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Preliminary study of higher-order mode based scheme for bunch length compression in SRF Electron guns

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Higher-Order Modes (HOMs) in superconducting radiofrequency (SRF) cavities are traditionally considered detrimental to efficient operation. They are often associated with beam instabilities and are actively damped. However, these "harmful"HOMs, if used strategically, can be transformed into a tool for providing extra control over the beam, which can introduce new opportunities that are not easily achievable by conventional SRF cavity-based systems. Particularly, we have investigated the feasibility of boosting ballistic bunch compression using HOMs in SRF gun. The proposed idea will be presented with preliminary simulation results. The 185 MHz SRF gun cavity used for the simulation study was modelled using the ACE3P software suite and further modelling of the compression scheme was performed using the GPT code.

Footnotes

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