brief description of how they can be prepared, followed by a discussion of some of their physical properties. In chapters 3–7 the description is clearly from an experimenter's point of view, although theoretical explanations are given for some of the experimental results.

Although the authors suggest that the book could be used in a senior undergraduate or first-year graduate course, it appears to be too specialized for any of the general courses that form the core of most curricula. On the other hand, the book may seem to be of marginal interest to someone who already has some knowledge of the field. However, it does cover a large number of issues in one-dimensional physics that hitherto could be found only in reviews, conference proceedings or specialized articles. It also may serve as a good starting point for physicists, chemists or materials scientists unfamiliar with the field.

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Large Ion Beams: Fundamentals of Generation and Propagation

A. Theodore Forrester
Wiley, New York, 1988. 325 pp. $41.95 hc ISBN 0-471-62557-4

Large Ion Beams is an outgrowth of undergraduate courses A. Theodore Forrester taught during his tenure as a professor of physics and electrical engineering at UCLA. The book represents the first text devoted exclusively to the physics of ion-beam generation and extraction from high-intensity ion sources, subjects not covered in detail in elementary classical electrostatics, electrodynamics or introductory plasma physics courses. While a number of books have been written on high-intensity ion sources, these texts in general have not had the detailed, pedagogical style used by Forrester and therefore are not suitable for classroom use. This book goes a long way toward meeting the long-standing need for an introductory text on the subject that is suitable for undergraduate training. It should be a welcome addition to the libraries of teaching institutions as well as to those of graduate neophytes and experienced ion-source physicists.

The book is sensibly structured, with chapters devoted to the following topics: space-charge phenomena; collisionless plasmas; collisional effects; positive-ion extraction and ac-

celeration; propagation of highly space-charge-dominated ion beams; ion-source cathodes; and the taxonomy of positive-ion sources, negative-ion sources and surface-ionization sources. The chapters are divided into logically ordered subtopics. Several self-contained derivations, ordered according to progressive physical complexity in terms of assumed initial conditions, are provided. Thus readers not only see the effect of each initial condition on the final result, but also reinforce their mathematical skills through repetitive calculation. For example, Forrester introduces the subject of space-charge effects within an ion beam by solving Poisson's equation for space-charge flow between simple parallel-plate electrodes for the initial injection conditions of a zero velocity, a constant velocity and a Maxwellian velocity distribution.

The first five chapters chronicle the fundamentals of space-charge flow, collisionless plasma formation, the effects of collisions within a plasma, and ion-beam extraction and transport as set forth by such pioneers in ion-source and ion-beam physics as Irving Langmuir, Clement Child, David Bohm and Meghnad Saha, as well as more contemporary contributors. The remaining chapters cover more technological aspects of positive- and negative-ion sources, including a complete chapter on cathodes of plasma-discharge sources. Individual chapters are devoted to cesium surface ionization sources and to descriptions of a limited number of low-mass, plasma-discharge positive- and negative-ion sources. Problem sets at the end of each chapter are designed to illustrate particular physical concepts, as well as to challenge the student's understanding; the appendix contains a complete set of solutions to these problems.

Forrester was an innovative practitioner of ion-source physics. This book will serve as lasting testimony to his numerous and prodigious contributions. Certainly anyone interested in studying the physics of high-intensity ion sources and space-charge-dominated ion beams will find this a valuable book.

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Astronomy and Astrophysics Abstracts, Vol. 45: Literature 1988, Part 1. U. Esser, H. Hefele, I. Heinrich, W. Hofmann, D. Krahn, V. R. Matas, L. D. Schmadel, G. Zech, eds. Springer-Verlag, New York, 1988. 1259 pp. $169.00 *hc* ISBN 0-387-50475-3. *Reference*

Cosmic Abundances of Matter. *AIP Conference Proceedings 183.* Proc. Symp., Minneapolis, Minn., 1988. C. J. Waddington, ed. AIP, New York, 1989. 426 pp. $59.50 ($47.60, AIP members) *hc* ISBN 0-88318-383-8

Dynamics and Structure of Quiescent Solar Prominences. *Astrophysics and Space Science Library 150.* Proc. Wksp., Palma de Mallorca, Spain, November 1987. E. R. Priest, ed. Kluwer, Boston, 1989. 217 pp. Dfl 145.00 ($69.00) *hc* ISBN 90-277-2833-X. *Compilation based on workshop*