigated. Acceptance for 0.8 A and 2.5 A electron current are 65% and 85% for an injected ion beam of 10π mm-mrad, respectively, and the breeding time for Ca¹⁵⁺ is approximately 0.7 ms.

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