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MR2757286 (2011m:82001) 82-01 (82Cxx)

Krapivsky, Pavel L. [Krapivsky, Paul L.] (1-BOST-P); **Redner, Sidney** (1-BOST-P); **Ben-Naim, Eli** (1-LANL)

★A kinetic view of statistical physics.

Cambridge University Press, Cambridge, 2010. *xvi*+488 *pp*. $70.00. *ISBN* 978-0-521-85103-9

The authors justly remark at the very beginning of the book that statistical physics is not defined by a specific subject matter but rather by ideas and tools. The book presents an array of exact mathematical tools, of common underlying techniques and concepts.

We would also agree with the authors that the book is very good for students beyond their first year (however, not only for them; see below). The authors seem to always be reminding themselves that they are writing for students, so they feel their duty to emphasize points which may contradict the common beliefs of students. The authors think it is very useful to remind the student of the necessity to be critical. The solutions and the scaling estimates presented are beautiful. They show the reader how much, contrary to everyday wisdom, can be done without computers but just with a pen, a sheet of paper and a bit of human brain power.

As to the scope of the book, it comprises nearly all of the interesting, important and intriguing areas of statistical physics in which there has been considerable interest recently (especially starting in the 1970s). The chapters of the book are devoted to diffusion, collisions (that is, kinetic theory of gases but without any mention of the labor-intensive Chapman-Enskog method), exclusion, aggregation, fragmentation, adsorption, spin dynamics, coarsening, disorder, hysteresis, population dynamics, diffusive reactions, and complex networks. The only field the reviewer was surprised at not finding in the book was fractals (though non-integer dimension is indeed mentioned and used on one occasion).

The book contains only results already published. However, the reviewer would like to note that the book could be very helpful for researchers who, due to some reason or other, change their area within statistical physics. By reading the chapter on their preceding and their future area, they would be happy to see similar equations, similar enduring and omnipresent methods like generating function, considerations of dimensionality, Laplace and Fourier transforms, etc., which, for all that, lead to new results, to new laws of nature and to opportunities for lots of new directions of research.

Reviewed by *Alexander Orlov*

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