

CONTENTS

PANEL DISCUSSION

The Future Course of Quantum Electronics	3
NONLINEAR OPTICS	19
Picosecond Nonlinear Optics	
N. Bloembergen	21
Laser Beam Self-Focusing	
A. M. Prokhorov	51
Recent Results on Self-Focusing and Trapping	
Fujio Shimizu and Eric Courtens	67
Short Pulse Nonlinearities	
W. Kaiser	81
Ultrashort Laser Pulses and Applications	
Michel A. Duguay	95
PLASMA HEATING AND CONTROLLED FUSION	105
Some Aspects of Controlled Fusion By Use of Lasers	
Ray E. Kidder	107
Controlled Fusion Using Long Wavelength Laser Heating with Magnetic Confinement	
John M. Dawson, W. L. Kruer, Abraham Hertzberg, George C. Vlases, Harlow G. Ahlstrom, Loren C. Steinhauer, and Ray E. Kidder	119
Photon Machines	
A. Hertzberg, W. H. Christiansen, E. W. Johnston, and H.G. Ahlstrom	141
X-Ray Emission from Laser Generated Plasmas	
P.J. Mallozzi, H.M. Epstein, R.G. Jung, D.C. Applebaum, B.P. Fairand, and W.J. Gallagher	165
LASERS IN CHEMISTRY	
Photochemistry of Single Vibronic States: An Application of Nonlinear Optics	
Edward S. Yeung and C. Bradley Moore	223
Stimulation of Chemical Reactions by Laser Radiation	
N.G. Basov, E.M. Belenov, E.P. Markin, A.N. Oraevskii, and A.V. Pankratov	239
Photofragment Spectroscopy: Lasers In, Lasers Out	
Graham Hancock and Kent R. Wilson	257
Laser-Induced Fluorescence and Absorption Studies of Molecular Energy Transfer in Gases	
George W. Flynn	277

SPECTROSCOPY - A. Narrow Resonances and Precision Applications	293
Modern Methods in Precision Spectroscopy: A Decade of Developments Ali Javan	295
Narrow Resonances Induced in an Absorbing Gas by an Intense Light Field V.S. Letokhov	335
Laser Saturation Spectroscopy in Coupled Doppler-Broadened Systems: How to Find a Needle in a Haystack M.S. Feld	369
Nonlinear Infrared Spectroscopy and Coherent Transient Effects Richard G. Brewer	421
Hydrogen Maser Research Norman F. Ramsey	437
Saturated Absorption Line Shape J.L. Hall	463
Precision Interferometric Wavelength Comparison N.A. Kurnit	479
SPECTROSCOPY - B. Spectroscopy of Gases	489
Experimental Tests of the Quantum Theory of Molecular Hydrogen G. Herzberg	491
Highly Excited States of the Helium Atom W.E. Lamb, Jr., D.L. Mader, and W.H. Wing	523
High-Resolution Nonlinear Spectroscopy of Molecular Vibrational Resonances in Gases F. De Martini	549
Nonlinear Spectroscopy of Molecules Tadao Shimizu	563
SPECTROSCOPY - C. Spectroscopy of Condensed Matter	571
Brillouin and Raman Spectroscopy with Lasers B.F. Stoicheff	573
New Developments in the Raman Spectroscopy of Solids Aram Mooradian	613
Raman Spectra of Solids Involved in Order-Disorder Phase Transitions W.G. Harter and S.P.S. Porto	629
Laser Magnetoreflection Spectroscopy M.S. Dresselhaus	635

	Contents	xiii
SPECTROSCOPY - D. Tunable Sources and Their Applications	665	
Spectroscopy with Tunable Lasers in the Visible Region	667	
A. L. Schawlow	667	
Spin-Flip Raman Lasers	689	
C. K. N. Patel	689	
Tunable Semiconductor Lasers and Their Spectroscopic Uses	723	
P. L. Kelley and E. D. Hinkley	723	
EMISSION PROCESSES AND OPTICAL PUMPING	737	
Nonequilibrium Distributions of Molecular States in Interstellar Space	739	
C. H. Townes	739	
Optical Pumping in Weak Discharges	769	
J. Brossel	769	
Transverse Optical Pumping and Level Crossings in Free and "Dressed" Atoms	791	
C. Cohen-Tannoudji	791	
Macroscopic Approach to Effects of Radiative Interaction of Atoms and Molecules	817	
V. A. Alekseev, A. V. Vinogradov, and I. I. Sobel'man	817	
Atomic Coherent States in Quantum Optics	835	
F. T. Arecchi, E. Courtens, R. Gilmore, and H. Thomas	835	
Theory of a Gas Laser Amplifier for Broadband Fields	867	
J. H. Parks	867	
OPTICS AND OTHER APPLICATIONS	895	
Active Integrated Optics	897	
Anmon Yariv	897	
Geophysical Strain Measurement by Optical Interferometry	921	
R. H. Lovberg and J. Berger	921	
Laser Applications, Important and Delightful	939	
Paul H. Lee	939	