Joint DESY and University of Hamburg Accelerator Physics Seminar

Thursday, December 16, 2004

(16:00 in Room 459/30b)

Characterization of radiating apertures using the Multiple Multipole Method
and
Modeling and optimization of a spiral antenna for GPR applications

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Abstract

Radiating apertures are characterized using the Multiple Multipole Method, which is a well–known semi analytic electromagnetic field calculation method. Sources of electromagnetic radiation (multipoles) are placed inside the object. When the number and position of the multipoles are appropriate, the boundary conditions are satisfied and the corresponding distribution of multipoles can be used to compute the external electromagnetic field. The number and positions of the multipoles are of key interest in this method. To distribute the multipoles properly, we start with a high density of multipoles uniformly distributed along the radiating object. Afterwards, the redundant multipoles are identified and removed. Two methods, one based on the singular value decomposition and the other one based on rank revealing QR factorization have been applied for the identification of the redundant multipoles.

The ground penetrating radar (GPR) is used for detection and identification of the underground objects. The antennas for these applications should be lightweight and compact having a wide bandwidth. A spiral antenna, designed by Yu.I. Buyanov and others in Tomsk University, has been modeled and optimized with the commercial electromagnetic software Microwave Studio.

NOTE THE UNUSUAL DATE

D.P.Barber (MPY), J.Rossbach (Univ. HH) and M.Vogt (MPY).

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