Contribution ID: **493** Contribution code: **MOXP03** Type: **Invited Oral Presentation**

High Power Attosecond X-ray Pulses at LCLS-II

Monday 11 August 2025 10:00 (30 minutes)

The LCLS-II upgrade has expanded the capabilities of the Linac Coherent Light Source (LCLS), extending the deliverable photon energy range and increasing the repetition rate from 120 Hz to a maximum of 1 MHz. Here we report the development of attosecond X-ray science capabilities at the LCLS-II, including the commissioning of beam shaping methods for attosecond pulse generation, and the demonstration, characterization, and delivery of advanced attosecond XFEL modes at high repetition rates. We used the photocathode modulation method∗ at LCLS-II to generate single-spike pulses with up to 10s uJ pulse energy. These attosecond pulses are characterized at the TMO instrument with the angular streaking technique∗∗. Furthermore, we demonstrated advanced modes such as spectrotemporally shaped attosecond pulses∗ ∗ ∗ and pump/probe attosecond pulse pairs. These capabilities have been delivered at a repetition rate of up to 33 kHz, enabling the next generation of ultrafast experiments at XFELs.

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No

Footnotes

- Z. Zhang, et al., New Journal of Physics, 2020. [Online]. Available: https://doi.org/10.1088/1367-2630/aba14c ** S. Li, et al., Optics Express, 8 2018. *** R. R. Robles, et al., Phys. Rev. Lett., vol. 134, p. 115001, Mar 2025. [Online]. Available: https://link.aps.org/doi/10.1103/PhysRevLett.134.115001

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