



Contribution ID: 1722 Contribution code: WEPR43

Type: **Poster Presentation**

Experimental evidence of the effect of transverse Landau damping on the microbunching instability

Wednesday, 22 May 2024 16:00 (2 hours)

The mechanisms that drive short-range modulations in the longitudinal phase space of accelerated electron bunches, otherwise known as the microbunching instability, have undergone intensive study. The various collective interactions between charged particles within the bunch, and their environment, can degrade the quality of these bunches, eventually making them unsuitable to drive light sources such as free-electron lasers (FELs). Although the most common method for removing this instability at X-ray FELs –namely, the laser heater –has proven to be very useful in improving the performance of these facilities, alternative methods to achieve this goal are active areas of research. In this contribution, we present experimental evidence of the influence of transverse Landau damping on mitigating the microbunching instability.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

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Session Classification: Wednesday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D06 Coherent and Incoherent Instabilities Measurements and Countermeasures