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Statistical Mechanics, A Short Treatise

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Published in:
European Journal of Mechanics - B Fluids

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2000

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Enter, A. C. D. V. (2000). Statistical Mechanics, A Short Treatise. *European Journal of Mechanics - B Fluids*, 19.

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Book review

Statistical Mechanics, A Short Treatise, by **G. Gallavotti** (Springer Verlag GmbH & Co KG, 1999, 339pp., 21 figures, 1 table) DM 109, ÖS 796, SFr 99.50, FFr 411, £42, US\$ 68, hardcover ISBN 3 540 64883 6.

This book gives an unusual account of statistical mechanics.

The choice of topics is a very personal one, to an unusual degree based on the author's own interests. In fact I sometimes found it rather surprising, both for what is and is not there. It is definitely not for beginners, but almost each practitioner of the subject will find many valuable insights. The author is an eminent mathematical physicist who has made important contributions, not only to statistical mechanics, but also to quantum field theory, dynamical systems and condensed matter theory. His book is written in a very personal style, which offers much to enjoy.

The book contains a discussion on foundations and history of the subject which goes much deeper than is usual in a physics textbook. The discussion of the relationship with thermodynamics is equally much more extensive than one tends to find in a statistical mechanics textbook.

The treatment of equilibrium theory is based on an Italian Encyclopaedia contribution from the seventies, reflecting his important contributions from that period, but not too much updated since then, so that many interesting recent contributions are not mentioned.

His discussion of non-equilibrium theory, to which he has most recently put his attention, is much closer to the state of the art, and contains much of interest, in particular on the chaotic hypothesis and the Cohen-Gallavotti fluctuation theorem.

This is a book which each library should have, and which I can recommend to any expert. It is not suitable for learning the subject from, but once you have learned it, the notoriously tricky questions of interpretation and meaning are elucidated with deep insight and a lot of thought.

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