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Title:Bulk and surface electromagnetic response of metallic metamaterials to convection electrons Authors:So, Jin-Kyu (1); Jang, Kyu-Ha (1); Park, Gun-Sik (1); Garcia-Vidal, F.J. (2)

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Abstract: The electromagnetic response of three-dimensional metallic metamaterials with isotropic effective index of refraction to fast-moving electrons is studied by numerical simulations. The considered metamaterials can support Cerenkov radiation [P. A. Cherenkov, Dokl. Akad. Nauk SSSR 2, 451 (1934)], and their effective dielectric behavior is confirmed by the detailed angular dependence of the generated radiation cone on the kinetic energy of electrons. Moreover, in addition to the predicted bulk modes, surface electromagnetic excitation is observed in a specific type of metamaterials and its dispersion is sensitive to the thickness of the subwavelength rods. © 2011 American Institute of Physics.