LEDS Workshop – Longitudinal Electron beam Dynamics for coherent light Sources

Report of Contributions

https://indico.elettra.eu/e/LEDS2023

Contribution ID: **1** Type: **not specified**

CompactLight: how to write a proposal

Tuesday, October 3, 2023 2:30 PM (30 minutes)

Presenter: D'AURIA, Gerardo (Elettra Sincrotrone Trieste)

Session Classification: CompactLight, lessons learned

Contribution ID: **2** Type: **not specified**

CompactLight: bunch compression, microbunching instability and seeding aspects

Tuesday, October 3, 2023 3:00 PM (30 minutes)

Presenter: LATINA, Andrea (CERN)

Session Classification: CompactLight, lessons learned

Contribution ID: **3** Type: **not specified**

Beam loading effects in photo-injectors, simulations and measurements

Tuesday, October 3, 2023 3:30 PM (30 minutes)

Presenter: OLIVARES HERRADOR, Javier (CERN)

Session Classification: CompactLight, lessons learned

Contribution ID: **5** Type: **not specified**

Linac-driven beam physics at Eupraxia@SPARC_Lab

Tuesday, October 3, 2023 4:40 PM (30 minutes)

Primary author: GIRIBONO, Anna (INFN-LNF)

Presenter: GIRIBONO, Anna (INFN-LNF)

Session Classification: New coherent light sources

Contribution ID: **7** Type: **not specified**

The DALI project at HZDR

Tuesday, October 3, 2023 5:10 PM (30 minutes)

Primary author: LEHNERT, Ulf (HZDR)

Presenter: LEHNERT, Ulf (HZDR)

Session Classification: New coherent light sources

Contribution ID: **8** Type: **not specified**

THz source @ PITZ as pump for X-ray FELs

Tuesday, October 3, 2023 5:40 PM (30 minutes)

Presenter: KRASILNIKOV, Mikhail (DESY)

Session Classification: New coherent light sources

Contribution ID: **12** Type: **not specified**

Considerations for low energy slice energy spread measurements

Wednesday, October 4, 2023 8:30 AM (30 minutes)

Presenter: RICHARD, Christopher James (DESY)

Session Classification: On the true origin of microbunching

Contribution ID: **13** Type: **not specified**

Modelling and observation of intrabeam scattering in photoinjectors

Wednesday, October 4, 2023 9:00 AM (30 minutes)

Presenter: GEOFFREY, Thomas Lucas (PSI)

Session Classification: On the true origin of microbunching

Contribution ID: **14** Type: **not specified**

Energy spread measurements at the European XFEL

Wednesday, October 4, 2023 9:30 AM (30 minutes)

Presenter: WALKER, Stuart (EUXFEL)

Session Classification: On the true origin of microbunching

Contribution ID: **15** Type: **not specified**

Self-consistent intrabeam scattering methods

Wednesday, October 4, 2023 10:50 AM (30 minutes)

Presenter: ADELMANN, Andreas (PSI)

Session Classification: On the true origin of microbunching

Contribution ID: **18** Type: **not specified**

Widely tunable electron bunch trains for the generation of high-power narrowband 1–10 THz radiation

Wednesday, October 4, 2023 2:00 PM (30 minutes)

Presenter: YAN, Lixin (Tsinghua University)

Session Classification: Diagnostics of microbunching and beam manipulation

Contribution ID: **19** Type: **not specified**

Compact and versatile infrared spectrometer for microbunching detection

Wednesday, October 4, 2023 2:30 PM (30 minutes)

Presenter: SPEZZANI, Carlo (Elettra Sincrotrone Trieste)

Session Classification: Diagnostics of microbunching and beam manipulation

Contribution ID: **20** Type: **not specified**

Electron beam manipulation using self-induced fields

Wednesday, October 4, 2023 3:40 PM (30 minutes)

Presenter: DIJKSTAL, Philipp (PSI)

Session Classification: Diagnostics of microbunching and beam manipulation

Contribution ID: **21** Type: **not specified**

State-of-the-art transverse deflecting cavities

Wednesday, October 4, 2023 4:40 PM (30 minutes)

Primary author: CRAIEVICH, Paolo (PSI)

Presenter: CRAIEVICH, Paolo (PSI)

Session Classification: Diagnostics of microbunching and beam manipulation

Contribution ID: **22** Type: **not specified**

Experience with magnetic linearization, longitudinal jitters and outlook to HB-SASE

Thursday, October 5, 2023 8:30 AM (30 minutes)

Presenter: THORIN, Sara (MAX-IV)

Session Classification: Magnetic lattices

Contribution ID: **23** Type: **not specified**

Bunch compression for FELs –Chicanes or Arcs?

Thursday, October 5, 2023 9:00 AM (30 minutes)

Presenter: WILLIAMS, Peter (STFC Daresbury Laboratory & Cockcroft Institute)

Session Classification: Magnetic lattices

Contribution ID: **25** Type: **not specified**

Half-wavelength velocity bunching: non-adiabatic temporal focusing of charged particle beams

Thursday, October 5, 2023 11:10 AM (30 minutes)

X-ray Free-Electron Lasers (XFELs) and MegaElectronVolt Ultrafast Electron Diffractometers (MeV UEDs) are revolutionary scientific instruments that allow visualising the dynamics in a wide range of systems from atoms and molecules to phonons, magnons and plasmons. Femtosecond (fs) electron beams are at the heart of XFELs and MeV UEDs, and the formation of fs electron beams with ultrahigh densities in the phase space is the subject of active research. We report an interesting regime of non-adiabatic compression of electron beams by two orders of magnitude. Via analytical calculations and numerical simulations, we show that few MeV electron beams (an isolate ensemble of electrons in a beam) can be trapped and compressed by a strong electromagnetic field within a half of the wavelength. Furthermore, in a multi-cell accelerating cavity, the bunch is first compressed and then accelerated, thus allowing one to preserve very short bunch duration. For example, a 3 ps 16-pC 1-MeV electron bunch is compressed to 30 fs rms and accelerated to 12 MeV in a TESLA uperconducting cavity. This proposed mechanism of compression, which is another mode of velocity bunching, It opens the door for obtaining very high electron densities in the phase space.

Primary author: PEROSA, Giovanni (Uppsala University)

Presenter: PEROSA, Giovanni (Uppsala University)

Session Classification: Magnetic lattices

Contribution ID: **27** Type: **not specified**

Laser heater for a multi-stage compressor superconducting FEL driver

Thursday, October 5, 2023 10:40 AM (30 minutes)

Presenter: AMSTUTZ, Philipp (DESY)

Session Classification: Magnetic lattices

Contribution ID: **29** Type: **not specified**

Round table:definition of the LEDS proposal

Session Classification: LEDS proposal for LEAPS

Contribution ID: **30** Type: **not specified**

Self-locked time-resolved measurements with a passive streaker

Wednesday, October 4, 2023 4:10 PM (30 minutes)

Presenter: MALYZHENKOV, Alexander (CERN)

Session Classification: Diagnostics of microbunching and beam manipulation

Contribution ID: **31** Type: **not specified**

Intrabeam scattering model from astrophysics

Wednesday, October 4, 2023 11:20 AM (30 minutes)

Primary author: VAN DER GEER, Bas (Pulsar)

Presenter: VAN DER GEER, Bas (Pulsar)

Session Classification: On the true origin of microbunching

Contribution ID: **35** Type: **not specified**

Coherent synchrotron radiation and microbunching instability at FERMI

Thursday, October 5, 2023 10:10 AM (30 minutes)

Primary author: BRYNES, Alexander Darius (Elettra-Sincrotrone Trieste)

Presenter: BRYNES, Alexander Darius (Elettra-Sincrotrone Trieste)

Session Classification: Magnetic lattices

Contribution ID: **36** Type: **not specified**

IBS simulations for the injectors of the EuXFEL and the SwissFEL

Wednesday, October 4, 2023 11:50 AM (30 minutes)

Presenter: GJONAJ, Erion (TEMF Darmstadt)

Session Classification: On the true origin of microbunching