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A start-to-end optimisation of CLEAR for an inverse Compton scattering experiment, using RF-Track

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

The CERN Linear Electron Accelerator for Research (CLEAR) has been operating since 2017 as a user facility providing beams for various experiments. We created a start-to-end model of the CLEAR setup in RF-Track, aiming to optimise the CLEAR accelerator as a driver for an X-ray source based on inverse-Compton scattering. RF-Track, a CERN-developed particle tracking code, can simulate the generation, acceleration, and tracking of the electron beam from the cathode to the interaction point, across the entire accelerator. Additionally, RF-Track can compute the ICS interaction with an input laser beam, allowing for the first start-to-end optimisation of an ICS source using a single code. The optimisation was aimed to maximise the flux of the outcoming x-rays, while minimising the impact of static and dynamic imperfections. Sensitivity studies were performed, with an estimate of the effect of the jitter on the scattered photon flux.

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Footnotes

I have read and accept the Privacy Policy Statement

Yes

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