

PhotonMEADOW 2023

Contribution ID: 44

Type: Oral

X-ray pulse shortening via nonlinear absorption and diffraction

Thursday, September 14, 2023 2:30 PM (20 minutes)

Controlling optical properties with nonlinear light-matter interactions, which has been the justification of optical lasers, remains largely unexplored in the hard X-ray region. By combining nanofocusing optics and stable X-ray pulses from SACLA, we are testing various concepts of nonlinear devices to control the temporal and spectral properties of XFEL pulses. In this talk, I will discuss our recent experimental studies on X-ray pulse shortening through nonlinear absorption processes [1] and the reduction of atomic scattering factors at high intensity [2,3].

[1] I. Inoue et al., Phys. Rev. Lett. 127, 163903 (2021).

[2] I. Inoue et al., Phys. Rev. Lett. 126, 117403 (2021).

[3] I. Inoue et al., arXiv:2304.05948.

Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

no

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Session Classification: Time-related beam properties - temporal characterisation of electron, FEL, and laser beams