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Photonic Crystal Structures for Particle Acceleration GREGORY R. WERNER, University of Colorado, JOHN R. CARY, University of Colorado/Tech-X Corp., CARL A. BAUER, University of Colorado — An electromagnetic resonant cavity with only a single mode can be created using a photonic crystal structure to trap the fields. Because photonic crystals can reflect only radiation within a small frequency range, they can trap only the fundamental mode of a cavity, while higher frequency modes propagate out through the crystal. The absence of higher modes can benefit accelerator cavities, in which higher order modes (wakefields) excited by the beam degrade the beam quality. We examine the fields of an electron beam in a photonic crystal cavity using computer simulations.

Greg Werner
University of Colorado

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