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LCLS-II photo-injector operational challenges and developments

Tuesday 3 June 2025 16:00 (2 hours)

LCLS-II has turned into users operations since 2023 and has gradually ramped the beam rate to 16kHz to date. LCLS-II photoinjector has demonstrated low emittance beam operating at high rate. During operation, we also experienced challenges such as charge production and FEL intensity dependence to the beam rate, beam split, and emittance growth due to unexpected nonlinear field. These problems are addressed through systematic studies. Recently, the over-inserted Cs2Te photocathode has been developed and installed in the LCLS-II gun for significant dark current reduction and emittance improvement. This paper is to discuss LCLS-II photoinjector's ultra-low emittance operational challenges and developments with tens of kHz beam rate as well as the first measurements of the dark current and emittance with the over-inserted photocathodes.

Footnotes

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