



Contribution ID: 2066 Contribution code: SUPC066

Type: Student Poster Presentation

## An electron beam modulation laser for steady-state microbunching

*Sunday, 19 May 2024 14:00 (4 hours)*

Steady-state microbunching (SSMB) represents an innovative scheme for generating high-power coherent radiation. This approach is expected to generate kilowatt-scale extreme ultraviolet (EUV) radiation for lithography in the semiconductor industry. During the second phase of the SSMB proof-of-principle experiment (SSMB PoP II), the creation of quasi-steady-state microbunches requires specific modulation of the electron beam. This modulation is achieved through a phase-locked laser with a high repetition rate, which enables the detection of continuous coherent radiation over multiple turns. To meet the requirements of SSMB PoP II, a high-power, high-repetition-rate, phase-stabilized pulsed laser has been developed. The single-frequency pulsed laser has been achieved using an electro-optic modulator stage, three amplification stages, and a phase-locked feedback system. Here we report on the development and test results of the electron beam modulation laser.

### Footnotes

### Funding Agency

### Paper preparation format

### Region represented

Asia

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**Session Classification:** Student Poster Session

**Track Classification:** MC2: Photon Sources and Electron Accelerators: MC2.T25 Lasers