

Book Review: *Statistical Physics Statics, Dynamics, and Renormalization*

Statistical Physics Statics, Dynamics, and Renormalization. Leo P. Kadanoff, World Scientific, Singapore, 2000.

This is a wonderful book by one of the leading contemporary masters of the field. It excels not only in the topics covered but also in the author's unique approach to these topics. It reminds me a bit of the classic book by Landau and Lifshitz. The book consists of text and selected fundamental reprints mainly by the author but also by other important investigators. Almost all of the recent topics of research are covered in a surprisingly coherent and cohesive fashion. There are also homework problems in some of the chapters.

A list of the chapter headings gives an indication of the breadth of topics covered but certainly does not do justice to the approaches to those topics discussed. The first section of the book covers the Fundamentals of Statistical Physics. Even in this section, there are many worthwhile things to read, even by specialists in the field. The second section covers Random Dynamics with chapters and reprints on Diffusion and Hopping, From Hops to Statistical Mechanics and Correlations and Response. The third section entitled More Statistical Mechanics includes chapters on Statistical Thermodynamics and Fermi, Bose, and Others.

The fourth and largest section of the book, entitled Phase Transitions, has chapters entitled Overview of Phase Transitions; Mean Field Theory of Critical Behavior; Continuous Phase Transitions with two reprints of the author's works; Renormalization in One Dimension; Real Space Renormalization Techniques again with seminal reprints by the author and by others; Duality; Planar Model and Coulomb Systems with a reprint of Berezinskii's overview article; and XY Model, Renormalization, and Duality with reprints on the Kosterlitz-Thouless Theory and an article by Jose, Kadanoff, Kirkpatrick, and Nelson on Renormalization and Vortices. One could have wished to have more material on time-dependent phenomena but that would be like looking a gift horse in the mouth. There are

a number of misprints (especially Eq. (1.11)) but none of them are important enough to cause any difficulty in understanding. This book should be read by all workers in the field: faculty members, postdocs, and graduate students. Whether or not it is useful as a text depends completely on the instructor and his or her ability to deliver the material in as insightful manner as is presented in the text.

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