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Microbunching instability test for emittance exchange-based photoinjector

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Previous start-to-end simulations of an emittance exchange (EEX)-based photoinjector have demonstrated highly attractive beam properties. The EEX-based photoinjector can provide another interesting opportunity that potentially eliminate the microbunching instability issue. The space-charge and/or CSR-induced amplification occurs during density-to-energy and energy-to-density modulation conversion process. This amplification becomes particularly pronounced when multiple compressors are implemented. In contrast, the proposed EEX-based photoinjector doesn't require additional compression process. Moreover, the initial longitudinal phase space becomes the transverse phase space, resulting in a significant reduction of space-charge and CSR's longitudinal interaction. We present preliminary simulation results of microbunching instability in EEX-based photoinjector.

Footnotes

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