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Optimization of the FAST LINAC for a GREENS FEL Experiment

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The FAST-GREENS FEL experiment is aimed at demonstrating extraction efficiencies of greater than 10%. This is accomplished with a high-power seed laser and an aggressively tapered undulator to compensate for the energy loss in the electron beam. A proof of concept experiment will be conducted at the Fermilab Accelerator Science and Technology Facility (FAST) using an undulator specifically built for this purpose. To support this experiment, the LINAC requires a unique setup that optimizes the longitudinal current distribution while preserving emittance in the presence of CSR and space-charge effects. This paper summarizes the beam dynamics optimization performed in support of TESSA and provides the nominal working point for the FEL experiment.

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Yes

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