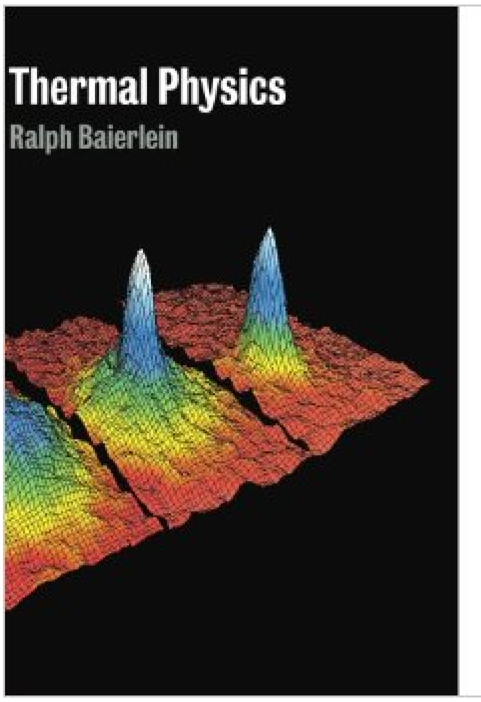
# Thermal Physics



## Synopsis

Suitable for both undergraduates and graduates, this textbook provides an up-to-date, accessible introduction to thermal physics. The material provides a comprehensive understanding of thermodynamics, statistical mechanics, and kinetic theory, and has been extensively tested in the classroom by the author who is an experienced teacher. This book begins with a clear review of fundamental ideas and goes on to construct a conceptual foundation of four linked elements: entropy and the Second Law, the canonical probability distribution, the partition function, and the chemical potential. This foundation is used throughout the book to help explain new topics and exciting recent developments such as Bose-Einstein condensation and critical phenomena. The highlighting of key equations, summaries of essential ideas, and an extensive set of problems of varying degrees of difficulty will allow readers to fully grasp both the basic and current aspects of the subject. A solutions manual is available for instructors. This book is an invaluable textbook for students in physics and astronomy.

## Book Information

Paperback: 460 pages

Publisher: Cambridge University Press (July 28, 1999)

Language: English

ISBN-10: 0521658381

ISBN-13: 978-0521658386

Product Dimensions:  6.8 x 0.9 x 9.7 inches

Shipping Weight: 2 pounds (View shipping rates and policies)

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Best Sellers Rank: #727,397 in Books (See Top 100 in Books)   #15 inÂ Books > Science & Math > Physics > Entropy   #324 inÂ Books > Science & Math > Physics > Dynamics > Thermodynamics #669 inÂ Books > Textbooks > Science & Mathematics > Mechanics

## Customer Reviews

While a nice, non-intimidating introduction to the field with an emphasis on physical insight and "back of the envelope" reasoning, it is NOT suitable as a graduate level text for statistical & thermal physics, contrary to what is stated on the back cover. I would say that if one were to use this and Reif as a combo as an undergraduate, one would get a good picture of the field from both a classic and a well done modern presentation.For graduate studies, by all means look elsewhere. McQuarrie, Kubo, Huang (if need be), heck, digging up the Dover reprints by Hill and Wannier wouldn’t be such a bad idea, really.

This is by far and away the best book on introductory thermal physics I’ve read. It is written in plain and clear English and the development of concepts and the required mathematical framework is language-based rather than formula-driven.The first three chapters give a beautifully concise overview of the basic concepts of first-year thermodynamics, with a very clear introduction of the concept of entropy. The highlight of the book is perhaps the development of the chemical potential and the Helmholtz and Gibbs free energies.

Baierlein gives a great introduction to thermal physics. He emphasizes the how and why and writes in english, i.e. this book is not a collection of formulas.He does a very good job of explaning statistical mechanics, providing insiteful discussions of the Maxwell-Boltzman, Einstein-Bose, Fermi, and canonical distributions. Great description of the chemical potential. Easy to understand discussion of entropy and multiplicity and also of the partial and exact differentials used in thermal physics.IMHO, it is the best introduction to the topic available. A similar book, but not as well written is "Thermal Physics" by Kittel and Kroemer. Of course if you are looking for a reference on Statistical Mechanics, chock full of mathematics, try Reif, Reichl, or Landau.

Hello. I have been studying physics and chemistry for about the last seven years and I am currently a graduate student. I am reading through Baierien and thoroughly enjoying the book. It does require I think, a bit of a background on waves and oscillations to know exactly what is happening in some of the derivations and an introductory course in chemistry, specifically thermodynamics, helps to recognize how these concepts are put to use. Besides that, the book is straightforward and the text is clear. Baierlein starts with very physically intuitive examples to derive his expressions and express the concepts and then moves to the abstract. The problems in the back, or what I have completed of them, are well thought out and do not ask the read to make great leaps between what is presented in the chapter and what is asked for.If you need a solid and straightforward introduction to the subject I would definitely recommend this.

I had trouble with a quantum book last year due to lacking any real examples. But this book is very nice in providing those examples. Some of the questions in each chapter start to diverge from the book some requiring either to look up values online or to have prior knowledge to something relating to this subject that even a major like myself lacked.

Baierlein’s book is not just unclear on thermal physics, the fundamental errors it contains show he has no understanding of the subject.The basis of all themal physics is the concept of temperature. He starts his explanation on p.1 (bottom) with:- "In some early studies of paramagnetic salts at low (p.2) temperature, gamma rays were used to heat the samples by radiation"What on earth is he doing introducing ’gamma rays’ and ’paramagnetic salts’ at this stage?This is part of the section 1.1 ’Heating and Temperature’.Immediate confusion here - ’heating is a process that arises from temperature difference, temperature is the property of a matter containing thermal energy. These are quite different but related matters, if the distinction is lost then the subject gets lost with it.He has opened with baby talk about frying eggs ’sunny side up’ (Is ’sunny side up’ important?) that avoids the common experience of things at a high temperature by referring to ’jiggling atoms’. Why not ’temperature’? Gas and vapour molecules do not really ’jiggle’.Not much later he mentions a few devices for measuring temperature, including (p.3) a thermocouple. No, thermocouples COMPARE temperatures (temperature DIFFERENCE) of two (or more) locations, they do not measure temperature unless a reference exists.But Baierlein is already in deep trouble.p.2: he writes:- ’1. There is nel transfer of energy (to or from the system, be it frying pan or muffin orsoda). 2. The amount of energy transferred may be controlled and known at the macroscopiclevel but not at the microscopic level. 3. The transfer of energy does not require any change in the system’s externalparameters.’1)The poor beginner has no idea what a ’system’ is so this is garbage to him/her.2)Controlled? How? Known "known at the macroscopic level but not at the microscopic level. Really?What does Baierlein mean by this? The microscopic level is the individual particl, the macroscopic is an assembly of particles and about the interaction of particles - different but related. This matter should be intoduced properly in a ’Introduction’, Baierlein merely states it, no way to treat a student!3) What does he mean by 3.? If the external parmeters do not change (e.g. switching the power on) there will be no transfer of energy.I suggest Baierlein has not thought this book through, it is contains not only errors but is not even self consistent (measuring temperature). It cannot be reccommended for any purpose at all.

The book lays out the concepts of thermodynamics as they relate to statistical mechanics very well. One downfall to the text is that some of the analogies chosen to simplify concepts are not very helpful. Also, I don’t believe answer keys are given to the chapter problems. Overall, however, a good read.

Book has fairly good qualitative descriptions. However the books description and work regarding analytically problem solving is minimal at best. Good for courses that focus on qualitative but bad for courses focusing on the analytic.



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