



Contribution ID: 16

Type: Oral presentation

Autocorrelation measurement of the FEL coherence and pulse length using a magnetic delaying chicane in the undulator beamline

Tuesday 27 October 2020 14:00 (20 minutes)

A delay of the electron beam with respect to the FEL radiation field can be used for auto-correlation measurements since the phase is imprinted both in the radiation field as well as the microbunching. As long as the delay is within the coherence length of the SASE spikes there is interference, resulting in a modulation of the output power, similar to a phase shifter. For longer delays the bunching is overlapped with a different spike, which shows in average no dependence on the delay due to the arbitrary phase relation between the bunching and the radiation of the other spike. Even further delays will separate the radiation field from the electron bunch reducing further the output power of the FEL signal, since the FEL starts from the spontaneous radiation again. Therefore a scan of the delay can give information on both the coherence length and the FEL pulse length with a resolution on the scale of the radiation wavelength. We present simulation examples for SwissFEL that show the validity and feasibility of the method.

Primary authors: REICHE, Sven (Paul Scherrer Institut); PRAT COSTA, Eduard (Paul Scherrer Institut)

Presenter: REICHE, Sven (Paul Scherrer Institut)

Session Classification: Coherence, Profile and Position Measurements

Track Classification: Coherence, profile, and position measurements