



Contribution ID: 2098 Contribution code: SUPC043

Type: Student Poster Presentation

## Beam dynamics research for high-repetition-rate infrared FEL linac

*Sunday, 19 May 2024 14:00 (4 hours)*

Compared to conventional free-electron lasers (FELs), high-repetition-rate FEL has the ability to generate laser pulses at a higher frequency, thereby significantly enhancing the laser's mean power. The high-repetition-rate infrared FEL (IR-FEL) device aims to incorporate optical resonator-based FEL technology, powered by a photocathode RF gun and a superconducting RF accelerator. This paper outlines the design layout and optimization of the primary parameters of the high-repetition-rate IR-FEL device. Beam dynamics simulations of the injector, accelerator, and bunch compressor are performed using the codes ASTRA and CSRTrack. Code Genesis 1.3 is used to simulate the physics in the undulator sections. During the simulation, the collective effects like space charge, coherent synchrotron radiation (CSR), and longitudinal cavity wake field effects are taken into consideration.

### Footnotes

### Funding Agency

### Paper preparation format

Word

### Region represented

Asia

**Primary author:** YANG, Yimin (University of Science and Technology of China)

**Co-author:** FENG, Guangyao (University of Science and Technology of China)

**Presenters:** YANG, Yimin (University of Science and Technology of China); DONG, Shaoxiang (University of Science and Technology of China)

**Session Classification:** Student Poster Session

**Track Classification:** MC2: Photon Sources and Electron Accelerators: MC2.A06 Free Electron Lasers