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Start to End Beam dynamics optimization for the SHINE accelerator

Tuesday, 9 May 2023 16:30 (2 hours)

Shanghai HIgh repetitioN rate XFEL and Extreme light facility (SHINE) is an x-ray FEL facility based on an 8 GeV CW superconducting linac and 3 FEL undulator lines, with the capability that delivering wide spectral range coherent radiation to multi end stations.

In this paper, we present the detailed dynamics design strategy based on global optimization with start-to-end simulations from the photocathode to the end of the accelerator. In addition, we discuss the impact of Coherent Synchrotron Radiation (CSR) diminishing the peak current of the beam in the second bunch compressors. Through the optimization study, we showed that a 100 pC beam with sub-μm projected emittance and over kilo-Ampere final core current can be attained using a VHF gun and 1.3GHz Tesla cryomodules.

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Footnotes

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