



Contribution ID: 122 Contribution code: WEBO3

Type: Contributed Oral

## Energy Spread Blow-Up by Intra-Beam Scattering and Micro-Bunching at the SwissFEL Injector

*Wednesday, 24 August 2022 12:00 (25 minutes)*

High-resolution measurements of the uncorrelated energy spread at SwissFEL indicate energy spread levels much larger than predicted by state-of-the-art particle tracking. This contribution presents measurements of the energy spread at the SwissFEL injector as a function of the electron bunch charge, the optics and the longitudinal dispersion of the lattice. The results indicate that both intra-beam scattering and micro-bunching, not covered in the conventional modeling of injectors, cause a blow-up of the energy spread. The work underlines the importance of considering the energy spread in the optimization and design of high-brightness electron beam sources and the need to develop new models to adequately understand and simulate the observed physics effects.

### I have read and accept the Privacy Policy Statement

Yes

**Primary authors:** PRAT, Eduard (Paul Scherrer Institut); CRAIEVICH, Paolo (Paul Scherrer Institut); DI MITRI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.); LUCAS, Thomas (Paul Scherrer Institut); MALYZHENKOV, Alexander (Paul Scherrer Institut); PEROSA, Giovanni (University of Trieste, Elettra Sincrotrone Trieste); REICHE, Sven (Paul Scherrer Institut); FERRARI, Eugenio (Deutsches Elektronen-Synchrotron); DIJKSTAL, Philipp (Paul Scherrer Institut)

**Presenters:** PRAT, Eduard (Paul Scherrer Institut); CRAIEVICH, Paolo (Paul Scherrer Institut); DI MITRI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.); LUCAS, Thomas (Paul Scherrer Institut); MALYZHENKOV, Alexander (Paul Scherrer Institut); PEROSA, Giovanni (University of Trieste, Elettra Sincrotrone Trieste); REICHE, Sven (Paul Scherrer Institut); FERRARI, Eugenio (Deutsches Elektronen-Synchrotron); DIJKSTAL, Philipp (Paul Scherrer Institut)

**Session Classification:** Electron beam dynamics

**Track Classification:** Electron beam dynamics