



Contribution ID: 149 Contribution code: WEP24

Type: Contributed Poster

Infrared Spectrometer for Microbunching Characterization

Wednesday, 24 August 2022 17:00 (20 minutes)

The presence of microbunching in the FERMI FEL electron beam is a known nuisance that can impact the performance of the FEL. Microbunching is generated by complex dynamics along the machine where there are several amplification sources. The use of a laser heater, at the cost of an increased energy spread, can improve the quality of the electron beam mitigating the modulation due to microbunching. A new diagnostic has been developed to provide more detailed insight into the microbunching properties. This diagnostic is essentially an Infrared Spectrometer that analyzes the spectrum of the Coherent Transition Radiation emitted when the electron beam passes through a metallic screen. The Coherent Transition Radiation replicates in its spectral content the microbunching properties which, in the case of FERMI, is peaked in a range from 1 to 10 μm . A simple design based on a CaF₂ prism has been preferred over the use of diffraction gratings to avoid the superposition of higher diffraction orders. A spherical mirror is employed to improve the signal-to-noise ratio and the resolution of the spectrometer. PbSe and Pyroelectric detectors are used to cover a wavelength range from 0.25 to 10 μm . In this contribution, the design of the instrument together with some preliminary measurements is presented.

I have read and accept the Privacy Policy Statement

Yes

Primary authors: VERONESE, Marco (Elettra-Sincrotrone Trieste S.C.p.A.); ALLARIA, Enrico (Elettra-Sincrotrone Trieste S.C.p.A.); BRYNES, Alexander (Elettra-Sincrotrone Trieste S.C.p.A.); DE NINNO, Giovanni (Elettra-Sincrotrone Trieste S.C.p.A.); DI MITRI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.); FERLANIS, Mario (Elettra-Sincrotrone Trieste S.C.p.A.); GIANNESSI, Luca (Elettra Sincrotrone Trieste and Istituto Nazionale di Fisica Nucleare); PENCO, Giuseppe (Elettra-Sincrotrone Trieste S.C.p.A.); PEROSA, Giovanni (University of Trieste, Elettra Sincrotrone Trieste); ROUSSEL, Eléonore (Laboratoire de Physique des Lasers, Atomes et Molécules); SPEZZANI, Carlo (Elettra-Sincrotrone Trieste S.C.p.A.); SPAMPINATI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.)

Presenters: VERONESE, Marco (Elettra-Sincrotrone Trieste S.C.p.A.); ALLARIA, Enrico (Elettra-Sincrotrone Trieste S.C.p.A.); BRYNES, Alexander (Elettra-Sincrotrone Trieste S.C.p.A.); DE NINNO, Giovanni (Elettra-Sincrotrone Trieste S.C.p.A.); DI MITRI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.); FERLANIS, Mario (Elettra-Sincrotrone Trieste S.C.p.A.); GIANNESSI, Luca (Elettra Sincrotrone Trieste and Istituto Nazionale di Fisica Nucleare); PENCO, Giuseppe (Elettra-Sincrotrone Trieste S.C.p.A.); PEROSA, Giovanni (University of Trieste, Elettra Sincrotrone Trieste); ROUSSEL, Eléonore (Laboratoire de Physique des Lasers, Atomes et Molécules); SPEZZANI, Carlo (Elettra-Sincrotrone Trieste S.C.p.A.); SPAMPINATI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.)

Session Classification: Wednesday posters

Track Classification: Electron diagnostics, timing, synchronization & controls