SPIE Reports

BOOK REVIEWS • SHORT COURSES • MEETINGS • SPIE SCENE • ADVERTISERS

Book Reviews

Paul R. Yoder, Jr., Book Reviews Editor

Send books for review to the Managing Editor, Optical Engineering, P.O. Box 10, Bellingham, WA 98227-0010. Since there is not space to review all books received, the Book Reviews Editor will use his discretion in selecting those of most interest to the readership of this journal.

Laser Spectroscopy and Its Applications

Leon J. Radziemski, Richard W. Solarz, and Jeffrey A. Paisner, eds., xvi + 685 pp., illus., index, list of contributors, references. Optical Engineering Series Volume 11, Brian J. Thompson, series editor. ISBN 0-8247-7525-2. Marcel Dekker, Inc., 270 Madison Ave., New York, NY 10016 (1987) $99.75 hardbound U.S. and Canada, $119.50 other countries.

Reviewed by Robert A. Bernheim, The Pennsylvania State University, Department of Chemistry, University Park, PA 16802.

Three decades ago many of us who today do spectroscopy with lasers were struggling with atomic lamps as sources of "monochromatic" radiation. With the discovery and current availability of many kinds of lasers, everything has changed. Many kinds of experiments have become possible that were unimaginable in those prelaser years.

In giving us this modern, applications-oriented volume *Laser Spectroscopy and Its Applications,* the editors have performed a valuable service for both the laser spectroscopist and the general scientific community. The specialist as well as the engineer or nonlaser scientist will find this to be a worthwhile book. The editors have succeeded very nicely in their objective of providing a current, complete, and comprehensive review of a selected number of topics presented in such a way as to be useful to a broad audience.

The volume begins with a chapter by Chris W. Patterson that is a minicourse in atomic and molecular spectroscopy presented from a semiclassical point of view. Beginning with a treatment of absorption and emission of radiation including line shapes, cross sections, and saturation phenomena, the discussion moves through the fundamental aspects of atomic and molecular spectroscopy. Various examples of rotational fine structure and superfine structure are presented with illustrations taken from the wealth of experience with molecules like SF_6. This is followed by a background chapter on the physics and technology of lasers by John R. Murray that covers the various aspects in a very descriptive fashion.

The remainder of the volume is directed toward several spectroscopic topics: resonance photoionization, laser absorption, laser-induced breakdown, photodissociation, Raman scattering, remote sensing, and laser-induced fluorescence. Each is covered by a chapter that includes numerous examples of applications.

The chapter on resonance photoionization by Paisner and Solarz gives a review of the theoretical formalisms and underlying physics. An array of experimental configurations and methods are discussed, including atomic and molecular spectroscopy, MPI mass spectrometry, trace element detection, and laser isotope separation.

Laser absorption spectroscopy is the subject of the next chapter, by H.-L. Chen. The techniques discussed range from the far infrared to the XUV.

The highly versatile and technologically important field of laser ablation is covered in the chapter on laser plasmas for chemical analysis by David A. Cremus and Radziemski. Included are analytical applications in which atomic constituents are detected by laser-induced fluorescence following an ablating laser pulse. Molecular and cluster species can also be detected and studied. The discussion is oriented toward the broad applicability of the method.

The chapter on molecular dissociation by John L. Lyman is directed mainly toward isotope separation and, in particular, applications to hydrogen, carbon, sulfur, and uranium. The techniques discussed fall into three main categories: infrared multiple-photon dissociation, ultraviolet photolysis, and infrared-ultraviolet dissociation.

In the chapter on Raman techniques by James J. Valentini, spontaneous and coherent Raman scattering are covered, with applications to combustion, biology and biophysics, photochemistry and kinetics, solids, polymers, surfaces, and molecular jets and shocks.

A general introduction to the many techniques involved in laser remote sensing is presented by William B. Grant, and laser-induced fluorescence as applied to combustion and plasma diagnostics is the subject of the last chapter, by Robert P. Lucht.

Each contributor has provided a generous bibliography and list of references. This and the emphasis on applications will be very helpful to the newcomer to any one of the above fields or to the expert who needs a quick introduction to a subject outside of his own area of expertise.

How to Write and Publish Engineering Papers and Reports, Second Edition

Herbert B. Michaelson, xiii + 182 pp., illus., index, references. ISBN 0-89495-055-x. ISI Press, 3501 Market St., Philadelphia, PA 19104 (1986) $21.95 hardbound, $14.95 paperback.

Reviewed by W. Lewis Hyde, Route 1, Woodstock, CT 06281.

It is scary to publish. The material may be well known to others, even if new to you, or it may be new enough, but wrong. Either way you get laughed at. Editors are supposed to help avoid these problems, but they don't always succeed. "Publish and perish" may be the result. Tenure is not granted or promotion is denied. Can a book on how to publish be of any help?

I doubt it, and this book doesn't change my opinion. A book about writing of any kind is about as useful as a book on how to swim or play golf. If you already know how, you can get some useful tips, but if you are a beginner, you would do better to sit down and start writing.

Michaelson certainly knows what has to be done and has useful things to say about identifying your audience, choosing a publication, deciding who should be coauthors, preparing diagrams, and finishing the paper. He recommends that papers be written "incrementally" as you do the work. Before you have even started, you must have reasons and expectations. It is wise to write them down and discuss them fully: Why is the problem important? Who else has worked on it? What is your advantage? What do you expect as a result? Such a prospectus naturally becomes the first section of the published paper.

Some of the book is devoted to things better found in style manuals or in the information for contributors that is available for most publications. Any serious writer should acquire them early. I also recommend *The Chicago Manual of Style,* published by the University of Chicago Press.

Michaelson does not discuss the use of the passive voice. It certainly makes for dull reading, but it is probably unavoidable in scientific writing, where the results are not supposed to depend on who did the work. Engineering is done by humans, however, for human purposes, and the active voice makes for better reading.

Much of the book contains rather wordy recommendations that your writing be clean and concise, that you bring out the points that are most important, that the diagrams have "visual impact," and that your search of the literature not be "lengthy or poorly conducted." He is right, of course, but you will make more progress by actually writing than by reading about how to do it. ⊙

Short Courses

SPIE SHORT COURSE PROGRAM

For more information on SPIE update and tutorial courses, contact Janice Gaines or Kathleen Robinson, P.O. Box 10, Bellingham, WA 98227. 206/676-3290. Telex 46-7053.

SPIE/OSSC Engineering Update Series courses

Engineering Update Series courses are designed to provide fundamental training in optics and optoelectronics to applied scientists, practicing engineers, and technical managers. Courses are cosponsored by SPIE and the OSSC—The Optical Society of Southern California and will be offered Jan. 10–17, 1988, in Los Angeles in conjunction with SPIE's O-E/LASE '88 Technical Symposium on Optoelectronics and Laser Applications in Science and Engineering.

Introduction to Free-Electron Lasers, Charles A. Brau, Los Alamos National Laboratory, Thurs., 9:00 am-6:00 pm; Fri., 9:00 am-5:00 pm, 12 hours instruction.

Introduction to Lasers, Clint Harper, Moorpark College, Sun.-Mon., 9:00 am-5:00 pm, Tues., 9:00 am-6:00 pm, 18 hours instruction.

Laser System Design, Hugo Weichel, U.S. Air Force Office of Scientific Research, Wed.-Thurs., 9:00 am-6:00 pm, 12 hours instruction.

Digital Communication Signal Processing: Baseband to Optical, Bernard Sklar, The Aerospace Corporation, Thurs., 9:00 am-6:00 pm; Fri., 9:00 am-5:00 pm, 12 hours instruction.

Practical Radiometry, James M. Palmer, Optical Sciences Center/University of Arizona, Sun.-Mon., 9:00 am-5:00 pm, 12 hours instruction.

Laser Radar, Richard J. Becherer, Science Applications International Corporation, Tues.-Wed., 9:00 am-6:00 pm, 12 hours instruction.

Introduction to Optomechanical Design for Mechanical Engineers, Daniel Vukobratovich, Optical Sciences Center/University of Arizona, Mon., 9:00 am-5:00 pm; Tues., 9:00 am-6:00 pm., 12 hours instruction.

Introduction to Optical Alignment Techniques, Mitchell C. Ruda, Talandic Research Corporation, Thurs., 9:00 am-6:00 pm; Fri., 9:00 am-5:00 pm, 12 hours instruction.

Coating, Characterization, and Contamination Control Technology, Michael Ray Jacobson, Optical Sciences Center/University of Arizona, Wed.-Thurs., 9:00 am-6:00 pm, 12 hours instruction.

Interferometry and Modern Optical Testing, James C. Wyant, WYKO Corporation and Optical Sciences Center/University of Arizona, Thurs., 9:00 am-6:00 pm; Fri., 9:00 am-5:00 pm, 12 hours instruction.

Workshop on Computer-Aided Optical Design, Michael Kidger and Geoffrey Adams, Kidger Optics; David Freeman, optical design consultant; Fri.-Sun., 9:00 am-5:00 pm, 18 hours instruction.

Comprehensive Overview of Lasers in Surgery and Therapy, John C. Fisher, St. Luke's Hospital (Milwaukee, WI) and St. Barnabas Medical Center (Livingston, NJ), Sun., 8:00 am-6:00 pm; Mon., 8:00 am-12:30 pm, 12 hours instruction.

Introduction to Automatic Target Recognition, Bir Bhanu, Honeywell Systems and Research Center, Mon., 9:00 am-5:00 pm; Tues., 9:00 am-6:00 pm, 12 hours instruction.

Optical Information Processing, David P. Casasent, Carnegie Mellon University, Wed.-Thurs., 6:00-9:30 pm; Fri., 9:00 am-5:00 pm, 12 hours instruction.

Introduction to Optical Fiber Components and Systems, Michael Corke, Aster, Mon., 9:00 am-5:00 pm; Tues., 9:00 am-6:00 pm, 12 hours instruction.

Optical Fiber Systems for Aircraft, Norris Lewis, Thurs., 9:00 am-6:00 pm; Fri., 9:00 am-5:00 pm, 12 hours instruction.

Fiber Optics Workshop, sponsored by SPIE and organized by the Newport Corporation, Wed. and Thurs., 8:30 am-5:00 pm.

SPIE's O-E/LASE '88 tutorials

The following tutorial program will be offered at SPIE's O-E/LASE '88 Technical Symposium on Optoelectronics and Laser Applications in Science and Engineering, held in conjunction with the International Symposium and Exposition on Electronic Imaging Devices and Systems '88 (sponsored by SPSE—The Society for Imaging Science and Technology and cosponsored by SPIE) Jan. 10–17, 1988, in Los Angeles.

LASERS AND OPTICS

Laser Science and Engineering

Coatings for Laser Systems, Karl H. Guenther, Ctr. for Applied Optics/Univ. of Alabama in Huntsville, Sun., 8:30 am-5:00 pm.

Design and Materials for Frequency Conversion, David Eimerl, Lawrence Livermore National Laboratory, Mon., 8:30 am-12:30 pm.

Optimization Methods for Lasers and Other Electro-Optical Devices, Daniel J.C. Herr, Honeywell, Inc., Mon., 6:00-10:00 pm.

Laser-Induced Damage of Optical Components, John K. McIver, University of New Mexico, Mon., 1:30-5:30 pm.

High Energy Lasers and Unstable Resonators, Dale Holmes, Rockwell International; Hugo Weichel, U.S. Air Force Office of Scientific Research, Tues., 1:30-10:00 pm.

Excimer Lasers: Physics and Technology, Roland Sauerbrey, Rice University, Sun., 1:30-5:30 pm.

Platform-Oriented Laser Systems Design, Hugo Weichel, U.S. Air Force Office of Scientific Research, Fri., 8:30 am-5:00 pm.

Diode Lasers, Kurt J. Linden, Spire Corporation, Sun., 8:30 am-5:00 pm.

Coherence of Semiconductor Lasers and Systems Applications, Elliot Eichen, GTE Labs., Wed., 8:00 am-12:00 pm.

Laser Diode Arrays and Applications, David Welch, Spectra Diode Laboratories, Inc., Mon., 8:30 am-12:30 pm.

Tunable Solid-State Lasers, Leon Esterowitz, Naval Research Lab., Wed., 6:30–10:00 pm.

Directed Energy, Beam Control, and Aerospace Sensing and Communications

Advances in Particle Beam Diagnostics, Joseph Mack, Los Alamos National Laboratory, Tues., 8:00 am-5:30 pm.

Raman Beam Cleanup and Beam Combining, John F. Reintjes, Naval Research Laboratory, Sun., 1:30-5:30 pm.

Adaptive Optics, Robert K. Tyson, W.J. Schafer Associates, Sun., 8:30 am-5:00 pm.

Optical Phase Conjugation, Robert A. Fisher, RA Fisher Consulting, Thurs., 8:00 am-5:30 pm.