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Speed Poster: FEL Lasing Suppression by a Seeded Microbunching Instability

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Collective effects and instabilities due to longitudinal space charge and coherent synchrotron radiation can degrade the quality of the ultra-relativistic, high-brilliance electron bunches needed for the operation of free-electron lasers. In this contribution, we demonstrate the application of a laser-induced microbunching instability to selectively suppress the SASE process. A significant decrease of photon pulse energies was observed at the free-electron laser FLASH in coincidence with overlap of 800 nm laser pulses and electron bunches within a modulator located approximately 40 meters upstream of the undulators. We discuss the underlying mechanisms based on longitudinal space charge amplification [E.A. Schneidmiller and M.V. Yurkov, Phys. Rev. ST Accel. Beams 13, 110701 (2010)] and present measurements.

Primary authors: Mr LECHNER, Christoph (Hamburg Universtiy); Dr BÖDEWADT, Jörn (DESY)

Presenter: Dr BÖDEWADT, Jörn (DESY)

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