Scattering Of Electromagnetic Waves By Obstacles

Propagation, Scattering and Dissipation of Electromagnetic Waves
Scattering of Electromagnetic Waves by Electroacoustic Plasma Waves
Reflection and Scattering of Electromagnetic Waves by a Layered Periodic Structure in the Atmosphere
Scattering of Electromagnetic Waves by Spheres
Electromagnetic Scattering
Electromagnetic Scattering by Particles and Particle Groups
The Scattering of Light and Other Electromagnetic Radiation
THE SCATTERING OF ELECTROMAGNETIC WAVES BY MOVING BODIES.
Electromagnetic Wave Scattering on Nonspherical Particles
SCATTERING OF ELECTROMAGNETIC WAVES BY A PERIODIC SURFACE WITH ARBITRARY PROFILE
Inverse Acoustic and Electromagnetic Scattering Theory
The Scattering of Electromagnetic Waves by Nonequilibrium Plasmas
Scattering of Electromagnetic Waves by Coated

Sphere
On the Scattering of Electromagnetic Waves by a Dielectric Cylinder
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Scattering of Electromagnetic Waves, 3 Volume Set
The Scattering of Electromagnetic Waves by an Electron Beam and a Dielctric Cylinder
Electromagnetic Wave Propagation, Radiation, and Scattering
Radiation and Scattering of Waves
Modern Electromagnetic Scattering Theory with Applications
Electromagnetic Radiation, Scattering, and Diffraction
Plasma Scattering of Electromagnetic Radiation
Scattering of Electromagnetic Waves by Buried Or Partly Buried Inhomogeneous Bodies of Revolution
Scattering of Electromagnetic Waves by a Plasma Cylinder
Wave Propagation and Scattering in Random Media
Wave Scattering from Statistically Rough Surfaces
Elastic Scattering of Electromagnetic Radiation
The Variational Method for Evaluation of Scattering of Electromagnetic Waves by Obstacles
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Particles
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Scattering of Electromagnetic Waves by a Periodic Surface with Arbitrary Profile
Electromagnetic Wave Propagation, Radiation, and Scattering
The Scattering of Electromagnetic Waves from Rough Surfaces
2017 Radiation and Scattering of Electromagnetic Waves, RSEMW
Scattering of Electromagnetic Waves
Scattering of Electromagnetic Waves, Numerical Simulations
Introduction to Wave Scattering, Localization and Mesoscopic Phenomena
Scattering of electromagnetic waves by two- and three-dimensional dielectric bodies
Scattering of Electromagnetic Waves by Obstacles

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Propagation, Scattering and Dissipation of Electromagnetic Waves John Wiley & Sons
Electromagnetic Radiation, Scattering, and Diffraction Discover a graduate-level text for students specializing in electromagnetic wave radiation, scattering, and diffraction for engineering applications In Electromagnetic Radiation, Scattering and Diffraction,

distinguished authors Drs. Prabhakar H. Pathak and Robert J. Burkholder deliver a thorough exploration of the behavior of electromagnetic fields in radiation, scattering, and guided wave environments. The book tackles its subject from first principles and includes coverage of low and high frequencies. It stresses physical interpretations of the electromagnetic wave phenomena along with their underlying mathematics. The authors emphasize fundamental principles and provide numerous examples to illustrate the concepts contained within. Students with a limited undergraduate electromagnetic background will rapidly and systematically advance their understanding of electromagnetic wave theory until they can complete useful and important graduate-level work on electromagnetic wave problems. Electromagnetic Radiation, Scattering and Diffraction also serves as a practical companion for students trying to simulate problems with commercial EM software and trying to better interpret their results. Readers will also benefit from the breadth and depth of topics, such as: Basic equations governing all electromagnetic (EM) phenomena at macroscopic scales are presented systematically. Stationary and relativistic moving boundary conditions are developed. Waves

in planar multilayered isotropic and anisotropic media are analyzed. EM theorems are introduced and applied to a variety of useful antenna problems. Modal techniques are presented for analyzing guided wave and periodic structures. Potential theory and Green's function methods are developed to treat interior and exterior EM problems. Asymptotic High Frequency methods are developed for evaluating radiation Integrals to extract ray fields. Edge and surface diffracted ray fields, as well as surface, leaky and lateral wave fields are obtained. A collective ray analysis for finite conformal antenna phased arrays is developed. EM beams are introduced and provide useful basis functions. Integral equations and their numerical solutions via the method of moments are developed. The fast multipole method is presented. Low frequency breakdown is studied. Characteristic modes are discussed. Perfect for graduate students studying electromagnetic theory, Electromagnetic Radiation, Scattering, and Diffraction is an invaluable resource for professional electromagnetic engineers and researchers working in this area.

Scattering of Electromagnetic Waves by Electroacoustic

Plasma Waves John Wiley & Sons
A timely and authoritative guide to the state of the art of wavescattering Scattering of Electromagnetic Waves offers in three volumes acomplete and up-to-date treatment of wave scattering by randomdiscrete scatterers and rough surfaces. Written by leadingscientists who have made important contributions to wave scatteringover three decades, this new work explains the principles, methods,and applications of this rapidly expanding, interdisciplinaryfield. It covers both introductory and advanced material andprovides students and researchers in remote sensing as well asimaging, optics, and electromagnetic theory with a one-stopreference to a wealth of current research results. Plus, Scatteringof Electromagnetic Waves contains detailed discussions of bothanalytical and numerical methods, including cutting-edge techniquesfor the recovery of earth/land parametric information. The three volumes are entitled respectively Theories andApplications, Numerical Simulation, and Advanced Topics. In thethird volume, Advanced Topics, Leung Tsang (University ofWashington) and Jin Au Kong (MIT), cover: * Two-dimensional random rough surface scattering * Kirchhoff and related methods for rough surface

scattering * Analytic theory of volume scattering based on cascading oflayers * Analytic wave theory for medium with permittivityfluctuations * Multiple scattering theory for discrete scatterers * Quasicrystalline approximation in dense media scattering * Dense media scattering * Backscattering enhancement Reflection and Scattering of Electromagnetic Waves by a Layered Periodic Structure in the Atmosphere Academic Press

It has now been almost ten years since our first book on scattering theory ap peared [32]. At that time we claimed that "in recent years the development of integral equation methods for the direct scattering problem seems to be nearing completion, whereas the use of such an approach to study the inverse scattering problem has progressed to an extent that a 'state of the art' survey appears highly desirable". Since we wrote these words, the inverse scattering problem for acoustic and electromagnetic waves has grown from being a few theoreti cal considerations with limited numerical implementations to a weH developed mathematical theory with tested numerical algorithms. This maturing of the field of inverse scattering theory has been based on the realization that such problems are in general not only nonlinear but also

improperly posed in the sense that the solution does not depend continuously on the measured data. This was emphasized in [32] and treated with the ideas and tools available at that time. Now, almost ten years later, these initial ideas have developed to the extent that a monograph summarizing the mathematical basis of the field seems appropriate. This book is oUf attempt to write such a monograph. The inverse scattering problem for acoustic and electromagnetic waves can broadly be divided into two classes, the inverse obstacle problem and the inverse medium problem.

Scattering of Electromagnetic Waves by Spheres

Springer

Plasma Scattering of Electromagnetic Radiation covers the theory and experimental application of plasma scattering. The book discusses the basic properties of a plasma and of the interaction of radiation with a plasma; the relationship between the scattered power spectrum and the fluctuations in plasma density; and the incoherent scattering of low-temperature plasma. The text also describes the constraints and problems that arise in the application of scattering as a diagnostic technique; the characteristic performance of various dispersion elements, image dissectors, and detectors; and the

general scattered spectrum for an unmagnetized, low-temperature, quasi-equilibrium plasma. The application of the general scattered spectrum for a magnetized plasma; the scattering from a high-temperature plasma; and the scattering from unstable plasmas are also encompassed. Plasma physicists and people involved in the study of electromagnetic radiation will find the book invaluable.
Electromagnetic Scattering John Wiley & Sons
Wave Propagation and Scattering in Random Media, Volume 2, presents the fundamental formulations of wave propagation and scattering in random media in a unified and systematic manner. The topics covered in this book may be grouped into three categories: waves in random scatterers, waves in random continua, and rough surface scattering. Random scatterers are random distributions of many particles. Examples are rain, fog, smog, hail, ocean particles, red blood cells, polymers, and other particles in a state of Brownian motion. Random continua are the media whose characteristics vary randomly and continuously in time and space. Examples are clear air turbulence, jet engine exhaust, tropospheric and ionospheric turbulence, ocean turbulence, and biological media such

as tissue and muscle. Rough surface examples are the ocean surface, planetary surfaces, interfaces between different biological media, and the surface roughness of an optical fiber. This book is intended for engineers and scientists interested in optical, acoustic, and microwave propagation and scattering in atmospheres, oceans, and biological media, and particularly for those involved in communication through such media and remote sensing of the characteristics of these media.

Electromagnetic Scattering by Particles and Particle Groups

John Wiley & Sons

Numerical procedures are developed for the digital solution of the integral equations for the current induced on a perfectly conducting, two- dimensional periodic surface of arbitrary profile when a plane electromagnetic wave is incident. By using Floquet's theorem the range of integration is reduced to a single period, and special summation techniques consisting of a Poisson summation and the subtraction of the dc term are used to improve the convergence of the infinite series representation of the Green's function. The integral equations are then solved numerically using the moment method and an interpolation scheme. Data are obtained for both the surface and far fields for a variety of

sinusoidal, full-wave rectified, inverted full-wave rectified and triangular profiles for plane waves of either polarization at oblique as well as normal incidence, and the results are compared with the predictions of physical optics.

The Scattering of Light and Other Electromagnetic Radiation Wiley-Interscience

A timely and authoritative guide to the state of the art of wavescattering Scattering of Electromagnetic Waves offers in three volumes acomplete and up-to-date treatment of wave scattering by randomdiscrete scatterers and rough surfaces. Written by leadingscientists who have made important contributions to wave scatteringover three decades, this new work explains the principles, methods,and applications of this rapidly expanding, interdisciplinaryfield. It covers both introductory and advanced material andprovides students and researchers in remote sensing as well asimaging, optics, and electromagnetic theory with a one-stopreference to a wealth of current research results. Plus, Scatteringof Electromagnetic Waves contains detailed discussions of bothanalytical and numerical methods, including cutting-edge techniquesfor the recovery of earth/land parametric information. The three volumes are entitled respectively Theories

andApplications, Numerical Simulation, and Advanced Topics. In thesecond volume, Numerical Simulations, Leung Tsang (University ofWashington) Jin Au Kong (MIT), Kung-Hau Ding (Air Force ResearchLab), and Chi On Ao (MIT) cover: * Layered media simulations * Rough surface and volume scattering simulations * Dense media models and simulations * Electromagnetic scattering by discrete scatterers and a buriedobject * Scattering by vertical cylinders above a surface * Electromagnetic waves scattering by vegetation * Computational methods and programs used for performing varioussimulations

THE SCATTERING OF ELECTROMAGNETIC WAVES BY MOVING BODIES. IET

One of the most methodical treatments of electromagnetic wave propagation, radiation, and scattering—including new applications and ideas Presented in two parts, this book takes an analytical approach on the subject and emphasizes new ideas and applications used today. Part one covers fundamentals of electromagnetic wave propagation, radiation, and scattering. It provides ample end-of-chapter problems and offers a 90-page solution manual to help readers check and comprehend their work. The second part of the book explores up-to-date applications of electromagnetic

waves—including radiometry, geophysical remote sensing and imaging, and biomedical and signal processing applications. Written by a world renowned authority in the field of electromagnetic research, this new edition of Electromagnetic Wave Propagation, Radiation, and Scattering: From Fundamentals to Applications presents detailed applications with useful appendices, including mathematical formulas, Airy function, Abel's equation, Hilbert transform, and Riemann surfaces. The book also features newly revised material that focuses on the following topics: Statistical wave theories—which have been extensively applied to topics such as geophysical remote sensing, bio-electromagnetics, bio-optics, and bio-ultrasound imaging Integration of several distinct yet related disciplines, such as statistical wave theories, communications, signal processing, and time reversal imaging New phenomena of multiple scattering, such as coherent scattering and memory effects Multiphysics applications that combine theories for different physical phenomena, such as seismic coda waves, stochastic wave theory, heat diffusion, and temperature rise in biological and other media Metamaterials and solitons in optical fibers, nonlinear phenomena, and porous media Primarily

a textbook for graduate courses in electrical engineering, Electromagnetic Wave Propagation, Radiation, and Scattering is also ideal for graduate students in bioengineering, geophysics, ocean engineering, and geophysical remote sensing. The book is also a useful reference for engineers and scientists working in fields such as geophysical remote sensing, bio–medical engineering in optics and ultrasound, and new materials and integration with signal processing.

Electromagnetic Wave Scattering on Nonspherical Particles

Wiley-Interscience

A timely and authoritative guide to the state of the art of wave scattering

Scattering of Electromagnetic Waves offers in three volumes a complete and up-to-date treatment of wave scattering by random discrete scatterers and rough surfaces. Written by leading scientists who have made important contributions to wave scattering over three decades, this new work explains the principles, methods, and applications of this rapidly expanding, interdisciplinary field. It covers both introductory and advanced material and provides students and researchers in remote sensing as well as imaging, optics, and electromagnetic theory with a one-stop reference to a wealth of current research results. Plus, Scattering of Electromagnetic Waves contains

detailed discussions of both analytical and numerical methods, including cutting-edge techniques for the recovery of earth/land parametric information. The three volumes are entitled respectively Theories and Applications, Numerical Simulation, and Advanced Topics. In the second volume, Numerical Simulations, Leung Tsang (University of Washington) Jin Au Kong (MIT), Kung-Hau Ding (Air Force Research Lab), and Chi On Ao (MIT) cover: Layered media simulations Rough surface and volume scattering simulations Dense media models and simulations Electromagnetic scattering by discrete scatterers and a buried object Scattering by vertical cylinders above a surface Electromagnetic waves scattering by vegetation Computational methods and programs used for performing various simulations

SCATTERING OF ELECTROMAGNETIC WAVES BY A PERIODIC SURFACE WITH ARBITRARY PROFILE

John Wiley & Sons

Electromagnetic Scattering is a collection of studies that aims to discuss methods, state of the art, applications, and future research in electromagnetic scattering. The book covers topics related to the subject, which includes low-frequency electromagnetic scattering; the uniform asymptomatic theory of electromagnetic edge diffraction;

analyses of problems involving high frequency diffraction and imperfect half planes; and multiple scattering of waves by periodic and random distribution. Also covered in this book are topics such as theories of scattering from wire grid and mesh structures; the electromagnetic inverse problem; computational methods for transmission of waves; and developments in the use of complex singularities in the electromagnetic theory. Engineers and physicists who are interested in the study, developments, and applications of electromagnetic scattering will find the text informative and helpful.

Inverse Acoustic and Electromagnetic Scattering Theory Springer Science & Business Media

The technique of elastic scattering of electromagnetic radiation has been used as a diagnostic tool in various disciplines of science,engineering,medicine and agriculture.The investigations relating to above problems may be divided in three categories:(i)Scattering by a single particle,(ii)Scattering by a tenuous system of uncorrelated scatterers and (iii)Scattering by a concentrated dispersion of scatterers.In the proposed book,the primary effort is to examine the analytic solutions of the scattering problems of types (i) and (ii) in

diverse backgrounds.For the completeness of the book,analytic solutions in scattering situations of type (iii) are also covered in reasonable details.

The Scattering of Electromagnetic Waves by Nonequilibrium Plasmas Pergamon

The Scattering of Light and other Electromagnetic Radiation covers the theory of electromagnetic scattering and its practical applications to light scattering. This book is divided into 10 chapters that particularly present examples of practical applications to light scattering from colloidal and macromolecular systems. The opening chapters survey the physical concept of electromagnetic waves and optics. The subsequent chapters deal with the theory of scattering by spheres and infinitely long cylinders. These topics are followed by discussions on the application of light scattering to the determination of the size distribution of colloidal particles. The last chapters are devoted to the Rayleigh-Debye scattering and the scattering by liquids, as well as the concept of anisotropy. These chapters also describe the effect upon light scattering of partial orientation of anisotropic particles in electrical and magnetic fields and in viscous flow. This book is of value to physical chemists and physical

chemistry researchers, teachers, and students.
Scattering of Electromagnetic Waves by Coated Sphere
Elsevier
Scatteringofelectromagneticwavesonthree-dimensional,dielectricstructures is a basic interaction process in physics, which is also of great practical - portance. Most of our visual impressions are caused not by direct but by scattered light, as everybody can experience of looking directly at the sun. Several modern measurement technologies in technical and medical diagn- tics are also based on this interaction process. Atmospheric remote sensing with lidar and radar as well as nephelometer instruments for measuring s- pended particulates in a liquid or gas colloid are only a few examples where scattered electromagnetic waves provide us with information concerning the structure and consistence of the objects under consideration. Using the inf- mation of the elastically scattered electromagnetic wave is a common ground of most of those measuring methods. The phrase “elastically scattered” - presses the restriction that we consider such interaction processes only where the scattered wave possesses the same wavelength as the primary incident wave. This book addresses this special scattering problem.
On the Scattering of

Electromagnetic Waves by a Dielectric Cylinder
Elsevier
A self-contained, accessible introduction to the basic concepts, formalism and recent advances in electromagnetic scattering, for researchers and graduate students.
On the Scattering of Electromagnetic Waves by Nonisotropic Inhomogeneities in the Atmosphere
Cambridge University Press
As relevant today as it was when it was first published 20 years ago, this book is a classic in the field. Nowhere else can you find more complete coverage of radiation and scattering of waves. The chapter: Asympotic Evaluation of Integrals is considered the definitive source for asympotic techniques. This book is essential reading for engineers, physicists and others involved in the fields of electromagnetics and acoustics. It is also an indispensable reference for advanced engineering courses.
Scattering of Electromagnetic Waves
CRC Press
This book gives a detailed overview of the theory of electromagnetic wave scattering on single, homogeneous, but nonspherical particles. Beside the systematically developed Green's function formalism of the first edition this second and enlarged edition contains additional material regarding group theoretical considerations for

nonspherical particles with boundary symmetries, an iterative T-matrix scheme for approximate solutions, and two additional but basic applications. Moreover, to demonstrate the advantages of the group theoretical approach and the iterative solution technique, the restriction to axisymmetric scatterers of the first edition was abandoned.

Scattering of Electromagnetic Waves, 3 Volume Set

Academic Press

One of the most methodical treatments of electromagnetic wave propagation, radiation, and scattering—including new applications and ideas Presented in two parts, this book takes an analytical approach on the subject and emphasizes new ideas and applications used today. Part one covers fundamentals of electromagnetic wave propagation, radiation, and scattering. It provides ample end-of-chapter problems and offers a 90-page solution manual to help readers check and comprehend their work. The second part of the book explores up-to-date applications of electromagnetic waves—including radiometry, geophysical remote sensing and imaging, and biomedical and signal processing applications. Written by a world renowned authority in the field of electromagnetic research, this new edition of

Electromagnetic Wave Propagation, Radiation, and Scattering: From Fundamentals to Applications presents detailed applications with useful appendices, including mathematical formulas, Airy function, Abel's equation, Hilbert transform, and Riemann surfaces. The book also features newly revised material that focuses on the following topics: Statistical wave theories—which have been extensively applied to topics such as geophysical remote sensing, bio-electromagnetics, bio-optics, and bio-ultrasound imaging Integration of several distinct yet related disciplines, such as statistical wave theories, communications, signal processing, and time reversal imaging New phenomena of multiple scattering, such as coherent scattering and memory effects Multiphysics applications that combine theories for different physical phenomena, such as seismic coda waves, stochastic wave theory, heat diffusion, and temperature rise in biological and other media Metamaterials and solitons in optical fibers, nonlinear phenomena, and porous media Primarily a textbook for graduate courses in electrical engineering, Electromagnetic Wave Propagation, Radiation, and Scattering is also ideal for graduate students in bioengineering, geophysics, ocean engineering, and geophysical remote

sensing. The book is also a useful reference for engineers and scientists working in fields such as geophysical remote sensing, bio–medical engineering in optics and ultrasound, and new materials and integration with signal processing.

The Scattering of Electromagnetic Waves by an Electron Beam and a Dielctric Cylinder

Springer

A timely and authoritative guide to the state of the art of wave scattering Scattering of Electromagnetic Waves offers in three volumes a complete and up-to-date treatment of wave scattering by random discrete scatterers and rough surfaces. Written by leading scientists who have made important contributions to wave scattering over three decades, this new work explains the principles, methods, and applications of this rapidly expanding, interdisciplinary field. It covers both introductory and advanced material and provides students and researchers in remote sensing as well as imaging, optics, and electromagnetic theory with a one-stop reference to a wealth of current research results. Plus, Scattering of Electromagnetic Waves contains detailed discussions of both analytical and numerical methods, including cutting-edge techniques for the recovery of earth/land parametric information. The three volumes are entitled respectively Theories and Applications,

Numerical Simulation, and Advanced Topics. In the first volume, Theories and Applications, Leung Tsang (University of Washington) Jin Au Kong (MIT), and Kung-Hau Ding (Air Force Research Lab) cover: * Basic theory of electromagnetic scattering * Fundamentals of random scattering * Characteristics of discrete scatterers and rough surfaces * Scattering and emission by layered media * Single scattering and applications * Radiative transfer theory and solution techniques * One-dimensional random rough surface scattering

Electromagnetic Wave Propagation, Radiation, and Scattering John Wiley & Sons

Waves represent an important topic of study in physics, mathematics, and engineering. This volume is a resource book for those interested in understanding the physics underlying nanotechnology and mesoscopic phenomena. It aims to bridge the gap between the textbooks and research frontiers in wave related topics.

Radiation and Scattering of Waves Elsevier

Electromagnetic (EM) wave scattering is of fundamental importance to antenna and radar design engineering, and the increasing interest in metamaterials has created a need for new approaches to solving scattering problems for characterizing

engineered media. This book lays the theoretical foundation for new computer programs in computational electromagnetics (CEM) and meets the need of today s researchers. This book represents over 30 years of the author s experience teaching this topic, with extensive lectures notes expanded to include advanced concepts and mathematical solutions to cover moderneffects on metamaterials and related advanced complexities.Problems and solutions at the end of each chapter help to reinforce concepts and highlight applications. This is an ideal text for advanced graduate students and researchers in EM and applied physics."