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Title:Analysis and design of a novel photonic crystal-based sub-mm/THz backward-wave oscillator
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Abstract:A novel Cerenkov-transition based high-frequency/high power backward wave oscillator (BWO) is presented. The proposed device is a defected metallic triangular lattice photonic crystal (PC) structure that has no axial discontinuities. The absence of the axial discontinuity and low axial DC magnetic field requirements allows for simple fabrication process. Isolation between the generated electromagnetic fields and electron beam offers easy field extraction and coupling to the output loads. Design of the proposed device was carried out with a first principles based combined FDTD/PIC simulator developed for this work. Typical design examples presented here demonstrate the potentials of the proposed structure. The PC based structure allows easy tunability and scaling to higher frequencies. © 2011-2012 IEEE.
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