is detailed enough to provide a good introduction to the field.

The theory of the properties of imperfect gases has not advanced greatly since the appearance of the book by Hirschfelder, Curtiss and Bird. The main advance has been in computation made possible by large digital computers. Much of this work, for example, the calculations of fourth and fifth virial coefficients, has not enlarged our knowledge of intermolecular forces, and so the authors cover it only briefly.

The authors explore the relation between the properties of solids and intermolecular forces. Here the advances in the past 25 years have been computational rather than theoretical.

They conclude their book with a survey of the present status of knowledge of the intermolecular forces, not only of simple molecules such as the inert gases, but also of complex molecules such as water, where there is much yet to be done.

Maitland, Rigby, Smith, and Wakeham are to be congratulated for preparing this welcome volume. It should be in any good institutional library. Although the price is steep, I also recommend this volume for the personal libraries of all those interested in intermolecular forces and their relation to the properties of gases, liquids and solids.

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Fusion Research: Vol. 1, Principles; Vol. 2, Experiments; Vol. 3, Technology

T. Dolan
855 pp. Pergamon, New York, 1982. $120.00 cloth, $75.00 paper

Research on thermonuclear fusion has entered a new era with the first operation of the Tokamak Fusion Test Reactor (TFTR). This machine, as well as several others with similar operating parameters, is expected to demonstrate the scientific feasibility of fusion in the next few years and to set the stage for work on fusion engineering facilities and reactor prototypes. The knowledge required for the design, construction and operation of these devices will come from many diverse fields. In *Fusion Research* Thomas Dolan describes the state of the art in the many branches of fusion physics and engineering in a form useful to both students and professionals.

The first volume, *Principles*, introduces the physics of fusion plasmas. Dolan gives few lengthy derivations, emphasizing instead the presentation of results. Sections on Coulomb collisions and atomic radiation lead to development of a point reactor model which is used to discuss power balances for a number of reactor types. Next come several chapters on plasma fundamentals, which suffer slightly from the condensation of material and a confusing arrangement of some topics. For example, Dolan derives macroscopic fluid equations before he presents Debye shielding, quasineutrality or single-particle orbits. Fortunately he provides numerous example problems (in all chapters) to help clarify material for the reader. The remaining chapters, on plasma confinement, heating, and diagnostics, are comprehensive and clearly written.

The second volume, *Experiments*, discusses a large number of magnetic and inertial-confinement concepts. It includes chapters on ICF targets, drivers and chambers. Some theory of the equilibrium, stability, and transport properties of these devices appears, along with experimental parameters achieved in the latest generation of machines. Because some sections of this volume depend on material presented in *Principles*, these two volumes should be used together.

The final volume, *Technology*, covers the engineering aspects of fusion research, with sections on vacuum systems, magnets, plasma purity and fueling, materials problems, blankets and shielding, environmental effects and fusion–fission hybrids. Dolan discusses theory, design requirements, and operation of fusion subsystems. Because the material here does not depend heavily on earlier sections and Dolan provides most of the essential background material, this volume can be understood independently of the others. This volume gives a clear picture of the current state of fusion technology, where problems exist, and the research that is being carried out to solve them.

Each chapter closes with an extensive list of references broken down by subject. In addition, there are problem sets suitable in difficulty for senior undergraduates in the *Principles* and *Technology* volumes (Chapters 1–10 and 19–28).

Fusion Research is comprehensive, well-researched and timely. It would be a valuable addition to the library of anyone interested in fusion.

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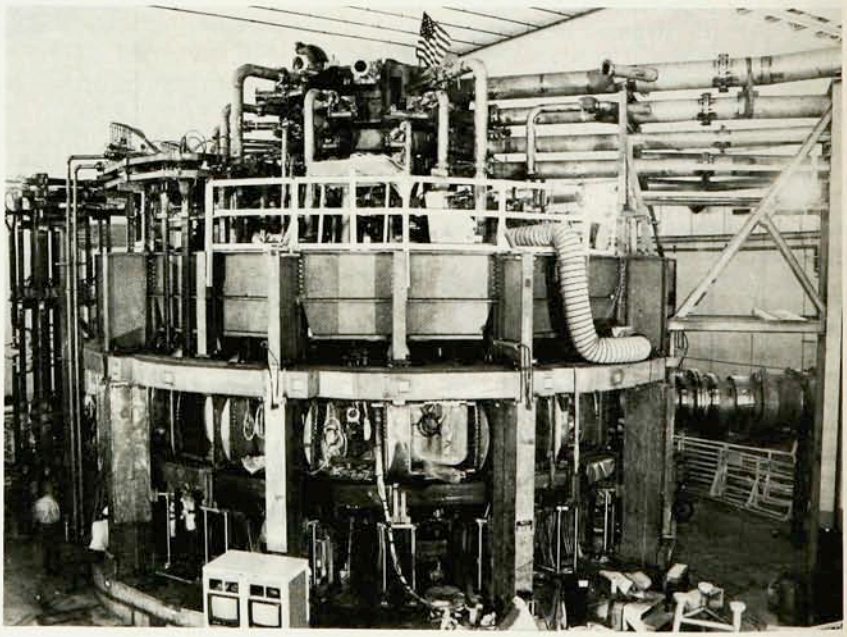
Collected Scientific Wokrs of A. D. Sakharov

D. V. Chudnovsky, G. V. Chudnovsky, D. ter Haar, eds.
303 pp. Dekker, New York, 1982. $27.50

This volume brings together for us in the West writings that display the full power and range of Andrei Sakharov's brilliant research achievements in theoretical physics. Sakharov is widely recognized, particularly in the West, as the father of the Soviet hydrogen bomb and as a moral leader in the search for peace, progress, and basic freedoms. Until recently we have known less about Andrei Sakharov the scientist. The editors of this volume, David and Gregory Chudnovsky and Dirk ter Haar, themselves distinguished math-



The Tokamak Fusion Test Reactor at the Princeton Plasma Physics Laboratory, which achieved its first plasma in December 1982 (see PHYSICS TODAY, March, page 17). *Fusion Research*, reviewed here, discusses this and other fusion devices.