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Simulations for a New Electron Gun for the TITAN EBIT

Highly charged ions (HCIs) can increase precision in Penning trap mass measurements significantly, due to their higher charge state. At the TITAN facility at TRIUMF, an electron beam ion trap (EBIT) provides radioactive HCIs for this purpose. To improve the electron beam properties and its control, a new electron gun is under development.

The electron gun within its TITAN EBIT environment was simulated using the TREK package. A new electrode geometry was chosen and optimized to extract up to 5A, 65 keV electron beams. Due to the strong fringe field of the unshielded 6T magnet, options for the passive and active shielding of the gun were explored. During the design process, careful attention was paid to safety and mechanical considerations. Simulations and the status of the new electron gun will be presented.

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