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Emulation of Two-Pass Gain in a cavity-based XFEL via Self-Seeding at LCLS

Thursday 14 August 2025 16:00 (2 hours)

This work presents an experimental study emulating a two-pass gain scenario in a cavity-based X-ray free-electron laser (CBXFEL) using a self-seeding configuration at LCLS. In this "7+7"arrangement, radiation generated by the first seven hard X-ray undulators (HXUs) is spectrally filtered by a high-resolution self-seeding crystal monochromator and used to seed a second set of seven undulators downstream. This setup mimics the regenerative amplification process expected in the CBXFEL cavity, where the seed pulse is recirculated and overlapped with a second trailing electron bunch. By systematically reducing the number of post-crystal undulators (from 13 to 5), we quantified the spectral amplification ratio by comparing the self-seeded peak signal to the SASE background. These results confirm the feasibility of seeding with the initial seven HXUs and provide a valuable benchmark for extrapolating gain in future two-bunch CBXFEL demonstration experiments.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

Authors: HALAVANAU, Aliaksei (SLAC National Accelerator Laboratory); ZHU, Diling (SLAC National Accelerator Laboratory); BALCAZAR, Mario (SLAC National Accelerator Laboratory)

Co-authors: LUTMAN, Alberto (SLAC National Accelerator Laboratory); TANG, Jingyi (Stanford University); HUANG, Zhirong (SLAC National Accelerator Laboratory)

Presenter: BALCAZAR, Mario (SLAC National Accelerator Laboratory)

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