

**LASER AND PARTICLE BEAMS**  
**Contents of Volume 14 1996**



# Laser and Particle Beams

## Pulse Power and High Energy Densities

### Editor in Chief:

G. H. MILEY  
 Director, Fusion Studies Laboratory,  
 University of Illinois,  
 103 S. Goodwin Ave,  
 Urbana, IL 61801, USA

### Emeritus Editor in Chief:

HEINRICH HORA  
 Professor Emeritus  
 University of New South Wales  
 Kensington 2033, Australia

### Associate Editors:

R. DAUTRAY (for Europe)  
 Haut Commissaire  
 Commissariat à l'Énergie Atomique  
 31-33 Rue de la Fédération  
 75752 Paris Cedex 15, France

J.P. QUINTENZ (for Pulse Power)  
 Sandia National Laboratories  
 P.O. Box 5800, MS 1195  
 Albuquerque, NM 87185-1195

C. YAMANAKA (for Japan)  
 Director, Institute for Laser Technology,  
 Osaka University, Suita,  
 565 Osaka, Japan

### Editorial Board

N. G. Basov (P.N. Lebedev Physical Inst.)  
 E. M. Campbell (Lawrence Livermore Nat. Lab.)  
 A. Caruso (ENEA Frascati)  
 M. Decroisette (Centre d'Études de Limeil-Valenton)  
 S. Eliezer (SOREQ)  
 A. A. Hauer (Los Alamos National Laboratory)  
 W. B. Herrmannsfeldt (Stanford Linear  
 Accelerator Center)  
 D. H. H. Hoffmann (Universität Erlangen-Nürnberg)  
 G. Kessler (Forschungszentrum Karlsruhe)  
 M. H. Key (Rutherford Appleton Lab.)  
 M. Kristiansen (Texas Tech)  
 R. L. McCrory (Laboratory for Laser Energetics)  
 G. A. Mesyats (Institute for Electrophysics, RAS)  
 J. Meyer-ter-Vehn (Max-Planck-Institut für  
 Quantenoptik)  
 P. Mulser (Technische Hochschule Darmstadt)  
 S. Nakai (Institute for Laser Engineering)  
 A. Ng (U. British Columbia)  
 K. Niu (Teikyo Univ. of Tech.)  
 A. A. Offenberger (Univ. of Alberta)  
 A. M. Prokhorov (General Physics Institute, RAS)  
 D. D. Ryutov (Budker Inst. of Nuclear Phys.)  
 A. S. Shikanov (P.N. Lebedev Physical Inst.)  
 V. F. Tarasenko (High Current Electronics Inst.)  
 A. V. Zrodnikov (Inst. of Phys. and Power Eng.)

*Laser and Particle Beams* is an international journal that covers the generation, and the interaction with matter, of high intensity laser and particle beams. It also covers the physics of systems with high energy densities. Specific fields of interest include nuclear fusion, especially inertial confinement, magnetic confinement, diagnostics, material treatment, laboratory astrophysics, plasmas and spectroscopy at extreme conditions, physical properties of hot dense matter and intense particle beams and optical (laser) beams from the microwave to the X-ray region. The exploration of these fields and their new physics, including nonlinear and nonclassical phenomena, should find a forum in this journal.

As well as publishing original articles the journal also publishes occasional review articles, surveys of research at particular laboratories and reviews of recent books.

© Cambridge University Press 1996

**Copying:** This journal is registered with the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923. Organizations in the USA who are also registered with C.C.C. may therefore copy material (beyond the limits permitted by sections 107 and 108 of US copyright law) subject to payment to C.C.C. of the per copy fee of \$11.00 + .10. This consent does not extend to multiple copying for promotional or commercial purposes. Code 5/0263-0346/96 \$11.00 + .10.

ISI Tear Sheet Service, 3501 Market Street, Philadelphia, PA 19104, USA, is authorized to supply single copies of separate articles for private use only.

For all other use, permission must be sought from Cambridge University Press.

**Subscriptions:** *Laser and Particle Beams* (ISSN 0263-0346) is published quarterly. The subscription price for institutions (which includes postage) of Volume 14, 1996 is US \$359 for the US, Mexico, and Canada (UK £194+VAT elsewhere). Individual rates: US \$99 in the US, Mexico, and Canada; UK £65+VAT elsewhere. Single parts cost US \$90 for the US, Mexico, and Canada (UK £55+VAT elsewhere) plus postage. Four parts form a volume. Orders, which must be accompanied by payment, may be sent to a bookseller, subscription agent, or direct to the publishers: Cambridge University Press, Journals Department, 40 West 20th Street, New York, NY 10011-4211, USA; orders outside the US, Canada, or Mexico may be sent to Cambridge University Press, The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU, England. Claims for missing issues should be made immediately after receipt of the next issue. POSTMASTER: Send address changes in the US, Mexico, and Canada to *Laser and Particle Beams*, Cambridge University Press, 110 Midland Avenue, Port Chester, NY 10573-9864.

Periodicals Postage paid at New York, NY and at additional mailing offices.

# CONTENTS OF VOLUME 14

## TABLE OF CONTENTS LASER AND PARTICLE BEAMS

Vol. 14 1996

### NUMBER 1

C.R. Phipps, C. Ho, W. Friedhorsky (Los Alamos Nat. Lab., Los Alamos, NM, USA), G. Albrecht, H. Friedman, D. Gavel, E.V. George, J. Murray (Lawrence Livermore Nat. Lab., Livermore, CA, USA), M.M. Michaelis (Univ. of Natal, Durban, South Africa), and J.P. Reilly (Northeast Science and Tech., Inc., East Sandwich, MA, USA): ORION: Clearing near-Earth space debris using a 20-kW, 530-nm, Earth-based, repetitively pulsed laser	1
Susumu Hasegawa and Katsunobu Nishihara (Osaka University, Osaka, Japan): Ablation effects in weakly nonlinear stage of the ablative Rayleigh-Taylor instability	45
V.Yu. Bychenkov (P.N. Lebedev Phys. Inst., Moscow, Russia), and V.T. Tikhonchuk (University of Alberta, Edmonton, Alberta, Canada): Magnetic field generation by short ultra-intense laser pulse in underdense plasmas	55
A.M. Orishich (Novosibirsk State Univ., Novosibirsk, Russia), I.F. Shaikhislamov and V.G. Posukh (Institute of Laser Physics, Novosibirsk, Russia): A self-compression of laser-produced plasma into thin monovelocity shell	63
J. Zhang, M.H. Key (Univ. of Oxford, Oxford, UK), P.A. Norreys, C. Danson, D. Neely, S.J. Rose, F. Walsh (Rutherford Appleton Lab., Chilton, UK), G.J. Tallents, L. Dwivedi, M. Holden (Univ. of Essex, Colchester, UK), P.B. Holden, G.J. Pert, S.A. Ramsden (Univ. of York, York, UK), C.L.S. Lewis, A.G. Macphee (Queens Univ., Belfast, Ireland, UK), and Y.L. You (Inst. of Nuclear Phys. and Chem., Chengdu, China): Characteristics of rapidly recombining plasmas suitable for high-gain X-ray laser action	71
B. Yaakobi, D. Shvarts, R. Epstein, and Q. Su (Laboratory for Laser Energetics, Rochester, NY, USA): X-ray backlighting imaging of mixed imploded targets	81
Lev A. Rivlin (Moscow State Institute of Radio Engineering, Electronics, & Automation (MIREA), Moscow, Russia): Free nuclei gamma-ray lasing	93
Isao Matsushima, Hidehiko Yashiro, Toshihisa Tomie, Isao Okuda, Yuji Matsumoto, Eisuke Miura, Eiichi Takahashi, and Yoshiro Owadano (Electrotechnical Laboratory, Tsukuba, Japan): Two-dimensional beam smoothing technique for KrF laser systems	101
Book Review: Heinrich Hora	107
Erratum	108

### NUMBER 2

#### Special Section: Laser and Particle Induced Shock Waves

G.H. Miley: Preface	v
S. Eliezer, Guest Editor's Preface: Laser and particle induced shock waves—A perspective	109

A.M. Evans, N.J. Freeman, P. Graham, C.J. Horsfield, S.D. Rothman, B.R. Thomas, and A.J. Tyrrell (Aldermaston Weapons Establishment plc, Aldermaston, Reading, Berkshire, UK): Hugoniot EOS measurements at Mbar pressures	113
K. Niu (Teikyo Heisei Univ., Uruido, Ichihara, Chiba, Japan): Shock waves in gas and plasma	125
M. Werdiger, B. Arad, Z. Henis, Y. Horowitz, E. Moshe, S. Maman, A. Ludmirsky, and S. Eliezer (SOREQ N.R.C., Yavne, Israel): Asymptotic measurements of free surface instabilities in laser-induced shock waves	133
M.H. Mahdiah and T.A. Hall (Univ. of Essex, Colchester, Essex, UK): Optical emissivity from a laser-driven shock-heated dense plasma	149
Yuan Gu, Sizu Fu, Jiang Wu, Songyu Yu, Yuanlong Ni, and Shiji Wang (Shanghai Inst. of Laser Plasma, Shanghai, China): Equation of state studies at SILP by laser-driven shock waves	157
M. Boustie, S. Couturier, J.P. Romain, D. Zagouri, and H. Simonnet (Lab. de Combustion et de Détonique, E.N.S.M.A., Futuroscope, France): Shock pressure and free surface velocity measurements in confined interaction – Response of new $VF_2/VF_3$ piezoelectric gauges	171
K. Baumung, H.J. Bluhm, B. Goel, P. Hoppé, H.U. Karow, D. Rusch (Forschungszentrum Karlsruhe, Karlsruhe, Germany), V.E. Fortov, G.I. Kanel, S.V. Razorenov, A.V. Utkin, and O.Yu. Vorobjev (Russian Academy of Sciences, Inst. of Chemical Physics, Chernogolovka, Russia): Shock-wave physics experiments with high-power proton beams	181
Dimitri Batani, Simone Bossi, Alessandra Benuzzi (Univ. degli Studi di Milano, Milano, Italy), Michel Koenig, Bernard Faral, Jean Michel Boudenne (Lab. pour l'Utilisation des Lasers Intenses, Ecole Polytechnique, Palaiseau, France), Nicolas Grandjouan (Lab. de Physique des Milieux Ionisés, Ecole Polytechnique, Palaiseau, France), Stefano Atzeni (Assoc. EURATOM-ENEA sulla Fusione, C.R.E. Frascati, Rome, Italy), and Mauro Temporal (INFN, Lab. Nazionali di Legnaro, Legnaro, Italy): Optical smoothing for shock-wave generation: Application to the measurement of equations of state	211
M. Boustie, T. de Rességuier, M. Hallouin, A. Migault, J.P. Romain, and D. Zagouri (Lab. de Combustion et de Détonique, E.N.S.M.A., Futuroscope, France): Some applications of laser-induced shocks on the dynamic behavior of materials	225
<b>Regular Papers</b>	
R.P.J. Town, J.D. Findlay, and A.R. Bell (The Blackett Lab., Imperial College of Science, London, England): Multimode modelling of the Rayleigh-Taylor instability	237
Henryk Fiedorowicz, Andrzej Bartnik, Mirosław Szczurek (Inst. of Optoelectronics, Military Univ. of Technology, Warsaw, Poland), Ernst Fill, Yuelin Li, and Georg Pretzler (Max-Planck-Inst., Garching, Germany): XUV emission from an elongated plasma column produced using a high-power laser with a gas puff target	253
M.G. Haines, A.E. Dangor, M. Coppins, P. Choi, I.H. Mitchell, J.P. Chittenden, J.M. Bayley, R.F. Aliaga Rossel, T.D. Arber, F. Beg, A.R. Bell, J. Scheffel, G. Decker, P. Russell, and J.F. Worley (The Blackett Lab., Imperial College of Science, London, England): Fiber Z-pinch experiments and calculations in the finite Larmor radius regime	261

### NUMBER 3

#### Special Section: Laser-Ion Sources

G.H. Miley: Preface	273
---------------------	-----

I.B. Földes and K. Eidmann (Max-Planck-Institut für Quantenoptik, Garching, Germany): Emission and absorption spectroscopy of X-ray-heated plastic foils	487
Nebil Y. Misconi (Univ. of Central Florida, Orlando, Florida, USA): New technique for levitating solid particles using a proton beam	501
Yuri B. Alferov and Alexander P. Budnik (Inst. of Physics and Power Engineering, Obninsk, Kaluga Region, Russia): Laser-supported detonation in a transverse magnetic field: A qualitative theory and direct conversion of laser radiation energy into electricity	511
Stanley Humphries, Jr. (Univ. of New Mexico, Albuquerque, New Mexico, USA): Quadrupole field geometries for intense electron beam acceleration	519
Errata	529

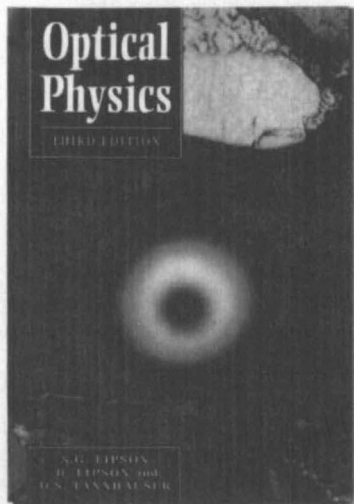
#### NUMBER 4

Special Issue: 7th International Workshop on Atomic Processes in Ion-Driven Fusion	
G.H. Miley: Preface	531
G. Velarde and E. Mínguez, Guest Editors' Preface	533
T. Sonogawa, C. Grigoriu, K. Masugata, K. Yatsui, Y. Shimotori, S. Furuuchi, and H. Yamamoto (Lab. of Beam Tech., Nagaoka Univ. of Tech., Nagaoka, Niigata, Japan): Low temperature preparation of BaTiO <sub>3</sub> thin films by intense, pulsed, ion beam evaporation	537
J.E. Bailey, A.B. Filuk, A.L. Carlson, D.J. Johnson, P. Lake, E.J. McGuire, T.A. Mehlhorn, T.D. Pointon, T.J. Renk, W.A. Stygar (Sandia Nat. Lab., Albuquerque, New Mexico, USA), Y. Maron, and E. Stambulchik (Weizmann Inst. of Sci., Rehovot, Israel): Basic and applied atomic spectroscopy in high-field ion diode acceleration gaps	543
D.L. Foulis, T.D. Beynon (School of Physics, Birmingham Univ., Birmingham, UK), and S.J. Rose (Rutherford Appleton Lab., Chilton, Didcot, UK): Multicenter wavefunctions in opacity calculations for dense plasmas	555
C. Stöckl, O. Boine-Frankenheim, M. Roth, W. Süb, H. Wetzler, W. Seelig (TH-Darmstadt, Darmstadt, Germany), M. Kulish (Inst. for Chem. Phys., Chernogolovka, Russia), M. Dornik, W. Laux, P. Spiller, M. Stetter, S. Stöwe (GSI-Darmstadt, Darmstadt, Germany), J. Jacoby, and D.H.H. Hoffmann (Universität Erlangen, Erlangen, Germany): Interaction of heavy ion beams with dense plasmas	561
S. Mabong, G. Maynard, and K. Katsonis (Lab. de Physique des Gaz et des Plasmas, CNRS-Université de Paris XI, Orsay Cedex, France): Parametric potential for modelling of highly charged heavy ions	575
G. Maynard, S. Mabong, and K. Katsonis (Lab. de Physique des Gaz et des Plasmas, CNRS-Université de Paris XI, Orsay Cedex, France): Photons emission and charge-exchange contributions to the energy loss of swift heavy ions in dense matter	587
R. Kowalewicz, E. Boggasch, D.H.H. Hoffmann, J. Jacoby (Univ. Erlangen-Nürnberg, Erlangen, Germany), W. Laux, C. Stöckl, K. Weyrich (GSI-Darmstadt, Darmstadt, Germany), and S. Miyamoto (Inst. of Laser Eng., Osaka, Japan): Enhanced energy loss of heavy ions passing a fully ionized hydrogen plasma	599
Z. Zinamon and E. Nardi (Weizmann Inst. of Sci., Rehovot, Israel): Electronic and ionic structure of dense plasmas	605

Boris Yu. Sharkov and Heinrich Hora, Guest Editors' Preface: Laser-ion sources	275
R.S. Pease: Laser produced ion sources: A historical note	279
J. Collier, G. Hall, H. Haseroth, H. Kugler, A. Kuttenger, K. Langbein, R. Scrivens, T. Sherwood, J. Tambini (CERN, Geneva, Switzerland), B. Sharkov, A. Shumshurov (ITEP, Moscow, Russia), and K. Masek (Phys. Inst., Prague, The Czech Republic): The CERN laser-ion source	283
E. Woryna, P. Parys, J. Wołowski (Inst. of Plasma Physics and Laser Microfusion, Warsaw, Poland), and W. Mróz (Inst. of Optoelectronics, Warsaw, Poland): Corpuscular diagnostics and processing methods applied in investigations of laser-produced plasma as a source of highly ionized ions	293
S.A. Kondrashev (ITEP, Moscow, Russia), J. Collier, and T.R. Sherwood (CERN, Geneva, Switzerland): Space-charge compensation of highly charged ion beam from laser ion source	323
K. Rohlena, B. Králiková, J. Krása, L. Lásková, K. Mašek, M. Pfeifer, J. Skála (Phys. Inst., Prague, The Czech Republic), P. Parys, J. Wołowski, E. Woryna (Inst. of Plasma Phys. and Laser Microfusion, Warsaw, Poland), J. Farney (Meraniering, Germany), W. Mróz (Inst. of Optoelectronics, Warsaw, Poland), I. Roudskoy, O. Shamaev, B. Sharkov, A. Shumshurov (ITEP, Moscow, Russia), B.A. Bryunetkin (MISDC, State Research Center of Russia, Mendeleevo, Moscow Region, Russia), H. Haseroth, J. Collier, A. Kuttenger, K. Langbein, and H. Kugler (PS-Division, CERN, Geneva, Switzerland): Ion production by lasers using high-power densities in a near infrared region	335
V.Yu. Baranov, K.N. Makarov, V.C. Roerich, Yu.A. Satov, A.N. Starostin, A.E. Stepanov, B.Yu. Sharkov (ITEP, Moscow, Russia), K. Langbein, and T.R. Sherwood (PS-Division, CERN, Geneva, Switzerland): Study of multicharged heavy ion generation from CO <sub>2</sub> laser-produced plasma	347
I.V. Roudskoy (ITEP, Moscow, Russia): General features of highly charged ion generation in laser-produced plasmas	369
V. Dubenkov, B. Sharkov, A. Golubev, A. Shumshurov, O. Shamaev, I. Roudskoy (ITEP, Moscow, Russia), A. Streltsov, Y. Satov, K. Makarov, Y. Smakovsky (TRINITI, Troitsk, Moscow Region, Russia), D. Hoffmann, W. Laux, R.W. Müller, P. Spädtke, C. Stöckl, B. Wolf, and J. Jacoby (GSI, Darmstadt, Germany): Acceleration of Ta <sup>10+</sup> ions produced by laser ion source in RFQ MAXILAC	385
Helmut Haseroth (PS-Division, CERN, Geneva, Switzerland), Heinrich Hora (Univ. of New South Wales, Sydney, Australia, and Anwenderzentrum, Inst. of Tech., Regensburg, Germany): Physical mechanisms leading to high currents of highly charged ions in laser-driven ion sources	393
V.A. Monchinsky, I.V. Kalagin, and A.I. Govorov (Lab. of High Energies, Joint Inst. for Nuclear Research, Dubna, Moscow Region, Russia): Laser ion source of Synchrophasotron and Nuclotron in Dubna	439
Frederick P. Boody, Reinhard Höpfl (Anwenderzentrum, Inst. of Technology, Regensburg, Germany), Heinrich Hora, (Anwenderzentrum, Inst. of Technology, Regensburg, Germany, and Univ. of New South Wales, Sydney, Australia) and Jak C. Kelly (Univ. of New South Wales, Sydney, Australia): Laser-driven ion source for reduced cost implantation of metal ions for strong reduction of dry friction and increased durability	443
<b>Regular Papers</b>	
A. Estévez (Escuela Univ. de Ingeniería Técnica Aeronáutica, Madrid, Spain): Slab model for Rayleigh-Taylor instability	449
M.M. Michaelis, M. Kuppen, A. Prause, A. Forbes, N. Viranna, and N. Lisi (Plasma Phys. Research Inst., Univ. of Natal, Durban, South Africa): Progress with gas lenses	473

K. Morawetz (Max-Planck-Gesellschaft, AG Theoretische Vielteilchenphysik an der Universität Rostock, Rostock, Germany): Stopping power in nonideal plasmas	611
A. Baer, J.L. Schwob (Racah Inst. of Phys.), S. Eliezer, Z. Henis (Plasma Phys., Soreq Nuclear Research Center, Yavne, Israel), and S. Eliezer (Instituto de Fusión Nuclear, Universidad Politécnica de Madrid, Madrid, Spain): An X-ray laser scheme driven by two laser pulses	625
P. Martel, J.M. Gil, R. Rodríguez, L. Doreste (Dept. de Física, Universidad de Las Palmas de Gran Canaria, Las Palmas de Gran Canaria), P. Martel, J.M. Gil, and E. Mínguez (Instituto de Fusión Nuclear, Universidad Politécnica de Madrid, Madrid, Spain): Opacity calculations of plasmas by using parametric potentials	631
Balbir Goel (Forschungszentrum Karlsruhe, Karlsruhe, Germany) and Oleg Yu. Vorobiev (Inst. of Chem. Phys.): Equation of state information from beam-target interaction Experiments at KALIF	637
H. Bluhm, G. Keblor (Forschungszentrum Karlsruhe, Institut für Neutronenphysik und Reaktorteknik, Karlsruhe, Germany), and R.R. Petersen (Fusion Tech. Inst., Univ. of Wisconsin-Madison, Madison, Wisconsin, USA): Light ion beam driven inertial confinement fusion: Requirements and achievements	655
P.M. Velarde, J.M. Martínez-Val, S. Eliezer, M. Piera, and L. Chacon (Inst. of Nuclear Fusion, Madrid Polytechnic Univ., Spain): Conical targets and pinch confinement for inertial fusion	665
T. Wagner, E. Eberl, and D.H.H. Hoffmann (Univ. Erlangen-Nürnberg, Erlangen, Germany): Evidence for recombination XUV lasing at 52.0 nm and 49.8 nm in a fast, compact Z-pinch discharge	679
M.A. Amato (Dept. de Física, Universidade de Brasília, Brasília, Brazil) and N.H. March (Univ. of Oxford, Oxford, England): Structure and equation of state of metallic plasmas	685
Claude Deutsch, Patrice Fromy and Günter Zwicknagel (L.P.G.P. and GDR-CNRS-918, Université Paris XI, Orsay, France): Correlated ion stopping in a classical dense plasma	699
C.F. Hooper, Jr., D.A. Haynes, Jr., D.T. Garber (Univ. of Florida, Gainesville, Florida, USA), R.C. Mancini (Univ. of Nevada, Reno, Nevada, USA), Y.T. Lee (Lawrence Livermore National Laboratory, Livermore, California, USA), D.K. Bradley, J. Delettretz, R. Epstein, and P.A. Jaanimagi (Lab. for Laser Energetics, Univ. of Rochester, Rochester, New York, USA): Spectroscopic analysis of hot dense plasmas: A focus on ion dynamics	713
F. Perrot (Centre d'Etudes de Limeil-Valenton, Villeneuve St-Georges Cedex, France): A new approximation for calculating free-free absorption in hot dense plasmas	731
Günter Zwicknagel and Claude Deutsch (Lab. de Physique des Gaz et des Plasmas, Université Paris XI, Orsay, France): Basic features of correlated ion stopping in plasmas	749
A.F. Nikiforov, V.G. Novikov, and A.D. Solomyannaya (M.V. Keldysh Inst. of Applied Math., Moscow, Russia): Analytical wave functions in self-consistent field models for high-temperature plasma	765
O. Boine-Frankenheim (Theoretische Quantenelektronik (TQE), TH Darmstadt, Darmstadt, Germany) and C. Stöckl (Institut für angewandte Physik (IAP) TH Darmstadt, Darmstadt, Germany): Charge state and nonlinear stopping power of heavy ions in a fully ionized plasma	781
V.E. Fortov, K.S. Dyabilin, M.E. Lebedev, V.P. Smirnov and E.V. Grabovskij (High Energy Density Research Center, Moscow, Russia): Shock wave excitation by soft X-rays	789
E.F. Fill, Conference Summary: Fifth International Conference on X-ray Lasers, Lund, Sweden	793
Book Review by Ronald M. Gilgenbach	797
Index	799

PINPOINT YOUR FUTURE  
with CAMBRIDGE BOOKS



## Optical Physics

Third Edition

**S.G. Lipson, H. Lipson, and D.S. Tannhauser**

*Praise for the Second Edition:*

“...an up-to-date survey of modern optics...it will be an excellent choice of text for...a course in optics.”

– *Applied Optics*

1995 515 pp.

43047-X Hardback \$84.95

43631-1 Paperback \$34.95

## Optical Polarization of Molecules

**Marcis Auzinsh and Ruvin Ferber**

Starts with a review of molecular angular momentum before considering resonant absorption, fluorescence, photodissociation, and collisions and static fields.

*Cambridge Monographs on Atomic, Molecular, and Chemical Physics 4*

1995 321 pp.

44346-6 Hardback \$84.95

## Optical Methods of Engineering Analysis

**Gary L. Cloud**

Efficiently integrates optics theory with the development of optical methods.

1995 515 pp.

45087-X Hardback \$79.95

## Design Issues in Optical Processing

**John N. Lee, Editor**

Provides a detailed review of key issues in the design, evaluation, and implementation of practical systems for signal processing and optical interconnection.

*Cambridge Studies in Modern Optics 16*

1995 292 pp.

43048-8 Hardback \$59.95

## Optical Effects of Ion Implantation

**P.D. Townsend, P.J. Chandler, and L. Zhang**

Gives a detailed description of the factors and processes that govern the optical properties of ion implanted materials, as well as the devices that can be produced in this way.

*Cambridge Studies in Modern Optics 13*

1994 294 pp.

39430-9 Hardback \$54.95

*Now in paperback...*

## Photodissociation Dynamics

Spectroscopy and Fragmentation of Small Polyatomic Molecules

**Reinhard Schinke**

“...destined to become standard reading for graduate students about to embark on research careers in chemical dynamics...”

– *Jim Baggott, Science*

*Cambridge Monographs on Atomic, Molecular, and Chemical Physics 1*

1993 432 pp.

38368-4 Hardback \$94.95

48414-6 Paperback \$39.95

*Available in bookstores or from*

**CAMBRIDGE**  
UNIVERSITY PRESS

40 West 20th Street, New York, NY 10011-4211

Call toll-free 800-872-7423

MasterCard/VISA accepted. Prices subject to change.

Web site: <http://www.cup.org>



# A NEW BENCHMARK IN OPTICS

*Cambridge University Press is extremely pleased to  
announce the publication of*

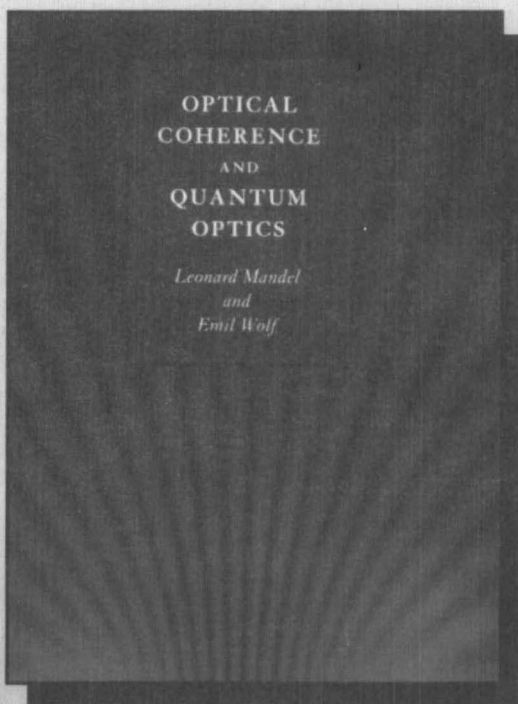
## **Optical Coherence and Quantum Optics**

**Leonard Mandel**, *University of Rochester*

**Emil Wolf**, *University of Rochester*

Written by two of the world's most highly regarded optical physicists, this book is a systematic treatment of the broad area that deals with the coherence and fluctuation of light. The authors begin with a review of probability theory and random processes, and follow this with a thorough discussion of optical coherence theory within the framework of classical optics. They next treat the theory of photoelectric detection of light and photoelectric correlation. They then discuss in some detail quantum systems and effects. The book closes with two chapters devoted to laser theory and one on the quantum theory of non-linear optics. This book is required reading of all physicists and engineers working in optics.

1995 c. 1100 pp.  
4 halftones 290 line diagrams  
41711-2 Hardback \$49.95



*Available in  
bookstores or from*

# CAMBRIDGE UNIVERSITY PRESS

40 West 20th St., New York, NY 10011-4211  
Call toll-free 800-872-7423. Web site: <http://www.cup.org>  
MasterCard/VISA accepted. Prices subject to change.

## Information for Contributors

1. Manuscripts must be written in English. All manuscripts will be referred to acknowledged experts in the subject. Only those receiving favorable recommendations from the referees will be accepted for publication. Manuscripts may be sent to any Board member, any Associate Editor or the Editor.
2. Manuscripts should be double spaced, on one side of good grade paper, allowing a reasonable left-hand margin. An original and two copies should be submitted with the author's full postal address, phone and/or fax numbers, position, and affiliations. Authors are urged to send in their final manuscripts on disks as well as on hard copy.
3. The title and section headings should highlight the significant points. A short abstract should precede the main text.
4. One copy of photographs, prints or transparencies of good quality and unmarked should be submitted. Where lines or lettering are to appear on the photograph, an additional print should be supplied appropriately marked. Each should have, lightly written on the back, the author's name, the figure number and an indication of which is the top of the picture.
5. One copy of each line diagram should be submitted at approximately twice final size and unlettered. Diagrams must be drawn in indian ink on plain white or transparent paper. A second copy should be supplied with lettering included. The author's name and the figure number should be written on this copy.
6. Tables should be typewritten on separate sheets. Avoid, where possible, very wide tables.
7. References and footnotes should be cited according to the Harvard (Author/date) system, also known as the "British form". In the text, author and year are cited in parentheses, e.g. "... was found by McCarthy (1980, 1980a)..." or "(Emmett *et al.* 1972)". Full references are listed in alphabetic order at the end of the paper. References are not numbered. An example of a reference list is:  
  
DEUTSCH, C. & KLARSFELD, S. 1973 *Phys. Rev. A* 7, 2081.  
NICHOLSON, D.R. 1983 *Plasma Theory* (John Wiley, New York).  
OOMURA, H. *et al.* 1982a *Res. Rep. ILE*, ILE-8207p.  
OOMURA, H. *et al.* 1982b *Trans. Ans.* 43, 617.  
  
Note that the year of publication appears after the author's name. If possible, all authors names should be listed in preference to "*et al.*" If one author or team is referred to more than once in any year, the letters *a*, *b*, etc., should be added after the year to distinguish the individual references.
8. Correction to proofs should be restricted to printers' errors only. Authors are entitled to 25 off-prints of their article free of charge. Additional offprints may be purchased if they are ordered on the form sent with the proofs.

ISSN 0263-0364

© 1996 Cambridge University Press

Printed in the United States of America

Cambridge University Press

40 West 20th Street, New York, NY 10011, USA

The Edinburgh Building, Shaftesbury Road, Cambridge CB2 2RU

10 Stamford Road, Oakleigh, Melbourne 3166, Australia

*Special Issue*

# LASER AND PARTICLE BEAMS

Pulse Power and High Energy Densities

Volume 14, Number 4, 1996

7th International Workshop on  
Atomic Processes in Ion-Driven Fusion

**Guest Editors**

G. Velarde and E. Minguez

**CAMBRIDGE**  
UNIVERSITY PRESS



0263-0346(199611)14:4;1-C