Abstracts

Generalized Lorentz Gauge and Boundary Conditions in Partially Dielectric-Loaded Cylindrical Waveguide (Short Papers)

J.-S. Choi, D.-I. Choi and S.-C. Yang. "Generalized Lorentz Gauge and Boundary Conditions in Partially Dielectric-Loaded Cylindrical Waveguide (Short Papers)." 1987 Transactions on Microwave Theory and Techniques 35.11 (Nov. 1987 [T-MTT]): 1065-1066.

A generalized Lorentz gauge condition for the set of Vlasov-Maxwell equations is introduced. The condition is applied to the free-electron-laser instability of a relativistic electron beam in a partially dielectric-loaded waveguide. For the dielectric-loaded system with the external wiggler magnetic field, the potential approach with the generalized Lorentz gauge rather than the field approach is shown to be more convenient in the self-consistent study of free-electron-laser instability. We also derive the boundary conditions for potentials to be satisfied at the vacuum-dielectic interface and show that they are equivalent to the B/sub Theta/ and E/sub Theta/ continuous conditions in the field approach. An example is discussed to illustrate the equivalence between the two approaches of potentials and fields.

❑ Return to main document.