

Abstract Submitted
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Improving Charging-Breeding Simulations with Space-Charge Effects RYAN BILEK, Department of Physics and Astronomy, Texas A&M University, Cyclotron Institute, Texas A&M University, ANIA KWIATKOWSKI, Department of Physics and Astronomy, Texas A&M M University, Cyclotron Institute, Texas A&M University, RENÉ STEINBRÜGGE, Cyclotron Institute, Texas A&M University — Rare-isotope-beam facilities use Highly Charged Ions (HCI) for accelerators accelerating heavy ions and to improve measurement precision and resolving power of certain experiments. An Electron Beam Ion Trap (EBIT) is able to create HCI through successive electron impact, charge breeding trapped ions into higher charge states. CBSIM was created to calculate successive charge breeding with an EBIT ¹. It was augmented by transferring it into an object-oriented programming language, including additional elements, improving ion-ion collision factors, and exploring the overlap of the electron beam with the ions. The calculation is enhanced with the effects of residual background gas by computing the space charge due to charge breeding. The program assimilates background species, ionizes and charge breeds them alongside the element being studied, and allows them to interact with the desired species through charge exchange, giving fairer overview of realistic charge breeding. Calculations of charge breeding will be shown for realistic experimental conditions. We reexamined the implementation of ionization energies, cross sections, and ion-ion interactions when charge breeding.

¹R. Becker, O. Kester, and T. Stoehlker, Journal of Physics: Conference Series 58, 443 (2007)

Ryan Bilek
Texas A
M Univ

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