

detailed examples of this new text from Moscow. Richard N. Zare's text *Angular Momentum* (Wiley, 1988) contains examples of molecular and chemical systems but does less physics. A surprisingly large number of other texts that cover optical, nuclear, and astrophysical applications can be easily found by searching the Internet.

This book is written in clear English and contains a number of neatly done figures illustrating important points. The index, especially useful to a new reader, is adequate. The rather concise bibliography contains only 31 entries, and, as with most comparable books, there are no problems to guide students.

In summary, *Polarization and Correlation Phenomena in Atomic Collisions* is a crisp, fresh look at a topic with relatively broad application, containing numerous and clear examples from the field of atomic collisions and especially helpful mathematical summaries. Written by internationally recognized authorities in the field, it is useful as both a reference book and a textbook for graduate students. Let us welcome this fine addition to our bookshelves.

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Magnetism and Superconductivity

▶ Laurent-Patrick Lévy
(translated from French
by Stephen Lyle)
Springer-Verlag, New York, 2000.
\$58.95 (467 pp.).
ISBN 3-540-66688-5

A proper description of Laurent-Patrick Lévy's *Magnetism and Superconductivity* requires a new word generalizing the concept of "monograph" and signifying two topics inside a single volume. This poses a challenge, as "digraph" is neither elegant nor descriptive. Perhaps "dual monographs" or "diatopical" will do. The problem is a title that will lead the casual reader, as it did this reviewer initially, to expect a treatment of a new generation of copper oxides that combine the physical virtues of magnetism with those of superconductivity. In fact, *Magnetism and Superconductivity* has nothing to do with high-temperature superconductivity. Rather, it moves on two separate tracks, with the first 260 pages or so consisting of a treatise on the origins of magnetism in atoms, molecules, and solids, and on the solution of mathematical models thereof, with the rest devoted to conventional, low-tempera-

ture superconductivity mediated by the electron-phonon interaction.

The prerequisites for understanding the magnetism portion include a good background in quantum mechanics and some familiarity with linear algebra. However, the concepts of second-quantization, symmetry theory, and group theory are not assumed, as elements of these topics are accurately and briefly developed in appendices.

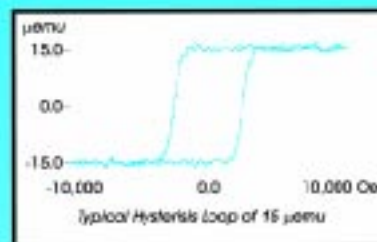
The contents of the first portion of the book are, in fact, standard in the study of the physical origins of magnetism and are almost all covered in a variety of existing textbooks by other authors. These topics include exchange forces, mean-field theory and phase transitions, Ising and XY models, linear response theory, spin waves, quantum chains, and itinerant magnetism. Each topic is introduced and manipulated with mathematical nicety and a sure hand. Transfer matrices, correlation functions, solitons, and an elementary overview of the Hall effect are additional topics that are touched on (or, rather, distilled) in the manner suitable for French students at a certain level of their graduate education.

The second half is, similarly, a standard treatment of its topic. The theoretical concepts are elaborated as a combination of Bardeen-Cooper-Schrieffer (BCS) theory, Bogoliubov's transformation, and the Ginzburg-Landau phenomenology. Many meaningful applications that are developed or at least touched on include the Josephson effects, Andreev reflection, vortices, gapless superconductivity, type I versus type II materials, and SQUIDs. As in the first half, the contents are standard in the field and can be found in several earlier texts on superconductivity. Again, the presentation is uniformly clear and succinct and readily accessible to graduate students at a certain level.

For the above reasons, I recommend this book to students of magnetism or of superconductivity (alas, there may not be too many students of both these disciplines in the US). They will find this to be an excellent although not an innovative textbook in the field of their choice. Either treatment will expand their horizons and help them deal with the difficult problems sure to arise in an uncertain future. As a bonus, they will receive a second textbook in the other field and may someday be glad of it.

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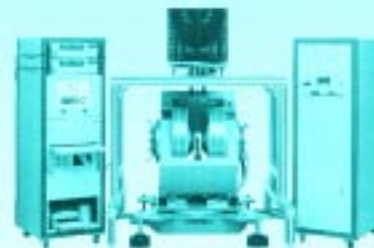
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