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Optimization of eletron beam brightness in the photoinjector of the European XFEL

Tuesday 3 June 2025 16:00 (2 hours)

Photoinjector performance is a key to accessing to the sub-angstrom operation regime of the European XFEL. Optimization of the photoinjector determines the lowest possible emittance along the long accelerator beamline, thus strongly influencing the lasing performance at a given electron beam energy and undulator settings of the user facility. In this paper, an injector optimization approach is established based on a semi-analytical model. It aims at achieving the maximum achievable brightness of the extracted electron beams from the photocathode, taking into account multiple cathode laser properties and gun operation parameters. The semi-analytical predictions are compared with conventional simulation results for an extended parameter range of the European XFEL injector. The obtained results will be presented and discussed.

Footnotes

Paper preparation format

Region represented

Europe

Funding Agency

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