

diagrams that illustrate mathematical relations, there is a shortage of charts and numerical data to supplement physical aspects of the discussion. In addition, as the author points out, several major topics are not included in the present work. These include turbulent flow, computational fluid dynamics, physical gas dynamics and hypervelocity flow. Finally, some of the vector and tensor notation is a little strange, especially the symbol for the orthonormal basis of Cartesian coordinates. All in all, however, what is covered is done with good insight. The book deserves to be in the library of those actively working in both inviscid and viscous gas dynamics.

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Introduction to Quantum Field Theory

George Sterman
Cambridge U. P., New York,
1993. 572 pp. \$39.95 pb
ISBN 0-521-31132-2

I was hoping to find in *Introduction to Quantum Field Theory* a text that would cover both the "how to" (which the book under review does reasonably well) and the "why" of quantum field theory (where this book, as many of the recent texts I have seen, is woefully inadequate). I realize how difficult it is to write a pedagogical introduction to quantum field theory, explaining the motivation as well as the current techniques. Nonetheless, I find the current tendency—the presentation of techniques with little or no attention to motivation—detrimental to the education of future generations of physicists. It also harms the "public relations" of particle physicists, since it makes it harder for physicists outside the field to find out what we are doing and why.

Most of the chapters of George Sterman's book that are devoted to applications, such as those on the standard model, perturbation theory and renormalization theory based on dimensional regularization, are quite good (though too often the reader is referred to other texts or articles, and various chapters show their vintage). I would not hesitate to use this book as a supplement in a graduate course on particle physics or quantum field theory. I would warn the students, however, not to try to imitate the author's extremely cavalier handling

of mathematical terminology (such as calling the Legendre transform a Laplace transform, or giving an incomplete definition of a functional derivative or defining a functional as a "function of functions").

The book starts out with a chapter on the action principle for classical fields, but no motivation is given for the use of the action principle, nor is the student told why one should use classical fields when attempting to describe particles. The chapter on canonical quantization is also highly condensed, and I am not sure the average graduate student could do the problems accompanying this chapter without appealing to other textbooks.

Part II of the book is devoted to fields with spin and contains a readable account of the representation theory of the Poincaré algebra, Dirac and Weyl spinors, gauge fields (in a very nongeometric presentation) and the standard model. The notations are sometimes impenetrable, and the letter δ is overused, so that sometimes it is hard to know whether it is a delta function, a variation or part of a functional derivative.

Part III is devoted to renormalization, based mainly on the dimensional regularization technique. More general developments (such as the BHPZ theorem) are described, and references are given. The discussion of ghosts never mentions the geometric aspects, and the introduction to the renormalization group is poor. This part ends with a brief chapter on bound states and limitations of perturbation theory.

The book is nicely typeset, but the editorial work is sloppy: Too many proper names are misspelled both in the text and the bibliography: Haag is spelled correctly and misspelled on the same page; Feynman is variously written as Feyman and Feynmann, Itzykson as Itzkson, Weinberg as Weiberg and Becchi as Becci. In addition, a spell checker should have caught such errors as "introductory" and "catastrophy." We can only hope that a second edition will be more carefully prepared.

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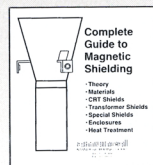
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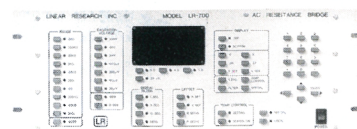
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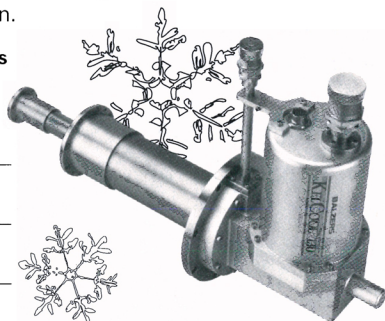
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