



Contribution ID: 1540 Contribution code: WEPG78

Type: **Poster Presentation**

Single shot THz spectrometer for FEBE experimental facility

Wednesday, 22 May 2024 16:00 (2 hours)

The CLARA facility at Daresbury Laboratory (UK) is capable of producing femtosecond-scale electron bunches, which will be used in the Full Energy Beam Exploitation (FEBE) beamline. CLARA will employ multiple techniques to manipulate the longitudinal beam profile, including a variable bunch compressor and velocity bunching. Existing longitudinal THz diagnostics on CLARA are multi-shot methods, but for user experiments a single-shot diagnostic operating at the machine repetition rate of 100 Hz is needed. Here, we present a single-shot, 4-channel calorimeter system for use in FEBE to measure the spectrum of THz Coherent Transition Radiation (CTR), which can then be used to estimate longitudinal bunch length. In the device, a set of frequency selective elements designed at STFC RAL Space (UK) distribute specific bandwidths between calorimeters, which use a single-shot detector based on earlier wideband single-shot THz diagnostics developed for CLARA. Characterization of the frequency selective elements has been done using both simulations and Time-domain spectroscopy. The instrument is currently being assembled and tested, and commissioning with beam is planned for early 2024.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

Primary author: SHACKLETON, Emily (Science and Technology Facilities Council)

Co-authors: ARMSTRONG, Christopher (Science and Technology Facilities Council); HERNANDEZ-GOMEZ, Cristina (Science and Technology Facilities Council); MCCORMACK, Elin (Science and Technology Facilities Council); JONES, James (Science and Technology Facilities Council); FEDOROV, Kirill (Science and Technology Facilities Council); HUGGARD, Peter (Science and Technology Facilities Council); MATHISEN, Storm (Science and Technology Facilities Council); PACEY, Thomas (Science and Technology Facilities Council); MALCONI, Valentina (Science and Technology Facilities Council)

Presenter: SHACKLETON, Emily (Science and Technology Facilities Council)

Session Classification: Wednesday Poster Session

Track Classification: MC6: Beam Instrumentation, Controls, Feedback, and Operational Aspects:
MC6.T03 Beam Diagnostics and Instrumentation