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Steady State and Power Buildup in a Tapered XUV FEL Oscillator

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We present a simulation study of a tapered FEL oscillator, which aims at delivering high average power in the extreme ultraviolet wavelength region. The setup relies on the combination of three critical elements: a pre-buncher, a strongly tapered undulator and an optical cavity enclosing them. Such a configuration allows for efficient power extraction from a high-brightness electron beam.

We concentrate on tuning the steady state of the oscillator, including the optimisation of the taper profile based on an analytical estimate, as well as a multi-pass optimisation of the cavity design. We briefly address the buildup from shot-noise power level.

Footnotes

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