

offers a number of improvements that have been suggested over the years. Among those he favors, as do I, are the use of structured questionnaires to attempt to quantify and standardize recommendations, the involving of authors in the refereeing process, the establishment of a right of appeal for authors and the development of uniform guidelines for manuscript review. Among the ones he rejects, as do I, are increasing the number of reviewers, eliminating reviewer anonymity and reviewing according to a double-blind procedure (that is, concealing the author's as well as the referee's identity). Except for the appeals process, I believe that all American Institute of Physics journals and certainly all APS journals follow his favored suggestions and do not follow the ones he does not favor, although APS does permit double-blind reviewing at the request of the author.

I recommend this book for anyone interested in how the often maligned but extraordinarily survivable peer review process works.

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Experimental Low Temperature Physics

Anthony Kent

AIP, New York, 1993. 212 pp.
\$55.00 hc ISBN 1-56396-030-3

In *Experimental Low Temperature Physics*, Anthony Kent has written a useful, uncomplicated and descriptive book that, in his words, "concentrates on the methods used to achieve low temperatures in the laboratory." Before deciding to buy this book, one should understand its goal: It is not a heavily referenced compendium of techniques for the specialist, nor is it a detailed discussion of the physics for advanced graduate students. Rather, the book lives up to the claim made in the preface that it is "an uncomplicated introduction to experimental aspects of low-temperature physics . . . at a level that might be of use to an undergraduate-project student or a first-year research student . . ." Thus, the book will be of primary use to students who have a substantial background in undergraduate-level physics and are, for example, encountering the use of low-temperature techniques in the advanced laboratory for the first time. The book will also be of some use to graduate students who are just beginning thesis work in an area that em-

ploys some of the techniques of experimental low-temperature physics.

About half of the book is devoted to an adequate discussion of the techniques used to reach low temperatures (from below 1 mK up to 300 K) and the various methods of thermometry used to measure temperature. The reader is prepared for this by an initial review of thermodynamics and the properties of solids and liquid helium at low temperature; this review includes a discussion of superconductivity. The material on techniques is sensibly broken into separate chapters for three ranges of temperature: 1–300 K, which includes information on cryostats and helium liquefaction; 1 mK–1 K, which deals primarily with ^3He and dilution refrigeration; and temperatures below 1 mK, which concentrates on demagnetization.

The final chapter, "Experimental Techniques, Hints and Tips," provides a useful discussion of vacuum and pumping calculations but is thin on nitty-gritty "tips and hints" and the sorts of topical but detailed tricks of the trade available elsewhere—in, for example, *Experimental Techniques in Condensed Matter Physics at Low Temperatures* by Robert C. Richardson and Eric N. Smith (Addison-Wesley, 1988).

The book has several strengths, including numerous useful illustrations, a good summary of conductivity and specific heat, a nice discussion of nuclear cooling and a significant discussion of thermometry. There is also a nice discussion of "What is low temperature?" and an appendix that gives an introduction to the rapidly moving field of laser cooling. A particularly useful feature of the book is the set of quantitative examples that illustrate, among other things, heat flow, thermal equilibration and pumping speed as these topics might be encountered in the design of experimental apparatus.

The book also has a few frustrating points. These include the relative paucity of primary references and the absence of significant discussion of some very important techniques, including capacitance gauges, the use of SQUIDS and modern electrical feed-through designs. The paucity of references is partially compensated for by the fact that a number of the references are to books that themselves contain extensive primary references.

This book would be a useful addition to the library of an advanced undergraduate or a beginning laboratory graduate student. In spite of a few limitations, *Experimental Low Temperature Physics* will be quite

useful to the community it is intended to serve.

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A First Course in Computational Physics

Paul L. DeVries

Wiley, New York, 1993.
424 pp. \$54.95 hc
ISBN 0-471-54869-3

Computational physics—the simulation of physical problems on a computer—is a key ingredient in the everyday professional life of a physicist. There is broad recognition of its central importance and a general consensus that it must be a part of the curriculum for physics majors. But how to teach computational physics? At the very least, the art of computational physics—in contrast to naive number crunching—is the triad of physics, numerical and applied mathematics and programming. In the (really not so) good old days, when I was in college, these subjects were taught in three different courses offered by three different departments. Naturally, the triad was quite dissonant, and a physics student was lucky if an exercise in applied mathematics had any relation to physics. More important, the student never learned how to write a physics simulation program, how to test it or how to develop any trust in its results. This was the norm until about a decade ago, when Steven Koonin set the standard for teaching computational physics, including the unification of all its aspects, in his landmark book *Computational Physics* (Benjamin-Cummings, 1985), which unified the three aspects of the subject.

Clearly, Paul DeVries favors a different approach. In his *A First Course in Computational Physics*, the emphasis is on the development of the basic numerical tools to do computational physics rather than on computational physics itself. In fact, there is very little physics in the book. However, if you are a freshman in physics or a novice in computational physics and have some command of FORTRAN, the book might provide the starter kit you were always looking for. (From my own experience of nearly a decade of teaching computational physics, I know that there are quite a few students who fall into this category, and they are not all physics freshmen.) To reach those students, DeVries offers some preliminaries concerning good programming, FORTRAN, and graphics, and then takes the reader