

9

DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

AD-A241 653



tion is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

2. REPORT DATE
Sep 88

3. REPORT TYPE AND DATES COVERED
FINAL 01 Mar 88 TO 31 Dec 88

4. TITLE AND SUBTITLE

Far East Optoelectronics Conferences

5. FUNDING NUMBERS

2301 A1

6. AUTHOR(S)

Dr Jarus W. Quinn

DTIC
SEP 1988
C

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

Optical Society of America
1816 Jefferson Place, NW
Washington DC 20036

8. PERFORMING ORGANIZATION REPORT NUMBER

1 0802

AFOSR-TR

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

AFOSR/NE
BOLLING AFB WASHINGTON DC 20332-6448
Dr Schlossberg

10. SPONSORING/MONITORING AGENCY REPORT NUMBER

AFOSR-88-0151

11. SUPPLEMENTARY NOTES

12a. DISTRIBUTION/AVAILABILITY STATEMENT

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

12b. DISTRIBUTION CODE

13. ABSTRACT (Maximum 200 words)

CONFERENCE WAS HELD

91-13091



14. SUBJECT TERMS

15. NUMBER OF PAGES

16. PRICE CODE

01 101 000

Proceedings of the Topical Meeting on
**LASER MATERIALS and
LASER SPECTROSCOPY**

(A SATELLITE MEETING OF IQEC '88)

Shanghai, China
July 25-27, 1988

Editors

Wang Zhifang

*Director, Shanghai Institute of Optics &
Fine Mechanics, Academia Sinica, China*

Zhang Zhiming

*Director, Laboratory of Laser Physics &
Optics, Fudan University, China*

Accession For

NTIS GRA&I

DTIC TAB

Unannounced

Justification

By

Distribution/

Availability Codes

Avail and/or

Dist Special

A-1



World Scientific

Singapore • New Jersey • London • Hong Kong

PREFACE

The Proceedings contain the majority of the papers presented at the Topical Meeting on Laser Materials and Laser Spectroscopy which was held at the Tien-Ma Hotel in Shanghai, China on July 25-27, 1988. This topical meeting is a post-conference meeting for the 16th International Quantum Electronics Conference in Tokyo, Japan and it focused on the relatively narrow subjects of laser materials and laser spectroscopy. The Chinese optics and laser community has greatly progressed in these fields in the past years, and hope to have opportunities to share their results with the outside world as well as to learn from the international optics and laser community.

The Topical Meeting was sponsored by the Chinese Optical Society and cooperatively supported by the Chinese Physical Society, Joint Council of Quantum Electronics, Laser and Electro-Optics Society of IEEE, Optical Society of America and SPIE. The organizations in Shanghai district: Fudan University, Shanghai Institute of Laser Technology, Shanghai Institute of Optics and Fine Mechanics, Shanghai Laser Society, were in charge of the detailed preparation for the successful meeting.

The Organizing Committee is much obliged for the kind financial support from ICTP, National Science Foundation of China, National Scientific and Technological Committee of China, North China Research Institute of Electro-Optics, and Shanghai Jiaotong University.

The purpose of this topical meeting is to review the state-of-the-art research achievements in the fields of laser materials and laser spectroscopy and to create an academic and harmonic environment of understanding and interaction between the international scientists in China. More than twenty leading scientists presented their recent achievements in these two fields and over hundreds of papers were presented, including the work by young graduate students. The high quality of their presented researches is reflected in the Proceedings which fulfilled the success of this meeting.

All the papers selected for publication in this volume have been carefully revised and compiled by the Editorial Board of the << ACTA OPTICA SINICA >>. The Proceedings were published in Singapore and distributed by World Scientific Publishing Co. We would like to thank the staff involved in editing and publishing these proceedings and also the many persons both in the Program Committee and elsewhere for reviewing the papers. Our thanks are due to all the authors whose contributions produced the contents of both the meeting and this volume.

Z. J. Wang
Z. M. Zhang

Shanghai, China
Sept. 1988

Topical Meeting on
Laser Materials & Laser Spectroscopy
(LM&LS '88)

A Satellite Meeting of IOEC '88

Tian Ma Hotel, Shanghai, China
July 25 - 27, 1988

Sponsored by
Chinese Optical Society

Organized by
Fudan University,
Shanghai Institute of Laser Technology,
Shanghai Institute of Optics and Fine Mechanics,
Academia Sinica,
Shanghai Laser Society.

Cooperatively Supported by
Chinese Physical Society,
Joint Council on Quantum Electronics,
Laser and Electro-optics Society of IEEE
Optical Society of America
SPIE

Organizing Committee

Honorary Chairman

Wang, Daheng

President of the Chinese
Optical Society.

General Co-chairmen

Wang, Zhijiang

Shanghai Institute of
Optics & Fine Mechanics,
Academia Sinica, China

SHEN, Y.R.

University of California,
Berkeley, USA

Program Committee

Co-chairmen

LIAO, P.F.

Bell Communications
Research, USA

ZHANG, Zhiming	Fudan University, China
Members	
ARECCHI, T	National Institute of Optics, Italy
BYER, R.	Stanford U., USA
CHEBOTAYEV, V.P.	Institute of Thermophysics, USSR
CHEN, Chuangtian	Fujian Institute of Research on the Structure of Matter, China
FLYTZANIS, C.	Ecole Polytechnique, France
GAN, Fuxi	Shanghai Institute of Optics & Fine Mechanics, Academia Sinica, China
GAN, Zhizhao	Beijing U., China
HÄNSCH, T.W.	Max-Planck-Institute for Quantumoptics, FRG
JIANG, Minghua	Shangdong U., China
LEE, Chi H.	U. Maryland, USA
LOY, M.M.T.	IBM Yorktown Heights, USA
MOORADIAN, A.	MIT Lincoln Lab, USA
MOULTON, P.F.	Schwartz Electro-Optics, USA
POWELL, R.	Oklahoma State U., USA
SCHÄFER, F.P.	Max-Planck-Institute for Biophysical Chemistry, FRG
SHIMIZU, T.	U. Tokyo, Japan
SVANBERG, S.	Lund Institute of Technology, Sweden
SVELTO, O.	Polytechnic of Milan, Italy
TANG, C.L.	Cornell U., USA
WANG, Zhaoyong	Fudan U., China
WITKOWSKI, S.	Max-Planck-Institute for Quantumoptics, FRG

WU, Chunkai	Anhui Institute of Optics & Fine Mechanics, Academia Sinica, China
YE, Peixian	Beijing Institute of Physics, China
YEN, W.	U. Georgia, USA
YU, Zhenxin	Zhongshan U., China
ZHANG, Cunhao	Dalian Institute of Chemical Physics, Academia Sinica, China
ZHANG, Guangyin	Nankai U., China

Local Members ▼

LI, Changlin	Fudan U., China
LI, Yufen	Fudan U., China
LIN, Fuchen	Shanghai Institute of Optics & Fine Mechanics, Academia Sinica, China
MA, Xiaoshan	Shanghai Institute of Optics & Fine Mechanics, Academia Sinica, China
QIU, Mingxin	Shanghai Institute of Laser Technology, China
SHEN, Guanqun	Shanghai Institute of Laser Technology, China
WANG, Yuzhu	Shanghai Institute of Optics & Fine Mechanics, Academia Sinica, China
XIA, Huirong	East China Normal U., China
XIE, Shengwu	Shanghai Jiaotong U., China
ZHANG, Yinghua	Shanghai Institute of Ceramics, Academia Sinica, China
ZHU, Shiyao	Shanghai Jiaotong U., China

x

LOCAL COMMITTEE

Co-chairmen

NIE, Baocheng

Shanghai Institute of
Laser Technology, China

WANG, Runwen

Shanghai Institute of
Optics & Fine Mechanics,
Academia Sinica, China

Secretary-General

WO, Xinneng

Shanghai Institute of
Optics & Fine Mechanics,
Academia Sinica, China

Deputy Secretary-General

LI, Fuming

Fudan U., China

Subordinate Groups for Secretariat

Secretarial Group Leader

TIAN, Shouyun

Shanghai Institute of
Optics & Fine Mechanics,
Academia Sinica, China

Program Group Leader

LI, Yifeng

Shanghai Institute of
Optics & Fine Mechanics,
Academia Sinica, China

FINANCIALLY SUPPORTED BY

International Centre for Theoretical Physics, United
Nations Educational, Scientific and Cultural Organization

National Natural Science Foundation, PRC

4th Bureau for Technology, State Committee for Defence
Science and Industry, PRC

North China Research Institute of Electro-Optics,
PRC

Shanghai Jiaotong University, PRC

**SPEECH AT THE RECEPTION PARTY OF THE
TOPICAL MEETING ON LASER MATERIALS & LASER SPECTROSCOPY**

Wang Daheng

Distinguished Guests
Dear Colleagues
Ladies & Gentlemen

First of all it is a great pleasure for me at this reception party to speak in the name of the China Association for Science and Technology to congratulate the opening of this Topical Meeting on Laser Materials and Laser Spectroscopy, and also in the name of the Chinese Optical Society, the host organization, to express our hearty and warm welcome to all attending this meeting. This is a satellite meeting of IQEC '88; the latter had just ended a week ago in Tokyo.

Besides having the Chinese Optical Society as sponsor this meeting is cooperatively supported by the Joint Council on Quantum Electronics, Laser and Electro-optics Society of IEEE, the Optical Society of America and the Society of Photo-optical Instrumentation Engineers as well as by the Chinese Physical Society.

Up to now, there are 77 overseas participants and 135 domestic participants. Our foreign participants come from 12 different countries, namely, Australia, Austria, Federal Republic of Germany, France, Hungary, Israel, Italy, Japan, Romania, and U. S. S. R.

I am glad to have the honour to introduce to you our distinguished guests, Prof. Xie Xide, Chairman of the Shanghai Branch of the China Association for Science and Technology, President of Fudan University and Wang Naili, Vice-chairman of the Shanghai Branch of CAST. I believe it is also appropriate on this occasion to pay tribute to Prof. Y. R. Shen who took the initiative for convening the present meeting, and to Prof. P. F. Liao who took up the real responsibility as Cochairman of the Program Committee, not only in organizing the evaluation of submitted papers, but also for inviting and organizing the invited papers to be presented by eminent scientists who are on the frontiers of the present field.

We have also the honour to receive the Delegation of the Optical Society of America headed by Prof. William B. Bridges, President of the present session. We are looking forward to cooperation between the Optical Society of America and the Chinese Optical Society.

On convening this meeting, 325 papers have been submitted, among them 242 papers from China and 83 from abroad. As a result of double peer review by 45 eminent scientists through the Program Committee 179 papers were accepted. Consequently, we expect that the academic level in this meeting ought to meet the qualification of IQEC tradition.

Speaking candidly, we regard this meeting taking place in China a great event for our Chinese colleagues. I should like to express our gratitude to it for providing us the opportunity for forthcoming academic exchanges and further acquaintances with our foreign scientists and experts. This would certainly be beneficial for promoting our developments in these fields.

Before concluding my speech I should mention we are much obliged for the financial support given by:

1. International Center for Theoretical Physics of UNESCO.
2. National Science Foundation of P. R. C.
3. North China Research Institute of Electro-optics.
4. Shanghai Jiatong University.

We are also indebted to the local organizers, the Shanghai Institute of Optics and Fine Mechanics, Academia Sinica, Fudan University, Shanghai Institute for Laser Technology and Shanghai Laser Society. Without their diligent and complicated efforts, the convening of this meeting would be impossible.

Finally, I wish to thank all who have contributed towards the success of this meeting.

Thank you for your attention.

CONTENTS

Laser Materials

*Laser Site Spectroscopy of Transition Metal Ions in Glass	1
<i>Gan Fuxi and Liu Huimin</i>	
Spectroscopy of Chromium Doped Tunable Laser Materials	6
<i>Richard C. Powell</i>	
Spectroscopic Properties of Nd ³⁺ Ions in LaMgAl ₁₁ O ₁₉ Crystal	11
<i>Zhang Xiurong and Ma Xiaoshan</i>	
Spectral Study and 2.938 μm Laser Emission of Er ³⁺ in the Y ₃ Al ₅ O ₁₂ Crystal ..	14
<i>Yuan-qi Lin et al.</i>	
Raman-infrared Spectra and Radiationless Relaxation of Laser Crystal NdAl ₃ (BO ₃) ₄	16
<i>Hong Shuili and Luo Zundu</i>	
A Study on HB and FLN in BaFCl _{0.5} Br _{0.5} :Sm ²⁺ at 77K	18
<i>Changjiang Wei et al.</i>	
*Pair-pumped Upconversion Solid State Lasers	20
<i>Stephen C. Rand</i>	
*CW Upconversion Laser Action in Neodymium and Erbium doped Solids	24
<i>R. M. Macfarlane et al.</i>	
Ultra-high Sensitive Upconversion Fluorescence of YbF ₃ Doped with Trace Tm ³⁺ and Er ³⁺	29
<i>Zhang Heyi et al.</i>	
The Growth and Properties of NYAB and EYAB Multifunctional Crystal	31
<i>Lu Baosheng et al.</i>	
Study on Fluorescence and Laser Light of Er ³⁺ in Glass	36
<i>Qi Changhong et al.</i>	

Growth and Properties of Single Crystal Fibers for Laser Materials	39
<i>Ding Zuchang et al.</i>	
A Study on the Quality of Sapphire, Ruby and Ti^{3+} Doped Sapphire Grown by Temperature Gradient Technique (TGT) and Czochralski Technique (CZ)	41
<i>Zhang Qiang and Deng Peizhen</i>	
The Measurement of Output Property of $Ti^{3+} Al_2O_3$ Laser Crystal	43
<i>Xie Shengwu et al.</i>	
An X_{α} Study of the Laser Crystal $MgF_2: V^{2+}$	45
<i>Qiu Yuanwu and Zhu Jikang</i>	
Q-switched NAB Laser	47
<i>Yan Ping and Deng Renliang</i>	
Miniature YAG Lasers	49
<i>Zha Guigen et al.</i>	
Study of High Efficiency $LiF:F_2^-$ Color Center Crystals	52
<i>Li Shenghua et al.</i>	
Study on the Formation Conditions and Optical Properties of $(F_2^+)_H$ Color Center in $NaCl:OH^-$ Crystals	54
<i>Wang Jiactin et al.</i>	
Novel Spectroscopic Properties of $LiF:F_3^+ - F_2^-$ Mixed Color Centers Laser Crystals	56
<i>Hongen Gu et al.</i>	
Terraced Substrate Visible GaAlAs Semiconductor Lasers with a Large Optical Cavity	58
<i>Chen Guoying et al.</i>	
The Temperature Dependence of Gain Spectra, Threshold Current and Auger Recombination in $InGaAsP-InP$ Double Heterojunction Laser diode	60
<i>Yue Jingxing et al.</i>	
Time-resolved Photoluminescence and Energy Transfer of Bound Excitons in $GaP:N$ Crystals	62
<i>Lin Xuhua et al.</i>	

Optical Limiting with Semiconductors	64
<i>E. W. Van Stryland et al.</i>	
Å Critical Review of High-efficiency Crystals for Tunable Lasers	66
<i>J. T. Lin</i>	
Parametric Scattering in β - BaB ₂ O ₄ Crystal Induced by Picosecond Pulses	71
<i>Chen Bosu et al.</i>	
Generation of Picosecond Pulses at 193 nm by Frequency Mixing in β - BaB ₂ O ₄	74
<i>P. Lokai et al.</i>	
Mixing Frequency Generation of 271.0 - 291.5 nm in β - BaB ₂ O ₄	77
<i>Lu Shiping et al.</i>	
Low Temperature Absorption Steps Near Ultraviolet Intrinsic Edge in Beta Barium Metaborate	80
<i>Zhang Guangyin et al.</i>	
† The Growth and Properties of BaTiO ₃ Crystals	83
<i>Wu Xing et al.</i>	
High-order Phenomena Accompanied with Self-pumped Phase Conjugation in BaTiO	88
<i>Zhiguo Zhang et al.</i>	
Growth and Laser Damage Estimation of Potassium Dihydrogen Phosphate Crystals for Laser Fusion	91
<i>Takanomo Sasaki et al.</i>	
Noncritically Phase-matched KTP for Diode-pumped Lasers (400 - 700 nm) ..	94
<i>J. T. Lin</i>	
*Potassium Titanyl Phosphate (KTP): Properties and New Applications	97
<i>J. D. Bierlein</i>	
A Kind of New Defect in KTP Crystal and its SHG Enhanced Effect	102
<i>Liu Yaogang et al.</i>	

Nucleation and Growth of the Non-linear Optical Crystal Potassium Pentaborate Tetrahydrate	104
<i>Chen Wanchun et al.</i>	
Quasi-periodic Oscillations in Photoinduced Conical Light Scattering from LiNbO ₃ : Fe Crystals	107
<i>Si-min Liu et al.</i>	
Laser Excited Photorefectance of Ga _x In _{1-x} As/InP Multiple Quantum Wells	110
<i>X M Fang et al.</i>	
*Growth, Spectroscopic Properties and Applications of Doped LiNbO ₃ Crystals	113
<i>Liu Jiancheng</i>	
Photorefractive and Photovoltaic Effect in Doped LiNbO ₃	116
<i>Wen Jinke et al.</i>	
*Recent Advances in Photorefractive Nonlinear Optics	118
<i>Pochi Yeh</i>	
Study on the Doubling-frequency and Anti-photorefractive Property of Heavily Magnesium-doped Lithium-rich Lithium Niobate Crystals	123
<i>Zhang Hongxi et al.</i>	
A New Technique for Increasing Two-wave Mixing Gain in Photorefractive Bi ₁₂ SiO ₂₀ Crystals	126
<i>Xu Gan et al.</i>	
Experimental Proof: There Existing Another Mechanism of Photorefractive Index in Crystal Ce-SBN	129
<i>Xu Huaiyang</i>	
Effect of Crystal Annealing on Holographic Recording in Bismuth Silicon Oxide	131
<i>Pan Shoukui and Ma Jian</i>	
Two Wave Coupling in KNbO ₃ Photorefractive Crystal	135
<i>Zhang Heyi et al.</i>	

Photorefractive Effects in Nd-Doped Ferroelectric $(K_x Na_{1-x})_{0.4} \cdot (Sr_y Ba_{1-y})_{0.6} Nb_2 O_6$ Single Crystal	137
<i>Huang Zhengqi et al.</i>	
High Pressure Raman Spectra and the Effect of Pressure to the Ferroelastic Phase Transition in $LnP_3 O_{15}$	139
<i>G. X. Lan et al.</i>	
Time-delay Four-wave Mixing with Incoherent Light in Absorption Bands Treated as a Multi-level System	142
<i>Xin Mi et al.</i>	
Pulsed Laser Induced Dislocation Structure in Lithium Fluoride Single Crystals	145
<i>Zhou Jiang et al.</i>	

Laser Spectroscopy

*Nonclassical Radiation from Single-atom Oscillators	148
<i>Herbert Walther</i>	
*Laser Spectroscopic Studies of Molecules in Highly Excited Vibrational State	161
<i>Tadao Shimizu et al.</i>	
Investigation of the Stark Effect in Xenon Autoionizing Rydberg Series with the Use of Coherent Tunable XUV Radiation	166
<i>W. E. Ernst et al.</i>	
Laser Spectroscopy of Autoionising $5\text{ dnf } J = 4.5$ Rydberg Series of Ba I	169
<i>W. Hogervorst</i>	
Resonance Photoionization Spectroscopy of Atoms: Autoionization and Highly Excited States of Kr and U	172
<i>Hu Qiquan et al.</i>	
Stark Spectra of Strontium and Calcium Atoms	175
<i>Zhang Sen et al.</i>	

xviii

Observation of Bidirectional Stimulated Radiation at 330 nm, 364 nm and 718 nm with 660 nm Laser Pumping in Sodium Vapour	178
<i>Zhang Ping et al.</i>	
Study of Molecular Rydberg States and their Discriminations in Na ₂	181
<i>Hui-Rong Xia et al.</i>	
The Measurement of the High Excited Spectra of Samarium by using Stepwise Laser Excitation Method	184
<i>Hu Sufen et al.</i>	
Product Analysis in the Reaction of the Two-photon Excited Xe(5p ⁵ 6p) States with Freons	186
<i>Xu Jie and D. W. Setser</i>	
Photoionization Spectra of Ca and Sr Atoms above the Classical Field-ionization Threshold	188
<i>Qiu Ji-zhen et al.</i>	
Effect of Medium Background on the Hydrogen Spectrum	190
<i>Zhu Shitong et al.</i>	
Photoemission and Photoelectron Spectra from Autoionizing Atoms in Strong Laser Field	193
<i>Guanhua Yao and Zhizhan Xu</i>	
Natural Radiative Lifetime Measurements of High-lying States of Samarium . .	195
<i>Jiang Zhankui et al.</i>	
Two-step Laser Excitation of nf Rydberg States in Neutral Al and Observation of Stark Effect	197
<i>Xu Lei et al.</i>	
Measurements of Excited Spectra of the Refractory Metal Elements using Discharge Synchronized with the Laser Pulse	199
<i>Zhu Lei et al.</i>	
Multiphoton Ionization of Atomic Lead at 1.06 μ	202
<i>Ding Dajun et al.</i>	

*Kinetic Processes
H. Takuma et al.

*Kinetic Processes in the Electron-beam pumped KrF Laser	204
<i>H. Takuma et al.</i>	
Laser-induced Fluorescence of Zn ₂ Excimer	210
<i>Zhang Peilin et al.</i>	
Calculation of Transition Intensity in Heteronuclear Dimer NaK: Comparison with Experiment	213
<i>Zhang Limin et al.</i>	
Laser-induced Fluorescence of CCl ₂ Carbene	216
<i>Zhou Shikang et al.</i>	
Study of Multiphoton Ionization Spectrum of Benzene and Two-photon Absorption Cross Section	218
<i>Zheng Bo et al.</i>	
Dicke Narrowing of N ₂ O Linewidth Perturbed by N ₂ at 10 μm Band	220
<i>Cai Peipei and Shen Shanxiong</i>	
Polyatomic Molecular Ions Studied by Laser Photodissociation Spectroscopy	222
<i>Chen Lingbing et al.</i>	
Transverse-optically Pumped Ultraviolet S ₂ Laser	224
<i>Yu Junhua et al.</i>	
Multiphoton Ionization of Propanal by High Power Laser	226
<i>Liu Houxiang et al.</i>	
UV MPI Mass Spectroscopy and Dynamics of Photodissociation of SO ₂	228
<i>Li Zhaolin et al.</i>	
Multiphoton Ionization-fragmentation Patterns of Ethylamine and Dimethylamine Isomers	230
<i>S. T. Li et al.</i>	
Cars Measurements of SF ₆ Pumped by a CO ₂ Laser Pulse	232
<i>Iwao Kitazima</i>	
Angular Dependence of Phase Conjugation of CO ₂ Laser on SF ₆ Gas	234
<i>C. L. Cesar et al.</i>	

Resolution of Stretching-vibrational and Translational Raman Bands of Liquid Water by Means of Polarization Four-photon Spectroscopy	237
<i>A. F. Bunkin et al.</i>	
Laser-produced Plasma as an Effective Source for X-Ray Spectroscopy	239
<i>I. I. Sobel'man</i>	
Rotational Structure of the Low Lying Electronic States of Samarium Monoxide	241
<i>Guo Bufin and C. Linton</i>	
Effects of Poling and Stretching on Second-harmonic Generation in Amorphous Vinylidene Cyanide/Vinyl Acetate Copolymer	243
<i>Heihachi Sato et al.</i>	
Laser-induced Spectroscopy of Cardiovascular Tissues	246
<i>G. H. Pettit et al.</i>	
Laser-excited Malignancy Autofluorescence for Tumour Malignancy Investigation and its Origin	250
<i>Yang Yuanlong et al.</i>	
A Study on Several Hematoporphyrin Derivatives by Time-resolved Spectroscopy	253
<i>W. L. Sha et al.</i>	
Research on Strong Field Processes with a Subpicosecond 400 GW Ultraviolet Source	258
<i>T. S. Luk et al.</i>	
*Growth, Decay and Quenching of Stimulated Raman Scattering in Transparent Liquid Droplets	259
<i>Jia-biao Zheng et al.</i>	
Layer Condensed Ammonia Studied by Photoacoustic Spectroscopy	265
<i>Yu Liming et al.</i>	
High Efficiency Raman Conversion of XeCl Laser Radiation in Lead Vapor	268
<i>Qihong Lou and Hongping Guo</i>	

Combined Effect of Stimulated Scattering and Phase Modulation on Generation of Supercontinuum	271
<i>R. Zhu et al.</i>	
Resonant Multiwave Mixing in Sodium Vapor	274
<i>Wang Shumin et al.</i>	
High Pressure Brillouin Scattering in Liquid Toluene	277
<i>A. Asenbaum et al.</i>	
Optical Nonlinearities and Bistability in Gold Colloid	280
<i>Li Chunfei et al.</i>	
*Sum-frequency Generation for Surface Vibrational Spectroscopy	283
<i>P. Guyot-Sionnest et al.</i>	
*Optical Studies of Molecule/Surface Interactions	288
<i>M. M. T. Loy et al.</i>	
*Optical Second Harmonic Generation with Coupled Surface Plasmons from a Multi-layer Silver/Quartz Grating	293
<i>Zhan Chen and H. J. Simon</i>	
Evidence of Silver Cluster and its Role in Surface Enhanced Raman Scattering (SERS)	298
<i>Dong Shuyan et al.</i>	
Study on Cold-evaporated Silver Surfaces with Second-harmonic- generation	301
<i>Li Le et al.</i>	
Study of Optical Second-harmonic-generation at Metal Surface with Polarization States	304
<i>Zheng Wanquan et al.</i>	
Spectroscopic Studies of J-Aggregates of Pseudoisocyanine in Molecular Monolayers in the Range 300 to 20 K	307
<i>Alexander Müller et al.</i>	
Study of Polymerization of Langmuir-Blodgett Monolayer by Surface Enhanced Raman Scattering	311
<i>Chen Gang et al.</i>	

Dynamics of Laser-induced Etching of Si(III) Surface of Chlorine	313
<i>Li Yulin et al.</i>	
Fourier Transform Heterodyne Spectroscopy of Liquid Interfaces	316
<i>Ka Yee Lee et al.</i>	
*Generation of High Power UV Femtosecond Pulses	320
<i>S. Szatmári and F. P. Schäfer</i>	
*Femtosecond Photon Echoes	323
<i>C. V. Shank et al.</i>	
Transition Radiation of Femtosecond Optical Pulses	328
<i>Jiang Wenbin et al.</i>	
Observation of DFWN in a Saturable Absorber inside the CPM Ring Dye Laser Cavity	333
<i>Jiang Wenbin et al.</i>	
Study on the Induced Spectral Superbroadening of Ultrafast Laser Pulse in a Nonlinear Medium	337
<i>W. H. Qin et al.</i>	
*Laser Cooling and Trapping of Atoms	340
<i>Steven Chu et al.</i>	
Femtosecond Absorption Spectroscopy of Primary Processes in Bacterial Photosynthesis Reaction Centers	348
<i>S. V. Chekalin et al.</i>	
*Observation of the Motion of Slow Atoms in a Standing Wave Field	351
<i>Wang Yuzhu et al.</i>	
*The Interrelation between the Optical Properties and the MBE Growth Control of Quantum Well Structures	357
<i>Ping Chen</i>	
Ionic Excimers	362
<i>R. Sauerbrey et al.</i>	
Optical SHG Study on Polymerization of Langmuir-Blodgett Molecular Layers	366
<i>Yu Gongda et al.</i>	

Weak Localization of Light	369
<i>M. Rosenbluh</i>	
Statistical Fragmentation Patterns of Metastable Ion: Comparison with Experiment	372
<i>S. T. Li et al.</i>	
Oxygenation Reaction of Cerium with XeCl Laser	375
<i>Zhou Zhengzhou et al.</i>	
Measurement of Verdet Coefficient and Magneto-optic Spectroscopy in terms of Beats	378
<i>Zhang Liqun</i>	
Study on Rhodamine 6G/Xylene and Red B Laser Dye Mixture System	380
<i>Wang Wenyun and Li Li</i>	
Ultraviolet Absorption Resonances of Cold Particles and their Application in Spectroscopy and Optical Frequency Standards	382
<i>S. N. Bagayev et al.</i>	
The Dynamics of Ion Clouds in Paul Traps: Implications for Frequency Standard Applications	384
<i>R. Blatt et al.</i>	
Frequency Stability Measurement of Zeeman Stabilized He-Ne Laser	387
<i>Seiichi Kakuma and Keiichi Tanaka</i>	
Multi-wavelength CW He-Ne Laser and its Frequency Stabilization	389
<i>Zhao Kegong and Ni Yucal</i>	
Efficient Isotope Separation using Semiconductor Lasers	391
<i>J. P. Woerdman et al.</i>	
Multi-beam Circularly Polarized Holography	395
<i>J. Polltch</i>	
Ring Laser Opticity Meter	397
<i>Zhang Liqun</i>	
Improved Rademacher Functions and Rademacher Transform	399
<i>Joseph Ben Uri</i>	
Index	401
Invited Papers	