

145. Title: Powerful terahertz free electron lasers with hybrid Bragg reflectors

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Source: PHYSICAL REVIEW SPECIAL TOPICS-ACCELERATORS AND BEAMS

Volume:14

Issue:4

Pages: 042001

Publication year: 2011

Document type:Journal article (JA)

Abstract: For the electron devices with oversized interaction space, the Bragg structures of different types are effective instruments for controlling and redistribution of the electromagnetic energy fluxes to provide a spatial coherence of radiation. In this paper a powerful long-pulse free-electron laser of the terahertz waveband is studied in which an advanced Bragg structure based on the coupling between the propagating waves and the cutoff mode is used as an upstream reflector in the two-mirror resonator. In the case of planar geometry, this structure provides effective mode selection over the "narrow" transverse coordinate directed between the plates. Under the assumption that the system is open over a second "wide" coordinate, the diffraction effects are sufficient for synchronization of radiation from a sheet electron beam over this direction. An alternative way of radiation synchronization for a case of more extended electron beam by exploiting a 2D Bragg structure as a downstream reflector is discussed.