



Contribution ID: 1687 Contribution code: THPL171

Type: **Poster Presentation**

## Demonstration of an electro-optic spectral interferometry longitudinal profile monitor at Clara

*Thursday, 11 May 2023 16:30 (2 hours)*

Electro-optic diagnostics are able to non-destructively resolve the longitudinal charge profile of highly relativistic bunches without complicated calibrations and ambiguous phase recovery techniques. The most implemented technique is EO spectral decoding as it is simple and reliable, and has an easy to interpret output. However, its resolution is limited to the geometric mean of the transform limited and stretched probe laser durations. Until very recently, efforts to improve on this have resulted in designs that lose the attractive properties of spectral decoding. On the CLARA accelerator at Daresbury Laboratory we have demonstrated a new EO system that exploits common-path spectral interferometry, 'EOSI', which removes the geometric mean limitation. The system was used to measure 35 MeV/c bunches live at 10 Hz, ranging from 150 pC down to 2 pC, and at a range of compressions from several ps down to  $\sim 300$  fs rms. We explain the technique, describe the measurements, and outline issues and improvements. The technique differs from a spectral decoding system by only a single optical element, potentially allowing current EO systems to be upgraded.

### Funding Agency

### Footnotes

### I have read and accept the Privacy Policy Statement

Yes

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**Session Classification:** Thursday Poster Session

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