

Book Review: *Simple Models of Equilibrium and Nonequilibrium Phenomena*

Simple Models of Equilibrium and Nonequilibrium Phenomena. J. L. Lebowitz, ed. Volume XIII of Studies in Statistical Mechanics, North-Holland, Amsterdam, 1987.

This volume of this well-known series contains two articles. The first, by J. K. Percus, is entitled, "Exactly Solvable Models of Classical Many-Body Systems," and the second, by B. J. West and K. Lindenberg, is entitled "State-dependent Fluctuations in Open Systems: Simple Models."

The chapter by Percus is extremely useful and provocative. He studies a number of equilibrium and time-dependent models which are either exactly solvable or in which the qualitative behavior of the model can be obtained unambiguously. The methods of solution are novel and the qualitative conclusions for "real" systems important. The chapter is well worth reading by experts and advanced students.

The emphasis in the article by West and Lindenberg is on systems that are coupled to external stochastic fields. The systems studied include a dye laser with fluctuating pump parameter, chemical reactions with fluctuating rate coefficients, linear mechanical oscillators with fluctuating frequencies, and non-Gaussian linear wave fields. Qualitative changes in the stationary distributions of the systems and noise-induced phase transitions are described and the dependence of these phenomena on the multiplicative nature of the stochastic forces emphasized. The authors have contributed significantly to the research in this area and the article is clearly written and stimulating.

In sum, the volume clearly maintains the high quality of this series and should be on the book shelves of those who do research in statistical mechanics and those who hope to do so.

I. Oppenheim
Massachusetts Institute of Technology
Cambridge, Massachusetts