various problems that have met with success: for instance, the relation of the ratio (Fe + Mn)/(Fe + Mn + Mg) to the refractive indices of cordierite; the re-determination of the transitions in the low plagioclase series. Three appendices give: (*A*) formulae to solve spherical triangles and some proofs omitted in the text; (*B*) more details on the *EXALIBR* program; (*C*) the derivation of Joel's equation and the cos $2V$ formula. Finally, answers to the 19 problems proposed in the text, 44 footnotes collected under *Notes*, a list of 90 references and a six-page index complete the volume.

The book should be a companion volume to the author's *Optical crystallography* (1961), definitely a prerequisite for *The spindle stage*. Such basic material should find a place in every science undergraduate curriculum. Its actual presentation assumes very little (not even the 'vector dot product'); on the whole it proceeds at a leisurely pace and gives the directions for use in minute detail, with over 160 accurate drawings excellently reproduced, graphic solutions, tabulations to facilitate calculations and nomograms to dispense with them. In short the job of imparting the 'know-how' is superbly done. As to the 'know-why', some proofs are left out and the clarity of the text occasionally suffers from the superabundance of details. The best explanation is often found in the small print of the lengthy figure legend, where a specific example is thoroughly thrashed out. The author must agree with us, for he sometimes refers the reader from the text to the legend! Professor Bloss is aware of the duplication, which he dubs the 'double coverage', but he says in its defense (p. xii) that he used it before and 'most students ... truly appreciate the practice'. Every good teacher will accept this argument.

As to book-making, printing and binding, this volume deserves the highest marks.

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Crystallography. By R. STEADMAN. Pp. viii + 120. Wokingham, England: Van Nostrand, 1982. £3·95.

The aim of this book, according to the author, is to provide a workmanlike knowledge of crystal geometry and the ability to interpret X-ray powder photographs and electron diffraction patterns. In this he succeeds very well, however, at a price. For applying the proper techniques in the interpretation of diffraction diagrams and the deduction of simple Bravais lattices the book is an excellent guide, but it presupposes a proper theoretical background or at least a general discussion of diffraction methods. It is only then that the book comes into its proper right, demonstrating the simplicity of the underlying ideas of crystallography and diffraction theory. Used by itself, the student at one end of the scale – the very intelligent one – will feel frustrated, whereas the student at the other end of the scale will become overconfident.

Any student using this book as supplementary reading, along with a theoretical text, will be highly rewarded and, as such, this little book has great merits.

The cost of the book, £3·95, is not too high and students will find it well worth the price.

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Recent developments in condensed matter physics, Vol. 1. Edited by J. T. DEVREESE. Vol. 2. Edited by J. T. DEVREESE, L. F. LEMMENS, V. E. VAN DOREN and J. VAN ROYEN. Pp: Vol. 1, xvii + 856; Vol. 2, xvii + 447. New York: Plenum, 1981. Price: Vol. 1, US$85.00; Vol. 2, US$59.50.

These two volumes are the first of a set of four which contain the proceedings of the first general conference of the Condensed Matter Division of the European Physical Society. The conference was held on 9–11 April 1980 in Antwerp.

The first volume contains fifty-four invited papers presented at this forum. The second volume consists of a collection of approximately one-third of the contributed papers.

The conference was organized to provide, in Europe, a setting similar to that of the popular 'March Meeting' of the American Physical Society. In this the organizers have evidently succeeded. They have brought together a large cross section of current condensed-matter research, and they have gone one step further in providing for the publication of these interesting proceedings – something which is not attempted in conjunction with the somewhat larger March Meeting.

The invited papers nearly all fall into one of two categories. They either provide a review of the long-term development of a particular field, or they offer a summary of recent, outstanding efforts of a group of investigators involved in a topic of current interest. Professor A. Abragam reviewed methods for producing and observing antiferromagnetic and ferromagnetic states of nuclear spins in dielectric crystals – an area in which he pioneered. Eric Karlsson and Dierk Herlach each present a detailed development on the use of positive muons in metal physics, together with results involving defects in metals.

Most of the invited contributors took their task seriously, and the result is a collection of well-considered and well-written papers. The presentations are such that they attract the interest not only of the specialist but they also capture an attentive audience from neighboring disciplines.

As is the case in much of condensed-matter physics in the United States today, a large fraction of the scientific effort in Europe is directed towards new classes of materials and on the special properties of low-dimensional systems. An increasing amount of attention is going toward amorphous

materials, metallic glasses, surfaces and interfaces. Specific topics in the first volume include: *Localization and disorder, Metals and alloys, Fluids, Excitons and electron–hole droplets, Semiconductors, Defects, Impurities, Spin waves and magnetism, Superionic conductors, Polarons, Molecular crystals, Superconductivity*, and *Spin glasses*.

The papers in the second volume are mostly presented in the form of extended abstracts, containing one or two figures and a brief list of references. These often give the impression of being work in progress, and as such can be particularly useful in providing a picture of what people are working on currently. The average length of the papers is slightly greater than seven pages, and many are concise and useful. The topics which are included are divided into eight basic sections which are: *Metals and alloys, Dielectric properties of metals, Disordered systems, Amorphous semiconductors, Glasses, Chalcogenides, Surfaces and interfaces*, and *Molecular crystals*.

As in Vol. 1, the papers in Vol. 2 are a balanced mixture of theoretical developments and experimental results. The section of disordered systems, for example, begins with a theoretical treatment of the thermodynamic properties of quenched disordered systems by A. Huber; next are presented results on short-range order in liquid selenium–tellurium systems by Bellissent & Tourand. These are then followed by five additional papers involving one-dimensional disordered systems (two papers), conductivity calculations for disordered systems, transport properties, and finally a study of critical behavior near the conductor–insulator transition.

These volumes are recommended to researchers who are active in condensed-matter physics and materials science.

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Developments in high power lasers and their applications. Edited by C. PELLEGRINI. Pp. xi + 477. Amsterdam: N. Holland, 1981. Price US $80.75, Dfl 190.00.

This book gives a very broad treatment of the developments and the applications of high-power lasers, over the world. In particular, the original development of the theory is given; also many theories and experiments of researchers worldwide are included. The authors expect the readers to have a knowledge of Maxwell's equation, Schrödinger's equation, quantum statistics, and so on, so this book is at the level of a text for a graduate course in either physics or electrical engineering.

In the first chapter, *Introduction to high-energy lasers*, several types of high-power lasers (CO_2, CO, HF, iodine, glass, eximer) are treated theoretically, with rate equations or with photon transport equations.

In *Laser-fusion and laser–plasma interactions*, laser–plasma interactions are discussed theoretically (as stimulated scattering processes by mode coupling, resonance absorption mechanism, ponderomotive force) and are briefly compared with experimental data.

The chapter *High-power, short pulse* CO_2 *laser systems for inertial-confinement fusion* treats high-power laser operation basically, and pulse propagation theoretically. Retropulse protection, suppression of unwanted parasitic oscillation, power amplifier technique and alignment techniques are explained, with many illustrations.

The next chapter is on *The high-power iodine laser*. The iodine laser is the newest high-power short-pulse laser and has quite recently been demonstrated to be successful in fusion experiments. Fundamental reactions of this laser are explained; also treated is pulse propagation theory. A description of the 1 TW iodine laser is added.

The next articles, *High-power tunable lasers and their applications to photochemistry and isotope separation, Photophysical and photochemical properties of gaseous* UF_6, and *High-power 16 micrometer lasers for uranium isotope separation*, deal with infrared tunable lasers (HF, HCl, CO, CO_2, N_2O, *etc.*), develop the theory, and show applications to laser chemistry and uranium isotope separation. Many topics in this area are illustrated graphically. In a chemical laser, the levels involved in the stimulated emission process are inverted directly as a result of chemical reaction. In the article, *High-power chemical lasers*, this laser is carefully defined and some examples (HCl, HF, *etc.*) are used, to illustrate the physical principles, or chemical explanation.

In the last three articles, *Single-particle theory of the free-electron laser, Coherent dynamics of the free-electron laser*, and *The free-electron laser: storage ring operation*, theories for the interaction between particles and fields are outlined, and some experimental data for the FE laser are given, and discussed.

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EXAFS spectroscopy: techniques and applications. Edited by B. K. TEO and D. C. JOY. Pp. viii + 275. New York: Plenum, 1981. Price US $32.50.

This is the first book devoted entirely to the expanding field of X-ray spectroscopy. EXAFS refers to those oscillations of the X-ray absorption coefficient on the high-energy side of an absorption edge, which have been known for 50 years as the Kronig oscillations. However, it remained a confusing scientific curiosity up to 1970 when Sayers, Stern & Lytle demonstrated, using Fourier transforms of the modulations, that EXAFS is due to the backscattering of the photoelectron by a few shells of neighbours around the excited central atom. A simple single scattering theory could then be