

its entirety in the fourth Appendix.

Segrè's presentation follows Fermi's role in and contributions to the US Atomic Energy project and provides a very interesting picture, not only of the discoveries and scientific and technical progress made by Fermi and the other scientists, but also of the different personalities and of their human relations. The last period of Fermi's life is presented in the chapter "Professor at Chicago." As soon as the war ended Fermi went back to his university life and devoted a few years to research on several solid-state problems with intensive beams of slow neutrons. But

already in Los Alamos Fermi had started to concentrate his attention on what was to become particle physics and to prepare himself thoroughly, expecting also to switch experimentally to the new field as soon as new tools became available. When the synchrocyclotron at the university began to operate, he started studying the pion-nucleon collision, obtaining results of permanent importance.

One of the aspects of Fermi's personality that emerges very clearly from reading the book by Segrè is the exceptional capacity he had to create a new school rapidly wherever he went; in

Rome, as well as at Columbia or in Chicago, before or after the war, Fermi was always able to assemble in a few months a group of young collaborators who devoted themselves to research with extraordinary vigor and enthusiasm. Fermi by his exemplary and exceptional determination and drive and by the clarity of his teaching always combined with his research work, inspired all young collaborators.

Segrè's presentation of Fermi's life is plain and concise, but at the same time very effective. In each chapter one finds, here and there, considerations and remarks that help to clarify the various aspects of Fermi's personality. The simplicity of the language is an homage to Fermi, who certainly would not have liked to be remembered in magniloquent terms.

As one of the people that had the great privilege to be a pupil of Fermi and later one of his collaborators for most of the time he was in Rome, it seems to me that the description by Segrè of the Italian period is very successful in reproducing the general atmosphere of the different situations, in particular that pervading the old Institute of Physics of Via Panisperna. I am not in the position to judge with the same direct knowledge of the daily facts the presentation of the American period of Fermi's life; but from the frequent contact I maintained with Fermi himself and that I had with most of his old and new pupils and collaborators, I have the impression that the description of the second part of Fermi's life is not less effective in conveying to the reader a fresh and lively image of this man, who could master theory and experiment equally well, and whose remarkable achievements have been always reached by extremely simple methods, methods that reflected his clarity of mind and his dominance of physics.

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Optical Properties of Solids

Frederick Wooten

260 pp. Academic, New York, 1972.
\$12.95

Of the methods available for studying the electronic structure of solids, optical methods have always appealed to me because of their directness. The transparency of rocksalt and diamond shows that they have large energy gaps, and the different colors of copper and silver are clues to their electronic structures. The second of these examples is discussed in Frederick Wooten's book, which treats the intrinsic optical

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properties of solids at a beginning graduate level, assuming knowledge of electromagnetic theory and elementary quantum mechanics. The style is personal and informal, and no steps are omitted in the derivations. There are more than 100 well chosen illustrations, and each major chapter has a set of problems, as well as references to selected papers, reviews and books. Gaussian units are used throughout, but their relation to practical units is not mentioned.

Most of the basic aspects of the optical properties of metals, semiconductors and insulators are covered, with emphasis on the dielectric function as a unifying concept. Infrared absorption by lattice vibrations is discussed only briefly, and stimulated emission and nonlinear effects are not treated at all. On the other hand, there is a useful introduction to photoemission, drawing in part on the author's own work. This is a readable book, and gives a good conceptual introduction to the optical properties of solids.

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Raman Spectra of Molecules and Crystals.

M. M. Sushchinskii

446 pp. Wiley, New York, 1972. \$34.00

There have been numerous books and articles published reviewing the ever growing field of Raman scattering. However most of these have been application oriented and have discussed the theoretical foundations of light scattering phenomena only superficially. Sushchinskii, in his preface, states his objective of bridging the gap between the extensive theoretical treatment given by G. Placzek and the more qualitative discussions currently available in other books and review articles. He has succeeded very well in this goal by presenting a complete but concise discussion of Raman scattering ranging from a description of the classical polarizability theory for individual molecules through R. Loudon's theories of polar modes in crystal lattices and a complete chapter on stimulated Raman scattering. Wherever appropriate, specific examples and illustrations have been cited.

Sushchinskii originally published this book in the Soviet Union in 1969. The English edition was prepared by the Israel Program for Scientific Translations in 1972. The text has no hint of Russian sentence structure and flows in perfect idiomatic English.

Raman Spectra of Molecules and Crystals is divided into four long chap-

ters: General Theory of Raman Scattering, Raman Spectra and Molecular Structure, Raman Spectra of Crystals, and Stimulated Raman Scattering. In addition to classical polarizability theory, the general-theory chapter includes a discussion of quantum effects such as the absorption and emission of radiation, Raman intensities, and vibrational transitions. Chapter II, Raman Spectra and Molecular Structure, comprises nearly half of the book and covers a variety of subjects. Included are discussions of rotational Raman scattering and rotational sidebands on vibrational lines. In addi-

tion, there is a rather standard section on the group theory of vibrational modes and a section on the calculation of frequencies. Considerable attention is given to the characteristic Raman shifts of simple paraffins, structural analysis and various systematic effects observable in organic molecules. These sections could prove very useful to analytical and organic chemists. The chapter on Raman scattering from crystals discusses space group theory, lattice vibrations, polar modes and first- and second-order Raman scattering. The last chapter gives an excellent introduction to the top-

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