

High-efficiency beam-wave interaction in quasiperiodic structures

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A semianalytical method for the design and analysis of high-efficiency ($> 50\%$) generation of radiation in traveling output structures is presented. No *a priori* assumption about the functional form of the electromagnetic field is required. The concept of scalar interaction impedance used in periodic structures is generalized to a matrix in the case of a nonperiodic system. Its eigenvalue is shown to be directly related to the beam-wave interaction efficiency. The method is demonstrated with the design and analysis of a 70% efficiency system.

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