



Contribution ID: 74 Contribution code: MOP39

Type: Contributed Poster

An Attosecond Scheme Overcoming Coherence Time Barrier in SASE FELs

Monday, 22 August 2022 17:10 (20 minutes)

In Self-Amplified Spontaneous Emission Free Electron Laser (SASE FEL) based short-pulse schemes, pulse duration is limited by FEL coherence time. For hard X-ray FELs, coherence time is in a few hundred attosecond range while for XUV and soft X-ray FELs it is in the femtosecond regime. In this paper the modification of so-called chirp-taper scheme is developed that allows to overcome the coherence time barrier. Numerical simulations for XUV and soft X-ray FEL user facility FLASH demonstrate that one can generate a few hundred attosecond long pulses in the wavelength range 2 - 10 nm with peak power reaching hundreds of megawatts.

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Session Classification: Monday posters

Track Classification: SASE FEL