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Investigating beam-induced electron emission from thin wires in PSI proton beams

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The emission of electrons induced by beam interaction with thin targets is a phenomenon used to measure various properties of particle beams. The main processes of electron emission are: secondary emission, delta electron production and thermionic emission. The last one is not desired, because the intensity of thermionic electrons is not directly related to beam density profile. A common technique to suppress thermionic emission employs bias potential on the wire, which allows for recapturing of low energy electrons. This study investigates the effectiveness of the bias voltage method for high-brightness proton beams of the HIPA accelerator. Through experiments and simulations, the study aims to better understand the emission spectra, the suppression of thermionic emission, and the effects of beam fields on electron dynamics.

Footnotes

Paper preparation format

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