



Contribution ID: 1388 Contribution code: MOPG25

Type: **Poster Presentation**

FERMI plans for a 2 nm seeded FEL

Monday, 20 May 2024 16:00 (2 hours)

Most FELs employ the mechanism of self-amplified spontaneous emission (SASE) from a relativistic electron beam to generate intense femtosecond pulses in the x-ray spectral region. Such SASE FELs are characterized by a broad bandwidth and relatively poor longitudinal coherence, and offer a rather limited control over the spectro-temporal properties. The limitations of a SASE FEL can be overcome by using an external laser to trigger the amplification process. Echo-enabled harmonic generation (EEHG), alone or in combination with the high-gain harmonic generation scheme (HGHG) is currently the most promising candidate to extend the operation of externally-seeded FELs into the soft x-ray region. Here, we discuss the plan at FERMI for the upgrade of the second FEL line in order to reach ~ 2 nm at the fundamental emission wavelength. In the first step, coherent radiation at ~ 10 nm will be generated with an EEHG layout and used as a seed in an HGHG stage on a fresh part of the electron beam. The experience with EEHG at the FEL-1 line will be an important step towards the final realization of the FERMI FEL as a reliable source of highly coherent radiation at ~ 2 nm and below.

Footnotes

Funding Agency

Paper preparation format

Word

Region represented

Europe

Primary author: ALLARIA, Enrico (Elettra-Sincrotrone Trieste S.C.p.A.)

Co-authors: BRYNES, Alexander (Elettra-Sincrotrone Trieste S.C.p.A.); SPEZZANI, Carlo (Elettra-Sincrotrone Trieste S.C.p.A.); GARZELLA, David (Elettra-Sincrotrone Trieste S.C.p.A.); SOTTOCORONA, Filippo (Elettra-Sincrotrone Trieste S.C.p.A.); DE NINNO, Giovanni (Elettra-Sincrotrone Trieste S.C.p.A.); PEROSA, Giovanni (Uppsala University); PENCO, Giuseppe (Elettra-Sincrotrone Trieste S.C.p.A.); Dr GIANNESI, Luca (Istituto Nazionale di Fisica Nucleare); REBERNIK RIBIC, Primož (Elettra-Sincrotrone Trieste S.C.p.A.); DI MITRI, Simone (Elettra-Sincrotrone Trieste S.C.p.A.)

Presenter: ALLARIA, Enrico (Elettra-Sincrotrone Trieste S.C.p.A.)

Session Classification: Monday Poster Session

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