

459

Accession number:WOS:000307422800095

Title:Terahertz radiation from a laser bunched relativistic electron beam in magnetic wiggler

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Source title:PHYSICS OF PLASMAS

Abbreviated source title:PHYS PLASMAS

Volume:19

Issue:7

Issue date:JUL 2012

Pages:073109

Language:English

ISSN:1070-664X

Document type:Article

Publisher:AMER INST PHYSICS, CIRCULATION & FULFILLMENT DIV, 2 HUNTINGTON QUADRANGLE, STE 1 N O 1, MELVILLE, NY 11747-4501 USA

Abstract:We develop a formalism for tunable coherent terahertz radiation generation from a relativistic electron beam, modulated by two laser beams, as it passes through a magnetic wiggler of wave vector $k(w)(z)$ over cap. The lasers exert a beat frequency ponderomotive force on beam electrons, and modulate their velocity. In the drift space, velocity modulation translates into density modulation. As the beam bunches pass through the wiggler, they acquire a transverse velocity, constituting a transverse current that acts as an antenna to produce coherent THz radiation, when $\omega(1) - \omega(2) = k(w)c/(\cos \theta - v(0b)/c)$, where $\omega(1)$, $\omega(2)$ are the frequencies of the lasers, $v(0b)(z)$ over cap is the beam velocity, and θ is the direction of maximum radiated intensity with respect to the direction of propagation of the beam. (C) 2012 American Institute of Physics. [<http://dx.doi.org/10.1063/1.4737112>]

Number of references:16

Main heading:Physics

DOI:10.1063/1.4737112