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Book Review: *Statistical Mechanics of Magnetically Ordered Systems*

Statistical Mechanics of Magnetically Ordered Systems. Yu. A. Izyumov and Yu. N. Skryabin, Consultants Bureau, New York and London, 1988.

The reader should first be warned that this book does not cover everything implied by its title. It is practically impossible to cover the wide variety of topics which should be reviewed under "statistical mechanics of magnetically ordered systems." Instead, the book is devoted to a *few selected techniques* used by theoreticians to study a *few selected models.* Specifically, the book discusses the anisotropic Heisenberg model, the Hubbard model, and the *s–d* model, and it gives a detailed technical discussion of the *diagrammatic techniques* for spin Green's functions, of the *path integration* approach, and of the *Bethe ansatz* for one-dimensional models. Other topics, such as critical phenomena, the renormalization group, or two-dimensional systems, are described only briefly and the relevant chapters cannot compete with alternative existing reviews and books. As stated by the authors in their introduction, they made "conscious attempts to narrow the circle of models," and did not aim to "find close approximations to the description of actual substances." Indeed, the book contains no reference to experiments, nor does it give specific numerical predictions. It also lacks in giving *physical insights.* It is rather a *technical mathematical* text, concentrating on the *techniques.* It should therefore not be considered as a textbook on magnetism, and it would certainly not be easily read by upper-level undergraduates, as proposed by the authors.

In spite of the above limitations, the book may be found very useful by advanced researchers, with a sound background in statistical physics and in many-body theory, who wish to master the three techniques listed above, i.e., diagrammatic expansions, path integrals, and the Bethe *ansatz.* In view of the recent renewed interest in strongly correlated electronic systems, especially in the context of high-temperature superconductivity, the book may indeed fill an important need. For these three techniques, the representation is clear and sound (although tedious), and one can use the book as a companion text for their practical use.

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Like many translations, the book suffers from poor linguistic editing, and it contains quite a few misprints. Its use would also be facilitated if it had an index. The book also lacks many relevant references published in the Western literature. In compensation, it gives many Russian references, some of which might have been overlooked by Western researchers. It is therefore a useful guide to the relevant Russian literature.

In conclusion, this is not a textbook for the general reader or student, but it is a useful technical monograph for the expert researcher in need of the three specific very important techniques.

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