

have considered philosophical (and hence treated in a wordy manner). Van Bladel gives a direct, straightforward analysis of the many complicated and subtle effects of relativity, such as the visual appearance of objects moving at high speed.

The engineering approach is even carried to the extent of not giving a derivation of the Lorentz transformation! However, the reader can find all of the physics required for such a derivation in the book. Instead, Van Bladel devotes space to a careful treatment of many important general phenomena, such as electromagnetism in moving media or Maxwell's equations in a gravitational field, and to a large number of specific examples such as the scattering and reflection of radiation by a moving body, the Cherenkov effect, magnetic levitation, radiation of a moving dipole and so on. All these examples are treated with remarkable clarity and physical insight.

Particularly appealing, and a direct result of the author's great depth and range of knowledge, are the extensive references to the literature (complete with titles, which I find most useful). These references are often to articles in pedagogical journals and thus provide a fine way for the student to approach the literature.

I highly recommend the book for students and practicing physicists. This book is an excellent complement to others and would be my choice if I had to select, either as a text or a reference book, only one book on relativity.

ANDREW M. SESSLER
Lawrence Berkeley Laboratory

Direct Nuclear Reactions

Norman K. Glendenning

378 pp., Academic, New York, 1983. \$62.00

A direct nuclear reaction is one that involves the excitation of simple nuclear degrees of freedom. Such reactions have been very important over the last 30 years for obtaining detailed information about the structure of the atomic nucleus. Theoretical research in this area continues with extensions to high energies, large interacting systems and quark degrees of freedom.

Direct Nuclear Reactions describes the theoretical framework within which direct reactions are analyzed today and includes considerable mathematical detail. In the early chapters the book deals carefully with multi-channel scattering theory and the foundations of an optical potential for elastic scattering. This preparation is important because the wavefunctions calculated in an optical potential model are used in the distorted-wave Born

approximation, which is the primary calculational tool for direct reactions.

The central part of the book discusses applications of the DWBA to inelastic scattering and particle-transfer reactions. The extension of the first-order theory to a treatment using coupled channels follows in a natural way. Norman Glendenning presents this material in a clear and concise fashion. A minor criticism I have concerns notation: Glendenning prefers the seldom used "C form" for the vector-coupling coefficients, although he occasionally switches to $3j$ symbols. I believe that a review text such as this should employ a standard convention, which in this case is the abbreviated Condon-Shortley, that is, $\langle j_1 j_2 m_1 m_2 | JM \rangle$, notation.

The final half of the book applies the direct-reaction formalism to specific cases where details of the nuclear structure are spelled out as needed. Of particular interest are the treatments of two-nucleon transfer and heavy-ion reactions. Glendenning is an expert on both of these subjects and has contributed to many of the calculations described in this book. He describes the state of the art as of about 1980. It is inevitable that such a cutoff would eliminate the discussion of topics currently in vogue; in particular, spin-dependent phenomena and relativistic nuclear models are given very little attention.

Glendenning has compiled an extensive bibliography with over 300 references. In glancing over these references I spotted several misspelt names—I hope this error rate did not propagate to the volume and page numbers.

It is natural to compare this book to one with the same title and publication date by G. R. Satchler (Oxford U.P.). Satchler's book has twice the number of pages (and has more words or equations per page as well) and provides a thorough presentation of the formulation and techniques of direct nuclear reactions. Glendenning's book is more concerned with application to nuclear-reaction models, especially those in use in heavy-ion physics. Specialists in this field will find both books useful. Other nuclear physicists may be satisfied with library access.

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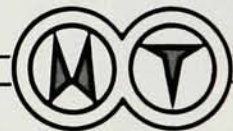
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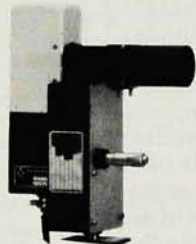
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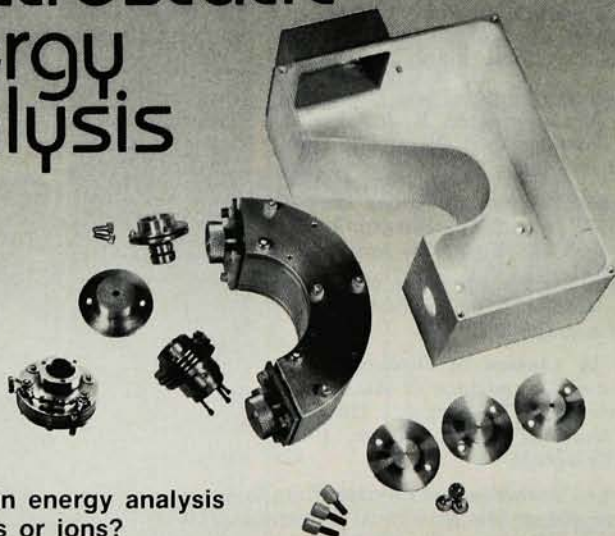
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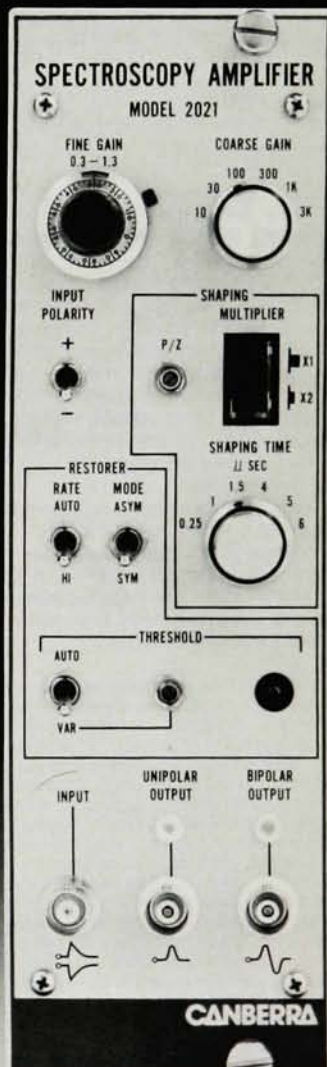
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