Joint DESY and University of Hamburg Accelerator Physics Seminar

Tuesday, 12.12.2023 16:00

Hybrid Seminar:

Seminar Room 30b/459 & `zoom` Video Access

Exploring the Essential Conditions Enabling Steady-State Microbunching

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Abstract

Coherent radiation is a powerful scheme for radiation sources as its intensity increases with the square of the number of radiating electrons. Therefore storage ring-based synchrotron radiation sources based on a steady-state microbunching scheme (SSMB) were suggested in 2010 by D. Ratner and A. Chao to benefit from their high repetition rates in the MHz range. Formation of bunches or sub-bunches similar or shorter than the emitted radiation wavelength is necessary for the radiation from different electrons to add in phase and therefore cohere. At the Metrology Light Source in Berlin it was shown that in a dedicated isochronous optics an electron beam energy modulation induced by an externally applied laser in an undulator section leads to the formation of sub-bunches with a length of 1 μm on the following turns [1]. Here we report on recent progress and further development of this experiment with focus on experimental verification of the theoretical foundation of the steady-state microbunching scheme.

[1] Deng, X., Chao, A., Feikes, J. *et al.*:
Experimental demonstration of the mechanism of steady-state microbunching.
Nature 590, 576–579 (2021). `https://doi.org/10.1038/s41586-021-03203-0 [doi.org]`

Please consider our zoom link

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