

Relativistic Electron Beam Interactions for Generation of High Power at Microwave Frequencies

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Several coherent emission processes operative within high-power, relativistic electron beams have been studied during the past few years. The spectral range of interest extends from centimeter to submillimeter wave-lengths. Effort within this field is presently concentrated in three areas: exploratory development of the electron cyclotron maser (gyrotron) for millimeter-wave sources; a basic study of scattering mechanisms whereby incident microwave radiation is Doppler-shifted to higher frequency; and the extension of conventional microwave sources to the gigawatt level using pulsed power techniques. The field is reviewed with emphasis on the several mechanisms employed and results of recent theoretical and experimental investigations.

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