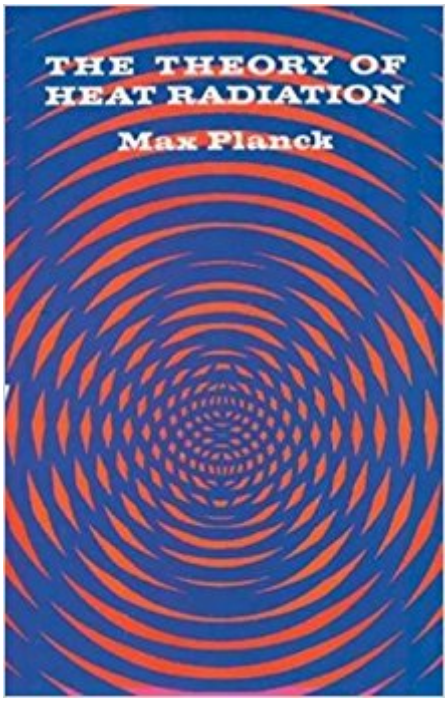
The Theory Of Heat Radiation (Dover Books On Physics)



Synopsis

The profoundly original ideas introduced by Nobel laureate Max Planck in this endeavor to reconcile the electromagnetic theory of radiation with experimental facts have proved to be of the greatest importance. Few modern introductions to the theory of heat radiation can match this work for precision, care, and attention to details of proof.Although Planck originally intended the book to be simply the connected account of ten years of study, he soon expanded it to a treatise which could serve as an introduction to the study of the entire theory of radiant heat in terms of the recently discovered principle of quantum action. He states his point of view in the introduction: "The hypothesis of quanta â | may be reduced to the simple proposition that the thermodynamic probability of a physical state is a definite integral number, or, what amounts to the same thing, that the entropy of a state has quite a definite positive value, which, as a minimum, becomes zero, while in contrast therewith, the energy may, according to the classical thermodynamics, decrease without limit to minus infinity." Although several other points of fundamental value in thermodynamics are included, the book is basically a rigorous elaboration of this fundamental idea.The treatment starts from the simple known experimental laws of optics and advances, by gradual extension and the addition of the results of electrodynamics and thermodynamics, to the problems of spectral distribution of energy and of reversibility.

Book Information

Series: Dover Books on Physics

Paperback: 256 pages

Publisher: Dover Publications; First Thus Used edition (February 17, 2011)

Language: English

ISBN-10: 0486668118

ISBN-13: 978-0486668116

Product Dimensions: 8.4 x 5.4 x 0.5 inches

Shipping Weight: 9.1 ounces

Average Customer Review: 3.7 out of 5 stars 8 customer reviews

Best Sellers Rank: #2,529,683 in Books (See Top 100 in Books) #57 inÂ Books > Science & Math > Chemistry > Nuclear Chemistry #991 inÂ Books > Science & Math > Physics > Dynamics > Thermodynamics #2020 inÂ Books > Textbooks > Science & Mathematics > Mechanics

Customer Reviews

Text: English, German --This text refers to an alternate Paperback edition.

Planck, Institute for Physics, Munich. --This text refers to an alternate Paperback edition.

This particular reprint is unusable. A certain amount of marginalia, and even some smudged/ambiguous symbols are to be expected, but this is beyond anything I've seen. Virtually every series of equations has at least some crucial part of it completely whited-out, and on some pages it is clear that several centimeters were cropped off of the outside edge, leaving whole columns of text out.The problem doesn't seem to be the source material, either, as can be seen by comparing the "preview" with the actual book - symbols that are clear in the preview are totally blank in the book (eg bottom of page 21).Planck's book itself is a treasure; but this version just isn't usable. I've had problems with "Forgotten Books" before, and will be more careful to avoid them in the future. was good enough to give an instant refund (less shipping), provided I print some labels and drop it off. Don't make the same mistake -- try a different print.

While this is the old book I have wanted to check out for years, it came as a bit of a disappointment when I finaly got it. The robot-based scan-and-flip system used for its re-creation did a pretty poor job in OCR. This is especially bad for all the equations used in this book. The end result is that I had to download the PDF images of this book from the publisher and painstakingly go through each page looking for typos (which are a lot...) To make things worse, the original copy used for the digital creation was full of hand-written notes and highlights, causing even more errors in the OCR results.Unless you are very, very interested in the subject, you should probably spend the time to read five other books.

As a graduate student taking a radiation heat transfer course, I found parts of this book a little difficult to grasp. It required many re-reads throughout the paragraphs, but obviously to truly understand radiative heat transfer, it helps to learn from a master like Planck. Recommended.

These are few classics ... but I could have have got them free as e-books from Forgotten Books publishers !

They say Nils Abel once said "Read the Masters!": he was talking about mathematics, of course.I think this advice from Abel should be extended to this book. It's clear-style, complete; proceeds from simple to complex concepts. It's just one of the best books on Physics I've read.

In 1900 Max Planck introduced a quantum constant into his mathematical expression for the energy distribution of blackbody radiation. This act is now considered to mark the beginning of the twentieth century revolution in physics. Planck's contemporaries had difficulty understanding his earliest papers on the quantum concept. In 1906 and 1914 Planck published more comprehensive accounts of his theory of blackbody heat radiation and his quantum hypothesis.This American Institute of Physics publication, The Theory of Heat Radiation, reprints these two later works - Vorlesungen Uber die Theorie der Warmestrahlung (1906) and his revised and expanded second edition (1914). The 1906 work is in German while the revised 1914 edition is in English. This publication is volume 11 in the outstanding AIP series titled The History of Modern Physics 1800-1950.I found the lengthy introduction by Allan Needell to be very helpful in placing Planck's work in the proper historical context and in identifying points at which Planck made key changes in his personal views. Much of Needell's introduction is devoted to Planck's gradual acceptance of Boltzmann's probabilistic approach to entropy.The first fifty pages examine heat radiation from the perspective of classical optics, including topics like radiation at thermodynamic equilibrium, Kirchhoff's law, and blackbody radiation. The next fifty pages, deductions from electrodynamics and thermodynamics, were substantially more mathematical. Planck discussed the Stefan-Boltzmann law of radiation and the Wien displacement law in detail as well as spectral distribution of energy radiation. Section III presents a general procedure for calculating entropy and introduces his quantum hypothesis. I did not study section IV (Planck's derivation of the law of the distribution of energy in the spectrum of blackbody radiation), nor section V (Irreversible Radiation Processes.)Despite an extended effort on my part, I did not find Planck's systematic examination of heat radiation to be particularly helpful as an aid to mastering thermodynamics. Its appeal is largely historical. Needell rightly observes that Planck's works will primarily benefit those readers who seek to study and understand the history of quantum physics. However, I do believe that general readers with substantial familiarity with thermodynamics and electrodynamics will find it worthwhile to study Allan Needell's thoughtful introduction and to browse Max Planck's seminal work.For those looking for a more basic self-tutorial, I highly recommend Thermodynamics by Enrico Fermi. Dover Publications has reprinted this remarkably lucid, concise work in an inexpensive soft cover format. This short book is based on a series of lectures given by Fermi at Columbia University in 1936.I also recommend chapter one, Thermal Radiation and Planck's Postulate, in the widely used text book Quantum Physics of Atoms, Molecules, Solids, Nuclei, and Particles by Robert Eisberg and Robert Resnick.

If you look through the first chapter, right away you will notice that the digital copy was unable to perform a good copy. Words like ultraviolet become

I recommend this book to anyone involved with radiative heat transfer, even engineers. Usually one makes contact with this subject through engineering-oriented books. But, at least in this case, the original work is much better. Engineers usually don’t like to read physics books, but this one is pretty accessible and easy to understand.

Privacy

FAQ & Help