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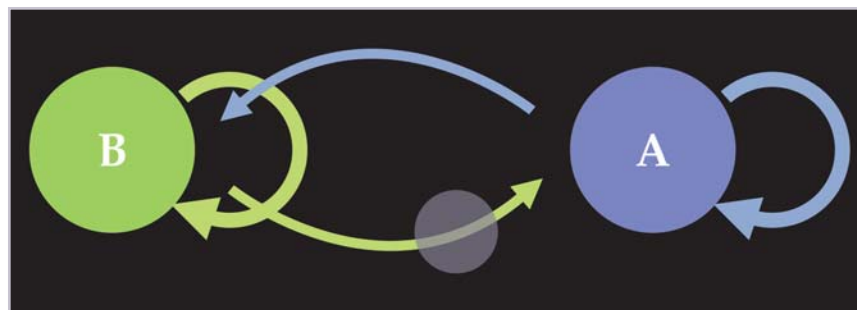
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The essentials of a broad and growing field

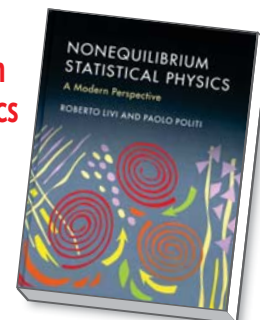
Equilibrium statistical mechanics is an enormous field, and no single book can capture its richness. That is even more true of nonequilibrium statistical mechanics, simply because there are so many more ways to be out of equilibrium than in it. The task of writing about nonequilibrium statistical physics is all the more daunting because in the past few decades, the field has grown and transformed beyond recognition. In particular, the area of nonequilibrium systems has expanded from the study of transport properties near equilibrium to the inclusion of active and even living matter. There is therefore a great need for a textbook that addresses some of the most significant recent developments in the field for scientists entering this vibrant area of research.

Roberto Livi and Paolo Politi, both internationally known experts in nonequilibrium phenomena, have now answered the call with *Nonequilibrium Statistical Physics: A Modern Perspective*. As you might imagine, authors have to make choices when writing a book dealing with such an expansive topic. On the whole, Livi and Politi have made smart, balanced choices. In fact, I was impressed by how many topics they manage to cover. The authors, furthermore, openly acknowledge that the topics covered reflect their personal taste and, to some extent, the suggestions of their peers.

The first two chapters cover the essential background material, including Brownian motion, the Monte Carlo method, Markov chains, and the variational principle. Chapters 3 to 7 describe more recent developments in nonequilibrium statistical physics, with a focus

Nonequilibrium Statistical Physics A Modern Perspective

Roberto Livi and
Paolo Politi
Cambridge U. Press,
2017. \$69.99



on out-of-equilibrium phase transitions and ordering kinetics. In addition, the book has 19 technical appendices that cover the Ising model, the Rayleigh-Bénard instability, and other bits of theory that are essential but would disrupt the narrative if included in the main text. The smart organizational choices mean that readers can get a feeling for the physical concepts involved and for where to find more information. A related website collects errata and offers additional resources for students.

In addition to difficult choices of subject inclusion, Livi and Politi had to decide how much detail to include. Again, I agree with their choices: They present the essentials using simple language, give a few examples, and provide a few references to more specialized books and reviews. Then they move on to the next topic. I found the chapters in the book to be reasonably self-contained. Committed students can work through the whole book, and less patient readers can concentrate on one or two chapters at a time.

Nonequilibrium Statistical Physics will be welcomed both by students and researchers entering the field and by those who are familiar with some recent developments and would like to learn more about others.

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