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words function without apparent precision. "Community" and "society," vigorously debated since the end of the nineteenth century, are notions embellishing the narrative instead of directing it. The "community" of American physicists announced in the subtitle rarely makes a proper appearance. Despite suggestive asides we are never clear about precisely who was a physicist, what most physicists did, and how they were drawn to their calling. Attention is lavished on twentieth-century figures who lightened philanthropic and ultimately public coffers during campaigns for high-energy machines, but scant remarks are directed to less glamorous fields of physics and their rank-and-file exponents. The narrative remains unconvincing on the aspirations and achievements of physicists teaching in small colleges or those who, working in obscure government or industrial laboratories, pursued research of little immediate interest to mandarins circulating reports along the corridors of power.

Why did so many young men and women persist with a physics career if only a small number could ever rise to the heights of their avatars? How does the appeal of physics differ from that of neighboring disciplines? Kevles's *Physicists* provides a solid foundation for considering these and other questions that will be posed by future social historians. The notes furnish a sure guide to many primary and secondary sources. Bibliographical commentary (that is, alas, more critical in some places than in others) and archival deposits provided in appendices will be consulted widely. Scholarly apparatuses by no means detract from a readable book, one that has clearly been many years in the making. At a time when a disproportionate number of historians of science are contemplating biographies of exemplary individuals or narrow surveys of ideas and institutions, *The Physicists* comes as a breath of fresh air. Kevles's book will find a secure place on the syllabuses of teachers, above the desks of research administrators, and near the laboratories and blackboards of its subjects.

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## Nonlinear Laser Spectroscopy

V. S. Letokhov, V. P. Chebotayev

466 pp. Springer-Verlag, New York, 1977.  
\$27.90

The intense monochromatic radiation generated by lasers has made it possible to observe a variety of nonlinear effects

when such radiation interacts with atoms and molecules. These nonlinear effects have been studied very thoroughly for more than a decade and have been responsible for the evolution of a number of new and very important spectroscopic techniques. Nonlinear laser spectroscopy has indeed revolutionized the field of spectroscopy and thus opened up a number of applications in fundamental and applied research. Researchers in the US and the USSR using nonlinear saturation techniques have achieved spectroscopic resolving power in excess of  $10^{11}$  and a further improvement is likely in the near future.

Authors Vladilen S. Letokhov and Veniamin P. Chebotayev, who are both from the USSR and are very well known for their many outstanding contributions to nonlinear spectroscopy, have succeeded in collecting in one volume all there is to know about nonlinear laser spectroscopy.

The book begins with the basic theory of resonant light interaction with atoms with special emphasis on saturation effects and the generation of narrow resonances. This is followed by detailed treatments of almost every kind of nonlinear line-narrowing scheme that has ever been conceived in two-level and three-level systems. In each case numerous references have been made to much of the work that has been performed within as well as outside the USSR.

Special topics include an analysis of two-photon transitions, particularly with counterpropagating traveling waves to eliminate Doppler broadening, and a study of coupled Doppler-broadened transitions including stimulated Raman scattering. An entire chapter is devoted to the important problem of the lineshape observed in nonlinear spectroscopy and how the lineshape is modified by misalignment, collisions, competing resonances, time-of-flight and second-order Doppler effects.

Applications of nonlinear spectroscopy in the study of atoms and molecules are well covered. In fact about one fifth of the book is devoted to this topic, including numerous references to the literature.

The authors go on to explore the use of narrow resonances generated by nonlinear interactions for laser frequency stabilization and optical clocks, and for the measurement of fundamental constants. A review of recent measurements of the second-order Doppler effect and molecular recoil is also given. The book closes with a discussion on gamma-ray spectroscopy without Doppler broadening and the prospects for laser nuclear spectroscopy in general.

In spite of the fact that Letokhov, at the Institute of Spectroscopy in Moscow, and Chebotayev, at the Institute of Semiconductor Physics in Novosibirsk (Siberia), are 4000 km apart, the book is well

coordinated and well organized. A previous book by the authors in Russian, *Principles of Nonlinear Laser Spectroscopy*, served as a starting point for the present volume in English. Although the text makes ample references to the many contributions of researchers throughout the world, the reader does get the impression that the emphasis in the book is on work performed by the two authors and their collaborators. This is not at all surprising when one considers that not only have Letokhov and Chebotayev performed some of the basic experiments in nonlinear spectroscopy but also, more importantly, they have suggested many of the concepts that have been explored by others.

The material in the book is clearly written with the same notation used throughout. The reader need not have an advanced background in quantum mechanics to follow the material; a first course in quantum mechanics will in general be sufficient. Although many aspects of nonlinear spectroscopy are available in contributed chapters in several books such as *High Resolution Laser Spectroscopy*, edited by K. Shimoda (Springer-Verlag, 1976), the present volume is the first one devoted entirely to nonlinear laser spectroscopy.

This timely book is highly recommended to students and researchers who are seriously interested in learning about nonlinear laser spectroscopy and its many applications from nonlinear optics to photochemistry.

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## Progress and Its Problems: Toward a Theory of Scientific Growth

L. Laudan

257 pp. California U.P., Berkeley, 1977.  
\$10.95

Ever since Thomas S. Kuhn's *Structure of Scientific Revolutions* appeared in 1962, philosophers of science have debated over scientific rationality and progressiveness with unusual vigor. As the participants achieved unprecedented sophistication, however, the lay audience for these squabbles over arcana dwindled. But now a scholar weaned on those paradigm debates promises to revive the public controversy. Larry Laudan, chairman of the University of Pittsburgh history and philosophy of science program, has written a book that shakes philosophy of science to its roots.

Laudan both destroys and creates. With detailed, scathing criticisms, he attacks the "pregnant confusions" in extant philosophies of science. The progress they espouse derives from strictly em-

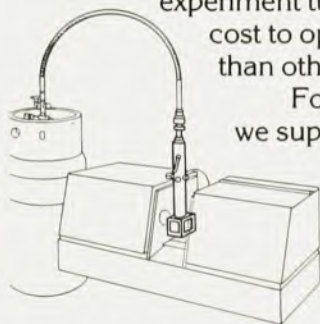
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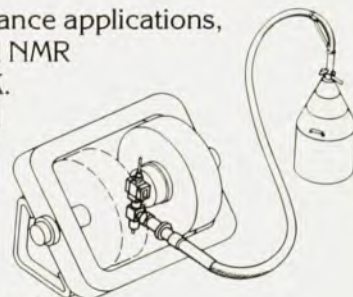
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