dered; structurally homogeneous, spinodally decomposed and precipitated; magnetic and nonmagnetic; and so on.

Rossiter begins with a brief review of electronic states in metals and the Boltzmann transport equation, then more extensively reviews how to characterize the atomic configurations of ordered and disordered alloys and the structures of magnetic alloys. He concludes his background presentation with a discussion of scattering theory in simple metals and alloys, including the scattering matrix and pseudopotentials. The main portion of the text develops more specialized concepts and applies both these and the general concepts to the properties of simple and complex metals and their alloys, including magnetic and nearly magnetic alloys. The book concludes with reviews up to 1985 of three topics of active research interest: resistivity at the critical point, highly resistive materials and amorphous metals. The latter two reviews are good up to the date noted, but are no longer as current as the rest of the text, due to recent theoretical advances in topics such as localization and electron–electron interactions in highly disordered materials.

The text is written clearly and carefully, at a graduate level. The author has done a good job of explaining what he is doing at each stage, and why. Familiarity with quantum mechanics is essential, and a solid-state physics course at the level of Neil Ashcroft and David Mermin's *Solid State Physics* (Holt, Rinehart and Winston, New York, 1976) would be highly desirable as background. Those with even a peripheral interest in the resistivities of metals and alloys will want their libraries to own this book. Those of us with more specific interests will find it very useful for quickly learning about any one of the many complex phenomena present in alloys, for examples of applications of various theoretical approaches, and for a good collection of references to the original literature.

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Experimental Techniques in High Energy Physics

Thomas Ferbel
Addison–Wesley, Reading, Mass., 1987. 678 pp.
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Progress in high-energy physics has been greatly boosted by the development over the years of a sophisticated and diverse arsenal of experimental

techniques. The pace of advance, building on old as well as new technologies, shows little sign of abating. New types of silicon detectors with high-spatial-resolution strip or pixel readout geometries have been brought into use, permitting measurements of heavy-quark lifetimes in the subpicosecond range. Drift chambers, already the foremost particle-tracking technique, have continued to bloom: A dazzling ensemble for the experimental program at CERN's LEP collider is nearing completion. Even the rather murky business of measuring hadronic energy by total-absorption calorimetry has recently advanced significantly due to an improved understanding of energy compensation by neutron–proton recoil. Many other examples could be cited. The advent of the Superconducting Super Collider will continue to stimulate substantial new efforts within the field to meet the formidable experimental challenges ahead.

It is a bit puzzling that fewer than a handful of book-length treatises have tried to chronicle so great an enterprise. Thomas Ferbel has made a valuable contribution to filling this gap with the publication of this reprint volume. The author's goal—"to provide graduate students and practicing experimenters with a compact source on some of the ingenious ideas and techniques developed for modern experiments in particle physics"—is by and large well met. Ferbel, a distinguished experimenter who for several years has organized a school for young physicists in St. Croix on techniques and concepts of high-energy physics, has assembled 12 articles spanning much of the current activity. Inevitably, there are omissions, redundancies and unevenness. Although some articles are beginning to show signs of age (three are more than ten years old), the choices all have good pedagogical value. The general categories of particle tracking, calorimetry and particle identification are well represented.

The book begins with a general introduction to particle detectors by Konrad Kleinknecht. A set of classic lectures by Fabio Sauli on principles of multiwire proportional and drift chambers is next, providing a thorough exploration of electron and ion behavior in these basic devices; this is surely essential reading for all graduate students in experimental particle physics. A more recent treatment of high-resolution particle detectors by Georges Charpak and Sauli, covering both gas-filled and solid-state detectors, follows. Four chapters are devoted to aspects of calorimetry. A landmark paper by William J. Willis and Velko Radeka on liquid-argon ionization chambers and a general introduction by Chris Fabjan, taken from his St. Croix lectures, are complemented by more specialized papers by Ugo Amaldi on shower development and fluctuations and by T. Doke on the fundamental properties of liquid argon, krypton and xenon as radiation-detector media.

Charged-particle identification by dE/dx, Čerenkov radiation and transition radiation is treated in a compact chapter by Wade W. M. Allison and P. R. S. Wright, which packs in both formalism and practical experience. A detailed presentation by Jacques Seguinot and Tom Ypsilantis, among others, of the development of a two-dimensional single-photoelectron drift detector provides a good look at the heroic efforts to use photoionization in a uv-sensitive gas to measure the angle of Čerenkov radiation. The next article, by David Anderson, expands on this topic, covering various applications of photosensitive gases and liquids as means to detect Čerenkov and scintillation light. A very instructive paper by Radeka on signal–noise resolution and its implications for electronic design forms the penultimate chapter. The last article, by Fred James, is on the theory and practice of Monte Carlo methods and is an excellent and down-to-Earth introduction to the art and pitfalls of simulation. It seems a bit out of place here, and might well have served to seed a companion volume on analysis techniques in high-energy physics.

This book shares with other reprint volumes a tendency to cover an active field in retrospect. Nevertheless, for graduate students entering the field and for practicing physicists desiring a good broad-brush source book, this compendium is a worthwhile investment. It could also serve well as basic material for a course or seminar on the subject. While not every particle physicist might need a copy, this book deserves space on the library shelves of all experimental high-energy physics groups.

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The New Alliance: America's R&D Consortia

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Dan Dimancescu and James Botkin have produced a cogent discussion of