
Book Review

David Ruelle, *Statistical Mechanics: Rigorous Results*, W. A. Benjamin, New York, 1969; hardcover, \$15.00; paperback, \$5.95.

Ruelle has written a very careful and rather mathematical exposition of equilibrium statistical mechanics for systems of interacting particles, in particular in the infinite-volume or "thermodynamic" limit. The book begins with proofs of the existence of thermodynamic functions in this limit. These are followed by a chapter on correlation functions and virial expansions. Next comes a chapter on phase transitions, and finally, two chapters on the abstract algebraic approach to states of an infinite system. The emphasis throughout is on formal existence proofs and the like, an area in which the author has made many of the major contributions in recent years, rather than practical methods of computing or estimating the properties of a given model.

The subtitle is apt in both senses of the word "rigorous." First, the level of mathematical presentation should satisfy the most punctilious theoretical scientist (or mathematician); the proofs are real proofs. Second, the compact exposition and minimal reference to physical motivation make the task of working through the arguments no mean mental exercise even for a scientist whose specialty is statistical mechanics but who (like the reviewer) has a weak background in formal mathematics. Thus, while the book should be an important reference (cited if not read!) for mathematicians and theoretical physicists and chemists working on more mathematical problems in statistical mechanics, it is unlikely to become a popular textbook in the usual graduate courses.

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