

references. It is unfortunate that a book like this has to appear two years after it is written, in spite of its photo-reproduced typewritten format.

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An Introduction to High-Voltage Experimental Technique

D. Kind

240 pp. Vieweg, Wiesbaden, Fed. Rep. Germany (US dist.: Heyden, Philadelphia, Pa.) 1978. \$19.50

In the past decades interest in high voltage has expanded from the area of electric power-line design to many areas of physics, chemistry and semiconductor engineering—fields in which high-intensity electric fields are now frequently found. Dieter Kind's book is most welcome because a good presentation on modern high-voltage techniques has long been needed.

The author is one of Europe's foremost authorities on the subject and was for years the director of the same institute at which the Marx surge generator was invented; he now is the president of Physikalisch-Technische Bundesanstalt, the "older brother" of our National Bureau of Standards. The book is written in the best tradition of European technical bookwriting where the student's and the practicing engineer/scientist's needs are merged with skillful balance. To quote: "Despite all progress in theoretical work, the physical phenomena in these materials is still not sufficiently understood. Hence, experiment is the bias of scientific work in this field. It follows, that experience in experimental work is essential for the successful treatment of numerous problems."

Kind considers the following topics in his treatment: the generation and measurement of high ac, dc, impulse voltages and currents; nondestructive testing; electric fields; liquid and solid dielectrics; partial discharges; breakdown of gases; internal overvoltages; traveling waves; arcs; impedance of plane conductors; statistical evaluation of test results; confidence limits; design and operation of high-voltage laboratories. Each chapter starts with five to seven page theoretical treatise, followed by a description of a related experiment concluding with an evaluation of techniques used. At the beginning of each chapter the most pertinent literature is given and, in the same way, all statements are referenced.

The translators have done a commendable job in making the book easy to read. Some of the British terminology used, like "earthing" instead of "grounding," and the use of International Electrotechnical Commission's alternative U for voltage, instead of E or V , should pose no problems to the reader. There are only two things to be aware of: following German standards the book has no graphical symbol for "impedance" and the complex coordinate system is shifted by $+90^\circ$; thus the real axis points upward in the phasor/vector diagrams. The well designed and executed drawings and photographs add to the attractiveness of the book.

An Introduction to High-Voltage Experimental Technique is a must for the shelf of everyone involved in any aspects of high-intensity electric fields and of electric power engineers in general.

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Elementary Particle Physics: An Introduction

D. C. Cheng, G. K. O'Neill

431 pp. Addison-Wesley, Reading, Mass. 1979. \$29.50

The past decade has been one of continual ferment and extraordinary achievement in high-energy physics. The constituent (quark model) picture of the strongly interacting particles has steadily gained experimental support from the pointlike character of inelastic electron-proton scattering, the jet structures observed in electron-positron annihilation, the atom-like spectra of the ψ/J and Y families of resonances, and more. Simultaneously, confidence has grown in the view that interactions among the fundamental constituents are described by gauge field theories. Prominent examples are the Weinberg-Salam model of weak and electromagnetic interactions and quantum chromodynamics, the gauge theory of strong interactions among quarks and gluons.

This new perspective has been shaped by both theoretical and experimental advances: the proof that the Weinberg-Salam theory is renormalizable, the discovery of weak neutral currents and the observation of charm; the recognition that gauge theories may be asymptotically free; the measurement of Bjorken-scaling violations in inelastic lepton-nucleon scattering, and the evidence for gluon jets. With this new perspective have come new experimental initiatives, including imminent searches for the intermediate bosons of the weak interactions, for proton insta-

bility and for neutrino oscillations.

In my view, high-energy physics is defined by what high-energy physicists are doing and a graduate course should introduce students to contemporary concerns. The selection of apposite topics is no easy task for the author of a textbook on such a rapidly moving field. In *Elementary Particle Physics*, David C. Cheng and Gerald K. O'Neill have chosen not to write a thoroughly modern introduction to particle physics, but rather to emphasize time-honored material. Unfortunately "time honored" all too often means antique. The book is divided into a brief introduction and major sections on the electromagnetic, weak and strong interactions. The strong-interaction portion, which makes up 40% of the text, contains only three post-1969 references: passing mention of the papers announcing asymptotic freedom and a citation of the 1978 *Review of Particle Properties*. The extensive studies of high-energy collisions carried out at the CERN Intersecting Storage Rings, at Fermilab and at the CERN Super Proton Synchrotron are thus ignored. This is regrettable, even within the authors' selection criteria, because many experiments and analyses of the recent era address traditional concerns more incisively than did earlier work. The rest of the book is scarcely more modern: it contains a half-dozen post-1975 references *en passant*.

Such complaints might be overlooked if *Elementary Particle Physics* were otherwise well-written. However, Cheng, a former high-energy experimenter now with Intel Magnetics and O'Neill, professor of physics at Princeton and a pioneer of colliding-beams research, have produced a disappointing book. It contains many statements that are misleading and many that are wrong.

For example, in a lengthy treatment of SU(3) and the quark model, there is continual confusion between the terminology "group" and "representation." The difference between SU(3) and the quark model is garbled, the photon is incorrectly described as isoscalar, and it is stated, also incorrectly, that charm as well as color is needed to reconcile the quark model with the Pauli exclusion principle.

A section on Regge theory (the utility of which has been confirmed by the high-energy experiments the book neglects) highlights something called the "interference model," which has been discredited since the discovery of duality in the late 1960s. The authors say that the total cross section should decrease as $1/\log$ (center-of-mass energy). What should be meant is the elastic cross section. In any event, the big news of early 1973—not mentioned here—is that

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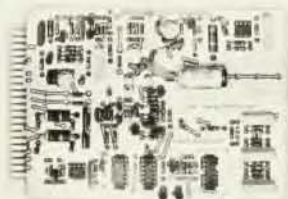
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both grow with increasing energy.

The section on weak interactions contains a brief resume of the Weinberg-Salam model in which a partial-wave unitarity argument is given for the existence of the neutral intermediate boson Z^0 . The mass of the Z^0 is incorrectly stated to be twice the mass of the charged intermediate boson $W^\pm$. The Higgs boson, whose existence is required by the same unitarity argument, is not mentioned. The theory is ascribed to Steven Weinberg in 1964 (1967 is correct), but the reference does not exist: it turns out to be a corrupted reference to the work of Abdus Salam and John Ward.

As these examples suggest, *Elementary Particle Physics* is so consistently unreliable that no student should be forced to struggle with it. I may suggest some alternatives. For a one-year course, the books by Steven Gasiorowicz and by Martin Perl, though somewhat dated, are more scholarly and authoritative, and an excellent short introduction is provided by Donald Perkin's slender volume.

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book notes

Patent and Trademark Tactics and Practice. D. A. Burge. 210 pp. Wiley-Interscience, New York, 1980. \$15.95

The inventor of a new device or process often finds himself at a loss when he decides to obtain a patent to protect his newly developed "intellectual property." Here is a book that should fill that need. Written by a practicing patent attorney, *Patent and Trademark Tactics and Practice* describes how to select a patent attorney, what can be patented, how to apply for a patent, how to keep invention records, how to protect trade secrets and tips on copyrights. Three appendices contain sample utility and design patents as well as a trademark registration.

Toward the Endless Frontier: History of the Committee on Science and Technology, 1959-79. 1173 pp. US Government Printing Office, Washington, D.C., 1980. \$11.00

This account of the political judgments behind twenty years of the most rapid scientific development in history—from the Sputnik scare to today's search for advanced energy technologies—reads less like a congressional report than a popular history. Ken Hechler, author of *The Bridge of Remagen*, former professor of political sci-

ence and history at Columbia, Princeton and Marshall Universities and member of the Committee on Science and Technology for 18 years, has collected a mass of anecdotal as well as factual information on the doings of the committee and has condensed it into a blow-by-blow account. Former Ohio congressman, Charles A. Mosher found it "more fascinating than I could have hoped, it abounds in meaningful incidents and details of which I was not aware... I have a... better understanding of the inner dynamics and broader influence of our committee's efforts."

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Advances in X-Ray Analysis (Proc. of a conf., Denver, Colorado, July-August 1979). J. R. Rhodes, C. S. Barrett, D. E. Leyden, J. B. Newkirk, P. K. Predecki, C. O. Ruud, eds. 406 pp. Plenum, New York, 1980. \$45.00

Radioactivity and Its Measurement (Second Edition). W. B. Mann, R. L. Ayres, S. B. Garfinkel. 291 pp. Pergamon, Elmsford, N.Y., 1980 (first ed., 1966). \$12.50

Photo-Electronic Image Devices (Proc. of symp., London, UK, September 1978). B. L. Morgan, D. McMullan, eds. 558 pp. Academic, London, UK, 1980. \$75.00

Fitting Equations to Data: Computer Analysis of Multifactor Data (Second Edition). C. Daniel, F. S. Wood. 476 pp. Wiley, New York, 1980. \$21.95

Fluorescent Lamp Phosphors: Technology and Theory. K. H. Butler. 351 pp. Pennsylvania State U., University Park, Pa., 1980. \$39.50

Metrology and Fundamental Constants (Proc. of a school, Varenna, Italy, July 1976). A. F. Milone, P. Giacomo, eds. 845 pp. North-Holland, New York, 1980. \$124.50

Modern X-Ray Analysis on Single Crystals. P. Luger. 325 pp. Walter de Gruyter, New York, 1980. (Price not stated)

Electron-Beam Technology in Micro-electronic Fabrication. G. R. Brewer, ed. 373 pp. Academic, New York, 1980. \$36.50

The Physics and Chemistry of Liquid Crystal Devices. G. J. Sprokel, ed. 352 pp. Plenum, New York, 1980. \$42.50

Heat, Thermodynamics and Statistical Physics

Statistical Physics—"Statphys 13," Part 2 (Proc. of a conf., Haifa, Israel, August 1977). D. Cabib, C. G. Kuper, I. Riess, eds. 698 pp. Hilger, Bristol, UK, 1978. \$49.50

Statistical Physics, Part 1 (Third Edition). L. D. Landau, E. M. Lifshitz. 578 pp. Perga-