

Foreword

It is only rarely realized how important the design of suitable, interesting problems is in the educational process. This is true for the professor — who periodically makes up exams and problem sets which test the effectiveness of his teaching — and also for the student — who must match his skills and acquired knowledge against these same problems. There is a great need for challenging problems in all scientific fields, but especially so in physics. Reading a physics paper requires familiarity and control of techniques which can only be obtained by serious practice in solving problems. Confidence in performing research demands a mastery of detailed technology which requires training, concentration, and reflection — again, gained only by working exercises.

In spite of the obvious need, there is very little systematic effort made to provide balanced, doable problems that do more than gratify the ego of the professor. Problems often are routine applications of procedures mentioned in lectures or in books. They do little to force students to reflect seriously about new situations. Furthermore, the problems are often excruciatingly dull and test persistence and intellectual stamina more than insight, technical skill, and originality. Another rather serious shortcoming is that most exams and problems carry the unmistakable imprint of the teacher. (In some excellent eastern U.S. universities, problems are catalogued by instructor, so that a good deal is known about an exam even before it is written.)

In contrast, *A Guide to Physics Problems, Part 2* not only serves an important function, but is a pleasure to read. By selecting problems from different universities and even different scientific cultures, the authors have effectively avoided a one-sided approach to physics. All the problems are good, some are very interesting, some positively intriguing, a few are crazy; but all of them stimulate the reader to think about physics, not merely to train you to pass an exam. I personally received considerable pleasure in working the problems, and I would guess that anyone who wants to be a professional physicist would experience similar enjoyment. I must confess

with some embarrassment that some of the problems gave me more trouble than I had expected. But, of course, this is progress. The coming generation can do with ease what causes the elder one trouble. This book will be a great help to students and professors, as well as a source of pleasure and enjoyment.

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