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Formation of sub-femtosecond microstructures via transverse-to-longitudinal phase space exchange

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The formation of short microstructure on the current density of an electron bunch can have application to coherent light sources and advanced acceleration techniques. In this contribution we compare different design of longitudinal-to-transverse phase space exchanger [P. Piot, et al., PRSTAB 14, 022801 (2011)] combined with structure cathodes to produce current modulation at the sub fs regime [W. S> Graves et al., PRL 108, 263904 (2012)]. We discuss possible applications and the limitations of the technique to inverse Compton scattering source, free-electron laser and advanced acceleration techniques.

Primary author: PHILIPPE, piot (northern Illinois University & Fermilab)

Presenter: PHILIPPE, piot (northern Illinois University & Fermilab)

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