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Investigation of IPM profile changes with variations in the applied electric field

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Variations in the applied electric field in the Ionization Profile Monitor (IPM) affects the time of flight for the ionized particles (primarily electrons) which could affect the measured transverse beam profile. In addition, the applied electric field may affect the space charge of the ionized electrons inside the IPM. In this paper, we present an experimental beam study of RHIC IPM profiles, examining the effect of varying applied electric fields. Such a beam study will be helpful to enhance the design of the future IPMs for the Electron-Ion Collider. We analyzed horizontal and vertical profiles of gold and proton beams, comparing measured data with simulations along with the procedure we used for measurement. Potential causes for discrepancies between measured and simulated results are also discussed.

Footnotes

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