OVERMODED, HIGH-POWER 0.2 THZ RADIATION SOURCE BASED ON A CYLINDRICAL 2D PERIODIC SURFACE LATTICE CAVITY*

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We present the theoretical and numerical study of a cylindrical two-dimensional periodic surface lattice (2D PSL) overmoded interaction cavity, excited by a thin, annular electron beam, immersed in a magnetic field. This high-power 0.2 THz radiation source with applications in plasma diagnostics, imaging, spectroscopy, radar, and communications is designed and simulated using the PIC solver of CST Microwave Studio. The amplitude of the corrugation is sufficiently small that the 2D PSL can be described as an effective metadielectric[1]. Coupling of volume and surface modes occurs[2-6] when optimum parameters and dimensions are chosen. The energy of the electron beam and the periodicities of the PSL are chosen for effective electron beam coupling. We demonstrate the production of well-defined, high-power 0.2 THz radiation.

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