

Electromagnetic material interrogation using conductive interfaces and acoustic wavefronts

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Abstrak

Electromagnetic theory offers fascination and challenge from both a physical and a mathematical perspective. This monograph contains the newest results on the use of electromagnetic probes to interrogate dielectric material structures for material properties and geometry. This volume systematically exploits interface phenomena, the electrodynamics of material responses, and time dependent interrogating signals in an integrated manner. The authors begin with basic electromagnetics, such as Maxwell's equations, and present modeling, theory, and computational results.

The book's strengths include a clear discussion of materials properties from the electromagnetic point of view, a careful formulation of the imaging problems addressed, rigorous treatment of mathematical issues, and useful illustration of computational methods and results. While confined to internal vision in one-dimensional settings, this volume will stimulate further developments in internal vision to include two- and three-dimensional interior assessments. It is an excellent and robust source of applied mathematics and engineering research challenges for the future.

Imaging technology stands to benefit much from this research on low energy electromagnetic radiation. The use of electromagnetic pulses interacting with specially placed reflective surfaces, whether solid or acoustic, is a new dimension that will substantively impact medical imaging, subsoil investigation, and structure evaluation.