Contribution ID: **2073** Contribution code: **WEPB100** Type: **Poster Presentation**

Development of ultra high power compact X-band pulse compressor

Wednesday 4 June 2025 16:00 (2 hours)

We have developed a new SLED-type RF pulse compressor for powering ultra-high gradient X-band photoinjectors with pulse lengths shorter than 10 ns. Klystrons capable of generating these short pulses at multi-MW levels are non-existent. However, RF pulse compression is an alternative technique used to increase klystron output peak power at the cost of pulse length. Over the years, we have developed numerous pulse compression systems, including super-compact SLEDs for X-band transverse deflectors at SLAC's LCLS and LCLS-II. Our new compact pulse compressor uses spherical cavities with axially-symmetric TE modes which have no electric field on the cavity surface. This allows our new SLED to potentially achieve higher peak RF power compared to the LCLS-II SLEDs. We present the design of this SLED composed of two spherical cavities and a waveguide hybrid with TE01 circular waveguide ports. During high power test this SLED produced peak RF power up to 317 MW.

Footnotes

Paper preparation format

LaTeX

Region represented

America

Funding Agency

This work is supported by U.S. Department of Energy Contract No. DE-AC02-76SF00515.

Author: DHAR, Ankur (SLAC National Accelerator Laboratory)

Co-authors: OTHMAN, Mohamed (SLAC National Accelerator Laboratory); DOLGASHEV, Valery (SLAC National Accelerator Laboratory)

Presenter: DHAR, Ankur (SLAC National Accelerator Laboratory)

Session Classification: Wednesday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T16 Pulsed Power Technology