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Simulations of the Electron Beam Ion Source (EBIS) at CANREB

Highly charged ions (HCI) up to uranium are produced efficiently at TRIUMF using an electron beam ion source (EBIS). The EBIS is essential to the new CANadian Rare isotope facility with Electron Beam ion source (CANREB) that delivers clean intense HCI to experiments (B. Schultz et al, this meeting). The EBIS has a high injection efficiency for stable and radioactive beams with $6 < E < 14$ keV at a bunch repetition rate up to 100 Hz for use with short-lived species. The 6T field of the superconducting Hemlholtz coil, electron beam density up to 10000 A/cm^2 (e^- currents up to 500 mA; e^- energies up to 15 keV), no plasma wall interactions and excellent high-vacuum offers a significant reduction of contaminants induced by the charge state breeding process. Here we use Trak and IGUN to simulate the physics and e-beam of the CANREB EBIS. Benchmarking Trak results against IGUN simulations forms a robust check on simulation strategies, results, and relevance to beam delivery from the EBIS.

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