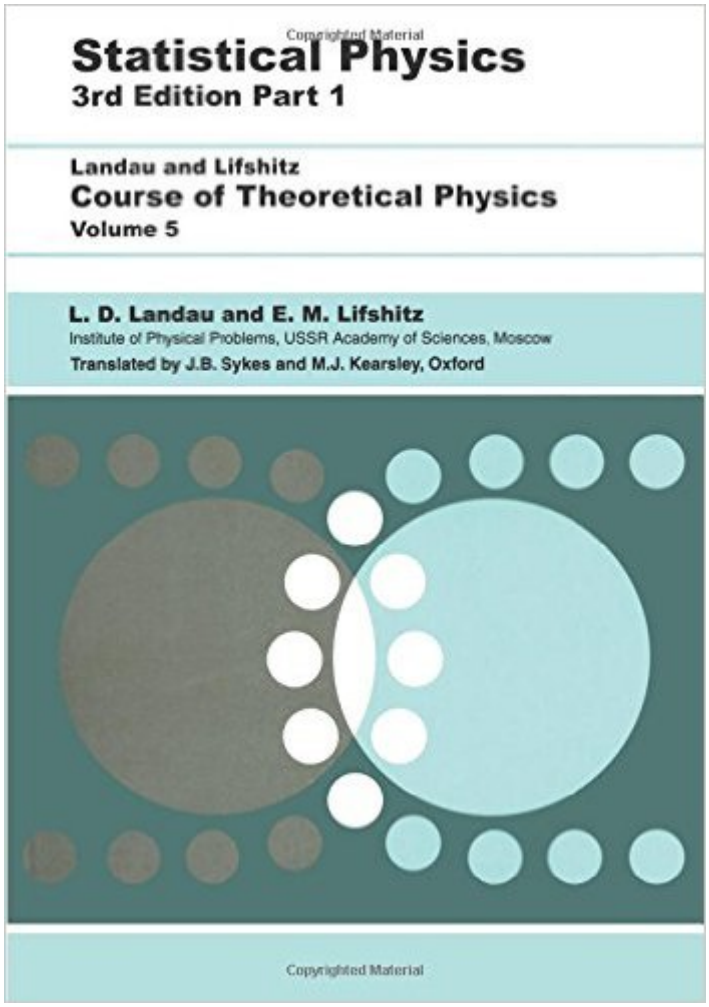
Statistical Physics, Third Edition, Part 1: Volume 5 (Course Of Theoretical Physics, Volume 5)



Synopsis

A lucid presentation of statistical physics and thermodynamics which develops from the general principles to give a large number of applications of the theory.

Book Information

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Customer Reviews

This book is a classic, especially in the sense it is somewhat old fashioned in its basic approaches when compared with newer books. For example it examines statistics and entropy from the ergodic as opposed to the ensemble approach. Information Theory and role of symmetry and symmetry breaking is not treated in detail. However I can't hold these omissions against the book since these developments happend mostly in the late 70s.What Landau does here, and which in explicably very few Statistical Mechanics books do nowadays, is the full Gibbs Formalism. Not only is the Gibbs Formalism more compatible with Quantum Mechanics, it can also fits in beautifully with Ensemble Statistics and Inofrmation Theory. More over, it is at once clear Maxwell and Boltzmann statistics are only special cases of the Gibbs formalism, and can be easily shown in a few lines.What Landau does, is to gave an elegant and cohesive view the trully fundamental features of Statistical Mechanics. Chapters 1-6 of this book alone displays a deeper level of understanding than whole books that have been written. If you are interested in Statistical Mechanics at all, this must be a centerpiece of your library.

This is the first volume of the Statistical Physics of Landau, Lifshitz. It's, of course, an extraordinary book, coming from these authors. The book starts with a chapter which defines entropy and derives

its main properties. Then comes a masterly chapter on Thermodynamics where the criterion for equillibrium is that the entropy be maximum. The things they derive from that! Now and then I like to reread this chapter just for fun! After that statistical mechanics of equillibrium is constructed along the lines of Gibbs, starting from the microcanonical distribution, wherefrom the others are derived. Applications then start. Thermodynamical equillibrium in General Relativity is treated, as is gravitational collapse of stars. Chemical equillibrium is wonderfully done, being applied also for relativistic reactions among elementary particles, as neutrinos. There is no other book even close to this, as physics is concerned.

This textbook is hardly to be surpassed by any other treatment of the subject. Originally written in 1937-1939, the treatment provides a bridge between the classics (Maxwell, Boltzmann, Gibbs) and the then new world of quantum mechanics.What really impresses me is its modernity in approaching the subject from the full quantum point of view, using quantum statistics and density matrices from the outset. This is unifying and economic at the same time. Moreover, time and again I have found that many "modern" concerns in equilibrium and nonequilibrium statistical mechanics, like, for instance, the issue about the equilibration of quantum many-particle systems, echoes opinions and insights already stated in this textbook. Everytime I pick my copy to take a glance I realize how puny such acclaimed books like L. Reichl’s or the new M. Kardar’s ones are (despite their many merits).There may be more gentle introductions to statistical mechanics out there (choose one), but this book makes an ideal 2nd. reading. This is the book that, together with S.-K. Ma’s and K. Huang’s books on the same subject, will make you a pro.

This book covers a lot of material in a fairly straightforward order - but it’s very dense and not a lot of helpful examples. Good for reference, but Pathria is probably better if you’re going through grad level stat mech for the first time.

This is the Volume 5 of the famous Course of Theoretical Physics by L. D. Landau and E. M. Lifshitz. All serious students of theoretical physics must possess the ten volumes of this excellent Course, which cover in detail and rigour practically all the branches of theoretical physics. The Volume 5 treats the subject of classical and quantum statistics. It contains an unusual approach of these subjects, based on the general Gibbs method, avoiding the introduction of ergodic hypotheses and, in the case of the ideal gas, of "a priori" probabilities, which are difficult to justify and serves only to obscure the exposition. The book is complete and contains chapters not usually

found in other similar books, such as the chapter on second-order phase transitions. The clarity of exposition and rigour is notorious in this book. A magnific book!