chapters are devoted to acoustical measurement, physical environment planning theory, and design of electroacoustic systems.

I can highly recommend the book to anybody who is interested in the principles of concert hall acoustics. Readers who wish to explore the subject further will enjoy reading the extensive referenced publications, which substantiate the material summarized in the book.

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RF Superconductivity for Accelerators

Hasan Padamsee, Jens Knobloch, and Tom Hays
Wiley, New York, 1998. 523 pp. $79.95 hc ISBN 0-471-15432-6

The books in the Wiley series Beam Physics and Accelerator Technology, edited by Mel Month, are in large part an outgrowth of courses given at US Particle Accelerator Schools held at major universities around the country. These schools, brought into being in 1987 and nourished since then almost entirely through the efforts of the series editor, are now the main vehicle for the transmission of knowledge in particle beam physics and related technologies, compensating (certainly in the early years) for a lack of formal university courses in accelerator physics. *RF Superconductivity for Accelerators* by Hasan Padamsee, Jens Knobloch, and Tom Hays is a welcome addition to the textbooks catalyzed by the Particle Accelerator Schools.

The text is divided into four parts. Part I gives a descriptive overview of the subject, including a short section on the historical foundations of radio frequency superconductivity, followed by some well-written sections on superconductivity essentials and the electrodynamics of superconducting surfaces. The section on historical background is all too brief, giving little hint of the complex story behind the rather sudden flowering of the field in the mid-1960s. (For the complete story, readers should turn to the 1997 report by Catherine Westfall; *The Prehistory of Jefferson Lab's SRF Accelerating Cavities, 1962 to 1985*, published by the Thomas Jefferson National Accelerator Facility. Westfall's account offers some valuable lessons: First, research is often characterized by long periods of frustration with little noticeable progress; second, bursts of progress often follow the development of new instrumentation and measurement techniques; and third, the entire research process is strongly modulated by a not-entirely-rational human element.)

Part 2 of the text discusses the performance of superconducting cavities. Because the authors have been intimately involved in rf superconductivity technology for many years, this section is much more than a collection of references and recipes. Extensive material on cavity fabrication technology, much of it not available in the published literature, is pulled together here. The interplay between theory and practical technology is nicely illustrated. The highlight of part 2, and perhaps of the whole book, is the excellent treatment of multipactor and field emission. Because these effects are also prominently observed in room-temperature copper accelerating structures and other rf components operating at high field levels, anyone interested in the high-gradient frontier is well advised to become familiar with this material.

Part 3 discusses couplers, tuners, windows, and beam loading, material that will be of great interest to those concerned with the detailed technology of superconducting accelerating cavities. The final part of the book, on frontier accelerators, discusses the application of superconducting cavities to high-current storage rings (so-called B factories), to intense proton accelerators for pulsed neutron sources and nuclear waste transmutation, and to high-energy linear colliders. As might be expected, the attractive features of the superconducting TESLA (TeV Energy Superconducting Linear Accelerator) collider proposal receive top billing. As might also be expected, the authors do not emphasize the main disadvantage of superconducting rf technology: that at present it can achieve (optimistically) an accelerating gradient of perhaps 40 MV/m. Higher gradients will require some sort of major breakthrough, and, although such a breakthrough can never be ruled out, the best bet for realizing a linear collider with an energy above 1 TeV remains with conventional rf technology based on copper accelerating structures. Advocates of muon colliders (briefly mentioned in the book) would claim that they have a better way to reach this energy regime, but that is another story.

The book is richly illustrated (with over 300 figures) and has 378 references. This last feature underscores the book's somewhat ambiguous purpose: Does it aim to be a detailed summary of the current status of superconducting rf research and technology, or is it meant to be a text to introduce a graduate student to the field? Toward the latter goal, as in the other texts in the series, the book includes 57 well-designed problems, which require the student to fill in details of the theory or to work out numerical examples illustrating practical situations. The tutorial aspect of the book is occasionally weak, however, in particular when the text veers from its main topic into beam physics or rf theory. At these points, the student needs to be directed to good tutorial references (rather than research papers), and this is not always clearly done in the text. This is a minor quibble however; *RF Superconductivity for Accelerators* is a useful, important, and even essential reference for anyone interested in this field.

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Fundamentals of Acoustical Oceanography

Herman Medwin and Clarence S. Clay
Academic Press, San Diego, Calif., 1998. 712 pp. $75.00 hc ISBN 0-12-487570-X

Both of the authors of *Fundamentals of Acoustical Oceanography*, Herman Medwin and Clarence Clay, were trained as applied physicists and then developed their research careers in ocean acoustics. Between them, they have spent many decades on experimental and theoretical investigations of the use of sound to explore the ocean. Medwin is world-renowned for his work on acoustic scattering from bubbles and from ocean surface roughness; he has treated these problems from both the theoretical and laboratory experimental points of view. Clay has contributed to many aspects of ocean acoustics, particularly to understanding the effects of ocean-bottom structure. The authors' research expertise has very much influenced the content of *Fundamentals of Acoustical Oceanography*, both its earlier edition (*Acoustical Oceanography*) and this revised volume, coming just over 20 years later.

The change in title reflects the unavoidable fact that this book, despite its 700-odd pages, only scratches the surface of many of the subjects presented, although a selected subset is covered in detail. Typical introductory presentations of topics—for example, the wave equation, geometrical acoustics, and Snell's law—require familiarity with mathematical physics at the level of an upper-division physics major. Each chapter has a set of problems that make it possible to use the book as a course textbook as well as a research reference.