



Contribution ID: 32 Contribution code: TUBO4

Type: **Contributed Oral**

## First Observation of Laser-Beam Interaction in a Dipole Magnet

*Tuesday, 23 August 2022 12:20 (25 minutes)*

Recently, a self-modulation scheme was proposed and experimentally demonstrated for enhancing energy modulation in seeded FELs [1], thereby significantly reducing the requirement of an external laser system. Driven by this scheme, an electron beam with a laser-induced energy modulation as small as 1.8 times the slice energy spread is used for lasing at the 7th harmonic of a 266-nm seed laser in a single-stage high-gain harmonic generation (HGHG) setup and the 30th harmonic of the seed laser in a two-stage HGHG setup. Moreover, using this scheme, we report the first observation of the laser-beam interaction in a pure dipole magnet [2] in which the electron beam energy modulation with a 40-keV amplitude and a 266-nm period is measured. We demonstrate that such an energy modulation can be used to launch a seeded FEL, that is, lasing at the sixth harmonic of the seed laser in a high-gain harmonic generation scheme. The results reveal the most basic process of the FEL lasing and open up a new direction for the study and exploitation of laser-beam interactions.

### I have read and accept the Privacy Policy Statement

Yes

**Primary authors:** YAN, Jiawei (European XFEL GmbH); DENG, Haixiao (Shanghai Advanced Research Institute Chinese Academy of Science); ZHAO, Zhentang (Shanghai Synchrotron Radiation Facility)

**Presenter:** YAN, Jiawei (European XFEL GmbH)

**Session Classification:** Seeded FELs

**Track Classification:** Seeded FEL