

MONDAY MORNING

24 April 1989 MA

CONVENTION CENTER ROOM 308

8:30 AM Infrared Detectors and Optics

Kadri Vural, Rockwell International Science Center, Presider

MA1 Fundamental limits of IR detectors: a technology comparison
MICHAEL A. KINCH (8:30 AM) 2

MA2 GaAs/AlGaAs multiple quantum well long-wavelength infrared
detector arrays using etched gratings GULAM HASNAIN, B. F. LE-
VINE, C. G. BETHEA, R. A. LOGAN, J. WALKER, R. J. MALIK (9:00
AM) 2

MA3 New optical detector using a high T_C superconductive BaY-
CuO/Ag metal composite thick film HEIHACHI SATO, MAKOTO YA-
SUI, TAKASHI YAMAMOTO (9:15 AM) 2

MA4 Binary optics WILFRID B. VELDKAMP, GARY SWAN-
SON (9:30 AM) 2

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24 April 1989 MB

CONVENTION CENTER ROOM 309

8:30 AM Progress in Inertial Confinement Fusion

W. Howard Lowdermilk, Lawrence Livermore National Laboratory,
Presider

MB1 Status of indirect drive inertial confinement fusion ERIK
STORM (8:30 AM) 4

MB2 Interaction, energy transport, and implosion experiments of
cryogenic foam targets TATSUHIKO YAMANAKA, K. NISHIHARA, K.
A. TANAKA, T. NORIMATSU, SADAI NAKAI (9:00 AM) 4

MB3 Recent development of the experimental laser fusion program
at the Kurchatov Institute of Atomic Energy N. KOVALSKY (9:30
AM) 4

MB4 Experimental observation and suppression of transverse stimu-
lated Brillouin scattering in large optical components J. R. MURRAY,
J. RAY SMITH, R. B. EHRlich, D. T. KYRAZIS, C. E. THOMPSON, T. L.
WEILAND, RUSSELL B. WILCOX (9:45 AM) 4

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CONVENTION CENTER ROOM 310

8:30 AM Tunable Lasers: 1

Thomas M. Baer, Spectra-Physics, Presider

MC1 Operation of low threshold cw Ti:Al₂O₃ lasers JAMES HARRI-
SON, GLEN A. RINES, PETER F. MOULTON (8:30 AM) 6

MC2 Growth and stimulated emission of Y₂Al₂O₇:Ti JOSEF KVAPIL,
M. KOSELJA, JIRI KVAPIL, K. HAMAL (8:45 AM) 6

MC3 Threshold analysis of pulsed lasers with application to a room-
temperature Co:MgF₂ laser JAMES HARRISON, DAVID WELFORD,
PETER F. MOULTON (9:00 AM) 8

MC4 Ti-doped sapphire lasers: results and perspectives G. A.
SKRIPKO (9:15 AM) 8

MC5 Advances in Ti:sapphire lasers PETER F. MOULTON (9:30
AM) 8

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24 April 1989	MD
CONVENTION CENTER ROOM 317	
8:30 AM Nonlinear Phase Conjugation	
David A. Rockwell, Hughes Research Laboratories, Presider	
MD1 Correction of thermal blooming by optical phase conjugation CHARLES J. WETTERER, LEE P. SCHELONKA, MARK A. KRAMER (8:30 AM)	8
MD2 Numerical studies of beam replication in stimulated Raman scattering GODEHARD HILFER, CURTIS R. MENYUK, JOHN REINTJES (8:45 PM)	10
MD3 Projection laser systems based on a highly sensitive phase conjugate mirror O. V. KULAGIN, G. A. PASMANIK, A. A. SHILOV (9:00 AM)	10
MD4 Physics of speckle field interactions in photorefractive crystals A. V. MAMAEV, V. V. SHKLUNOV (9:30 AM)	10
MD5 Aberration correction of acoustooptic modulated laser beam by phase conjugation TOKUYUKI HONDA, HIROKAZU MATSUMOTO (9:45 AM)	12

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HYATT REGENCY BALLROOM B	
8:30 AM Waveguide Optics	
Rodney C. Alferness, AT&T Bell Laboratories, Presider	
ME1 Polarization-dependent two-beam switching in GaAs/AlGaAs nonlinear directional couplers R. JIN, C. L. CHUANG, HYATT M. GIBBS, M. WARREN, J. SOKOLOFF, P. HARTEN, NASSER PEYGHAMBARIAN, J. N. POLKY, G. A. PUBANZ (8:30 AM)	12
ME2 Nonlinear optical fiber loop mirror device B. K. NAYAR, N. J. DORAN, D. S. FORRESTER (8:45 AM)	12
ME3 Integrated optical computers at 10- μ m wavelengths LAWRENCE C. WEST, NORMAN A. WHITAKER (9:00 AM)	14
ME4 Low-switching voltage InGaAs/P/InP waveguide interferometric modulator for integrated optics HIROAKI TAKEUCHI, KAZUO KASAYA, KUNISHIGE OE (9:30 AM)	14
ME5 Application of the selective poling procedure to the fabrication of single-mode waveguide devices J. I. THACKARA, A. J. TICKNOR, G. F. LIPSCOMB, M. A. STILLER, R. LYTEL (9:45 AM)	16

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24 April 1989	MF
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10:30 AM Infrared Focal Planes	
D. L. Spears, MIT Lincoln Laboratory, Presider	
MF1 Infrared arrays for astronomy WILLIAM J. FORREST (10:30 AM)	16
MF2 256 X 256 short wavelength HgCdTe focal plane array KADRI VURAL, MIKE BLESSINGER, JENKON CHEN (11:00 AM)	16
MF3 Eight to twelve micron infrared detectors using high quality CdHgTe epitaxial wafers Y. KUMINE, K. IKEDA, W. SUSAKI (11:30 AM)	16
MF4 Impact of chopper stabilization on LWIR FPA performance L. J. KOZLOWSKI (11:45 PM)	16

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CONVENTION CENTER ROOM 309	
10:30 AM Gas Lasers and Beam Scattering for Inertial Confinement Fusion	
Robert H. Lehmborg, U.S. Naval Research Laboratory, Presider	
MG1 Effects of laser beam smoothing on laser-plasma interaction S. P. OBENSCHAIN (10:30 AM)	18
MG2 Kilojoule operation of the Aurora KrF ICF laser system at Los Alamos L. A. ROSOCHA, ROBERT G. ANDERSON, S. J. CZUCHLEWSKI, J. A. HANLON, J. E. JONES, R. G. JONES, M. KANG, R. KRISTAL, C. R. MANSFIELD, S. J. THOMAS, R. G. WATT, JOSEPH F. FIGUEIRA (11:00 AM)	18
MG3 Recent progress in Ashura, a high power KrF laser system Y. OWADANO, I. OKUDA, Y. MATSUMOTO, M. TANIMOTO, T. TOMIE, K. KOYAMA M. YANO (11:15 AM)	18
MG4 First experimental results of the advanced Asterix IV high power iodine laser H. BAUMHACKER, G. BREDERLOW, E. FILL, H. KRAUSE, C. SCHRODTER, R. VOLK, K. WITTE (11:30 AM)	20
MG5 Ultrashort pulse energy extraction measurements in XeCl amplifiers A. J. TAYLOR, J. P. ROBERTS, T. R. GOSNELL (11:45 AM)	20

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10:30 AM Tunable Lasers: 2	
James Harrison, Schwartz Electro-Optics, Inc. Presider	
MH1 Multistage Ti:Al ₂ O ₃ amplifier system K. F. WALL, P. LACOVARA, R. L. AGGARWAL, P. A. SCHULZ, A. SANCHEZ (10:30 AM)	22
MH2 Alexandrite laser with high spectral resolution and high power capabilities E. ARMANDILLO, E. NAVA, G. MOMBRINI, C. MALVICINI (10:45 AM)	22
MH3 Applications of new solid state lasers to the production of tunable VUV and XUV coherent radiation C. H. MULLER III, DEAN R. GUYER C. E. HAMILTON, D. D. LOWENTHAL, T. D. RAYMOND, A. V. SMITH (11:00 AM)	22
MH4 Broadly tunable room temperature chromium activated forsterite laser V. PETRICEVIC, S. K. GAYEN, R. R. ALFANO (11:30 AM)	22
MG5 Solid state lasers on the basis of chromium-doped rare-earth scandium garnets A. M. PROKHOROV, I. A. SCHERBAKOV (11:45 AM)	24

MONDAY	MORNING
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CONVENTION CENTER ROOM 317	
10:30 AM Stimulated Brillouin Scattering Phase Conjugation	
George C. Valley, Hughes Research Laboratories, Presider	
MI1 Phase conjugate fidelity of an SBS oscillator/amplifier at the 1-J/pulse level METIN S. MANGIR, DAVID A. ROCKWELL (10:30 AM)	24
MI2 Phase conjugation of astigmatic aberrations by stimulated Brillouin scattering C. HOEFER, H. INJEYAN, B. ZUKOWSKI, M. NGUYEN-VO (10:45 AM)	24
MI3 Calculation of intensity modulation imposed on the input beam by self-focusing at SBS threshold DAVID MILAM, CHARMAINE L. VERCIMAK, THOMAS R. MOORE (11:00 AM)	26
MI4 Near field modulation induced by SBS phase conjugation of astigmatic beams CHARMAINE L. VERCIMAK, CHRIS MARSHALL, THOMAS R. MOORE, DAVID MILAM (11:15 AM)	26
MI5 Instabilities in SBS phase conjugate fidelity at high pump intensities JOHN J. OTTUSCH, DAVID A. ROCKWELL (11:30 AM)	26

MI6 Stimulated Brillouin scattering and phase conjugation with a multiple line hydrogen fluoride laser MICHAEL T. DUIGNAN, B. J. FELDMAN, W. T. WHITNEY (11:45 AM) 28

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24 April 1989 MJ

HYATT REGENCY BALLROOM B

10:30 AM **Quantum Well and Heterostructure Devices**

Brian F. Aull, MIT Lincoln Laboratory, Presider

MJ1 Long-lived metastable states in novel GaAlAs heterostructures R. C. SPITZER, C. E. BONNER, L. PFEIFFER, ALASTAIR M. GLASS, B. A. WILSON (10:30 AM) 28

MJ2 Symmetric self-electrooptic effect devices as an optical signal sense amplifier L. M. F. CHIROVSKY, A. L. LENTINE, DAVID A. B. MILLER (10:45 AM) 28

MJ3 High speed absorption recovery in quantum well diodes by diffusive electrical conduction G. LIVESCU, DAVID A. B. MILLER, T. SIZER, D. J. BURROWS, J. E. CUNNINGHAM, A. C. GOSSARD, J. H. ENGLISH (11:00 AM) 30

MJ4 Blue shifted absorption using field-induced Stark localization in superlattices R. H. YAN, R. J. SIMES, H. RIBOT, LARRY A. COL-DREN, A. C. GOSSARD (11:15 AM) 30

MJ5 III-V compounds and optical computing R. C. WILLIAMSON (11:30 AM) 32

MONDAY AFTERNOON

24 April 1989 JA

CONVENTION CENTER ROOM 307/308/309/310

1:45PM **Joint CLEO/QELS Plenary and Awards Session**

Robert A. Bartolini, David Sarnoff Research Center, Paul F. Liao, Bellcore, CLEO '89 General Cochairs
and

Arto Nurmikko, Brown University, David E. Pritchard, Massachusetts Institute of Technology, QELS '89 General Cochairs

1:45 PM **Introductory Remarks** 32

2:00 PM **Awards Ceremony** 32

Presentation of the 1989 Charles Hard Townes Award of the Optical Society of America to Daniel J. Bradley, Trinity College, Eire

Herwig Kogelnik, OSA President, Presenter

Presentation of the 1989 Quantum Electronics Award of the Lasers and Electro-Optics Society of the Institute of Electrical and Electronic Engineers

Melvin I. Cohen, IEEE/LEOS President, Presenter

Presentation of the OSA fellow certificates

Presentation of the IEEE/LEOS fellow certificates

JA1 Synthetic holography **STEPHEN A. BENTON (2:30 PM)** 32

JA2 Quantum jumps, ion crystals, and solid plasmas DAVID J. WINELAND, J. C. BERGQUIST, J. J. BOLLINGER, WAYNE M. ITANO, S. L. GILBERT, R. G. HULET (3:15 PM) 32

JA3 Optical spectroscopy of electronic excitations in semiconductor microstructures A. PINCZUK (4:00 PM) 34

JA4 Neural networks and the dynamics of nonlinear optical circuits DANA Z. ANDERSON (4:45 PM) 34

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25 April 1989 JB

HYATT REGENCY BALLROOM C/D

8:30 AM **Joint CLEO/QELS Symposium on High Field Effects: 1**

W. Howard Lowdermilk, Lawrence Livermore National Laboratory, Presider

JB1 A 12.8-eV laser in neutral cesium S. E. HARRIS, C. P. J.

BARTY, D. A. KING, C. Y. YIN, K. H. HAHN, J. E. FIELD, J. F. YOUNG (8:30 AM)	36
JB2 Laser driven particle accelerator C. JOSHI (9:00)	36
JB3 Blue shifting of intense femtosecond pulses during strong field ionization: a direct measurement of the Keldysh quiver energy WILLIAM M. WOOD, GLENN FOCHT, T. R. ZHANG, D. H. REITZE, M. C. DOWNER (9:30 AM)	38
JB4 Amplification of 100-fs pulses in alexandrite using chirped pulse techniques MAURICE PESSOT, GERARD A. MOUROU, DONALD J. HARTER (9:45 AM)	38

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25 April 1989 **TUA**

CONVENTION CENTER ROOM 308

8:30 AM **Multiwave Mixing**

Ian McMichael, Rockwell International Science Center, Presider

TUA1 Observation of retro-modulation/conjugation using a self-pumped atomic sodium PCM C. J. GAETA, DAVID M. PEPPER (8:30 AM)	38
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TUA2 Transverse relaxation time measurement of the Raman mode by nondegenerate four-wave mixing HAOSHENG FEI, YUN ZHANG, LI HAN, FENG ZHAO, ZHENQUAN WEI (8:45 AM)	40
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TUA3 Phase conjugation through self-pumped four-wave mixing using forward Brillouin scattering K. D. RIDLEY, A. M. SCOTT, D. E. WATKINS (9:00 AM)	40
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TUA4 Effects of side diffraction, phase modulation, and loss in optical phase conjugation I. C. KHOO, PIN ZHOU, W. WANG, R. R. MICHAEL, R. G. LINDQUIST, R. MANSFIELD (9:15 AM)	40
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TUA5 Collisionally enhanced degenerate four-wave mixing in a plasma Y. KITAGAWA, R. L. SAVAGE, JR, C. JOSHI (9:30 AM)	42
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TUA6 Efficient VUV generation by four-wave mixing in Hg vapor and limitations on the mixing process C. E. HAMILTON, C. H. MULLER III, D. D. LOWENTHAL (9:45 AM)	42
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25 April 1989 **TUB**

CONVENTION CENTER ROOM 309

8:30 AM **Optical Components**

C. Martin Stickley, BDM International, Presider

TUB1 Precision figuring of optics by ion machining processes LYNN N. ALLEN (8:30)	42
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TUB2 Two-dimensional arrayed microoptics K. IGA (9:00 AM)	44
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TUB3 Waveguides in acrylate photopolymerizable monomer systems B. L. BOOTH, J. E. MARCHEGIANO (9:30 AM)	44
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TUB4 N-type InSb 10-μm Faraday Isolator R. L. AGGARWAL, R. F. LUCEY, JR., D. P. RYAN-HOWARD, H. J. JIMENEZ-GONZALEZ, K. H. YOO (9:45 AM)	44
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TUESDAY MORNING

25 April 1989 **TUC**

CONVENTION CENTER ROOM 310

8:30 AM **Laser Angioplasty**

Brian Wilson, Hamilton Regional Cancer Center, Canada, Presider

TUC1 Laser coronary angioplasty: will it ever become a therapy of choice? ROBERT F. BONNER (8:30 AM)	46
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TUC2 Thrombolysis by excimer laser photoablation G. H. PETTIT, R. SAUERBREY, I. S. SAIDI, FRANK K. TITTEL, R. FARRELL, C. BENEDICT (9:00 AM)	46
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TUC3 <i>in vivo</i> assessment of human atherosclerotic plaques by laser-induced fluorescence spectroscopy ROBERT M. COTHREN,	
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MARK HAMON, JOHN R. KRAMER, MICHAEL S. OTTESON, MICHAEL S. FELD (9:15 AM)	46
TUC4 Multipixel <i>in vivo</i> imaging of coronary artery MICHAEL S. OTTESON, Y. PARK, MICHAEL S. FELD, ROBERT M. COTHREN, JOHN R. KRAMER (9:30 AM)	48
TUC5 Comparison of atheromatous tissue ablation between CO laser and excimer laser irradiations T. ARAI, M. NAKAGAWA, M. KIKUCHI, K. MIZUNO, A. MIYAMOTO, Y. OKAMOTO, K. SATOMURA, T. SHIBUYA, K. ARAKAWA, K. ISOJIMA, A. KURITA, H. NAKAMURA, A. UTSUMI, Y. AKAI, M. KATOH, K. TAKEUCHI (9:45 AM)	48

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25 April 1989 **TUD**

CONVENTION CENTER ROOM 317

8:30 AM **InGaAsP/InP Lasers**

Daniel Witt, AT&T Bell Laboratories, President

TUD1 Wide bandwidth and high power 1.3- μm InGaAsP buried heterostructure distributed feedback lasers S. J. WANG, N. K. DUTTA, A. GNAUCK (8:30 AM)	50
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TUD2 Wavelength division multiplexing light source with integrated quantum well tunable lasers and optical amplifiers UZIEL KOREN, T. L. KOCH, G. EISENSTEIN, BARRY I. MILLER, R. H. BOSWORTH (8:45 AM)	50
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TUD3 Very low threshold current density (410 A/cm ²) 1.3- μm GaInAsP graded-index separate confinement heterostructure multiple quantum well laser A. KASUKAWA, Y. IMAJO, I. J. MURGATROYD, S. KASHIWA (9:00 AM)	50
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TUD4 Novel frequency control scheme for a 1.56- μm DFB laser using an internal second harmonic and an atomic rubidium line M. OHTSU, E. IKEGAMI (9:15 AM)	52
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TUD5 GaInAs/GaInAsP multiquantum well DFB lasers IKUO MITO, K. KITAMURA (9:30 AM)	52
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25 April 1989 **JC**

HYATT REGENCY BALLROOM C/D

10:30 AM **Joint CLEO/QELS Symposium on High Field Effects: 2**

S. E. Harris, Stanford University, President

JC1 All high intensity multiphoton ionization is necessarily resonant RICHARD R. FREEMAN (10:30 AM)	52
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JC2 Above threshold ionization: a controlled plasma heating mechanism PAUL B. CORKUM, N. H. BURNETT, F. BRUNEL (11:00 AM)	52
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JC3 Molecular bonds in intense laser fields P. H. BUCKSBAUM, A. ZAVRIYEV, D. W. SCHUMACHER (11:30 AM)	54
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25 April 1989 **TUE**

CONVENTION CENTER ROOM 307

10:30 AM **Mid Infrared Lasers: 1**

Peter F. Moulton, Schwartz Electro-Optics, Inc., President

TUE1 Diode pumped Q-switched room temperature 2- μm Tm ³⁺ :YAG laser ROBERT C. STONEMAN, LEON ESTEROWITZ, GREGG H. ROSENBLATT (10:30 AM)	54
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TUE2 Diode laser pumped Tm,Ho:YLF room temperature laser HAMID HEMMATI (10:45 AM)	54
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TUE3 Diode pumped mid IR solid state lasers: system design and applications GREGORY J. KINTZ (11:00 AM)	54
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TUE4 Q-switched operation of a continuous-wave pumped Tm, Ho:YAG laser at 300 K JOSEPH M. FUKUMOTO, STEPHEN J. BROSANAN (11:30 AM)	56
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TUE5 Efficiency optimization for a flashlamp-pumped room temperature 2- μ m laser A. ROSENBAUM, G. J. QUARLES, C. L. MARQUARDT, LEON ESTEROWITZ (11:45 AM) 56

TUE6 (Nd,Er):YAIO₃: a new laser crystal L. FATHE, M. BIRNBAUM, M. BASS, M. KOKTA (12:00 M) 58

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25 April 1989 **TUF**

CONVENTION CENTER ROOM 308

10:30 AM **Optical Switching**

R. C. Williamson, MIT Lincoln Laboratory, Presider

TUF1 Soliton switching in elliptically birefringent single-mode fiber C. J. CHEN, P. K. A. WAI, CURTIS R. MENYUK (10:30 AM) 58

TUF2 Mechanism and dynamics of nonlinear optical switching in a dielectric prism cladded liquid crystal film I. C. KHOO, PING ZHOU, R. R. MICHAEL, R. G. LINDQUIST, R. MANSFIELD, P. G. LO-PRESTI (10:45 AM) 58

TUF3 Low power interferometric bistable devices in GaAs epitaxial structures J. L. OUDAR, R. KUSZELEWICZ, R. AZOULAY (11:00 AM) 60

TUF4 Switching behavior of a diffusive nonlinear interface KAI HEINZ STROBL, R. R. CUYKENDALL (11:30 AM) 60

TUF5 Highly sensitive polarization controlled optical switching via a photorefractive double phase conjugator QI-CHI HE, J. GRAEME DUTHIE, DON A. GREGORY (11:45 AM) 60

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25 April 1989 **TUG**

CONVENTION CENTER ROOM 309

10:30 AM **Optical Damage and Novel Thin Film Growth**

Earl Rudisill, Laser Power Optics, Presider

TUG1 Silicone treatments of harmonic conversion crystals to improve surface quality and optical transmission IAN M. THOMAS (10:30 AM) 60

TUG2 Laser-induced surface damage: multiphoton absorption or avalanche breakdown S. PETZOLDT, A. P. ELG, J. REIF, E. MATTHIAS (10:45 AM) 62

TUG3 Two-photon-induced losses in germanosilicate optical fibers: relaxation processes L. J. POYNTZ-WRIGHT, P. ST. J. RUSSELL (11:00 AM) 62

TUG4 Accumulated surface damage on ZnS crystals caused by picosecond laser pulses L. L. CHASE, H. W. H. LEE (11:15 AM) 62

TUG5 Laser assisted metal organic chemical vapor deposition of zinc selenide G. B. SHINN, P. M. GILLESPIE, W. B. HAYNES, W. L. WILSON, JR. (11:30 AM) 64

TUG6 Solgel growth of vanadium dioxide thin films K. R. SPECK, H. S.-W. HU, R. A. MURPHY, R. S. POTEMBER (11:45 AM) 64

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25 April 1989 **TUH**

CONVENTION CENTER ROOM 310

10:30 AM **Ophthalmology**

Douglas E. Gaasterland, Georgetown University Medical Center, Presider

TUH1 New UV and IR lasers for ocular tissue ablation CARMEN A. PULIAFITO (10:30 AM) 66

TUH2 Time-resolved studies and biological effects of picosecond pulse optical breakdown B. ZYSSET, JAMES G. FUJIMOTO, THOMAS F. DEUTSCH, R. BIRNGRUBER, CARMEN A. PULIAFITO (11:00 AM) 66

TUH3 Intraocular laser tissue interaction: linear and nonlinear ef-

fects produced with nanosecond, picosecond, and femtosecond pulses R. BIRNGRUBER, V. P. GABEL, CARMEN A. PULIAFITO, B. ZYSSET, JAMES G. FUJIMOTO (11:15 AM) 66

TUH4 Processing of biomaterials by excimer laser pulses transported through tapered light guides H. HITZLER, N. LECLERC, K.-O. GREULICH, J. WOLFRUM, K.-F. KLEIN (11:30 AM) 68

TUH5 Novel excimer laser system design for corneal refractive surgery QIUSHI REN (11:45 AM) 68

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CONVENTION CENTER ROOM 317

10:30 AM Photorefractive Nonlinear Optics: 1

Marvin B. Klein, Hughes Research Laboratories, Presider

TUI1 Recent advances in photorefractive nonlinear optics POCHI YEH (10:30 AM) 68

TUI2 Origin of the sublinear intensity dependence in photorefractive materials JUAN F. LAM (11:00 AM) 70

TUI3 Coupled double phase conjugate mirrors in photorefractive materials BARUCH FISCHER, SHIMON WEISS, OFER WERNER (11:15 AM) 70

TUI4 Fanning in undoped GaAs under a dc electric field DUNCAN T. H. LIU, LI-JEN CHENG (11:30 AM) 70

TUI5 Temporal responses of optical phase conjugation in the undoped KNSBN crystal WENJI PENG, RONG ZHU, WEILONG SHE, QINXING LI, ZHENXIN YU, HUAN-CHU CHEN, QING-LUN ZHANG, YU-HUAN XU, DE-RUI ZHU (11:45 AM) 72

TUESDAY AFTERNOON

25 April 1989 TUJ

CONVENTION CENTER MEZZANINE LEVEL

1:00 Poster Session: 1

NONLINEAR OPTICS AND SPECTROSCOPY

TUJ1 Beam walk-off effects on the efficiency of frequency conversion J. T. LIN, Y. L. HUANG 74

TUJ2 Frequency doubling of a 100-W copper laser for high power UV generation G. A. NAYLOR, R. R. LEWIS, A. J. KEARSLEY 74

TUJ3 Optical frequency doubling properties of two highly polar copolymers P(VDF-TrFE) and P(VDCN-VAc) P. ROBIN, E. CHASTAING, D. BROUSSOUX, J. RAFFY, J. P. POCHOLLE, M. BARZOUKAS, D. JOSSE, J. ZYSS 74

TUJ4 Two-photon near-resonant ultrashort pump pulse interaction with three-level atoms G. G. GRIGORIAN, D. H. SARKISIAN, M. L. TER-MIKAELIAN, G. A. TOROSIAN 74

TUJ5 Infrared laser spectroscopy of the extraordinary ray multiphonon processes in sapphire MICHAEL E. THOMAS 76

TUJ6 Nonlinear properties of silica for picosecond ultraviolet pulses I. N. ROSS, J. R. M. BARR, W. T. TONER 76

TUJ7 Temperature dependence of optical birefringence in some molecular liquids ZDZISLAW BLASZCZAK, ANWAR AL-DWERI 78

TUJ8 Measurement of the autoionizing levels of atomic samarium using the stepwise laser excitation method SUFEN HU, SHIMIN MEI, SEN ZHANG, XING CHEN 78

TUJ9 Nonlinear optical properties of δ -doped multiple quantum well GaAs Y. H. LEE, J. E. CUNNINGHAM, W. JAN, K. GOOSEN 78

TUJ10 Laser propagation effect in atomic laser isotope separation H. NIKI, S. ADACHI, Y. IZAWA, SADA O NAKAI, CHIYOE YAMANAKA 78

LIGHTWAVE COMMUNICATIONS

TUJ11 High speed optical transmission capability and long coherence length of AlGaAs distributed feedback lasers KANJI MIHARA, TAKASHI OTOBE, SHOJI HIRATA 80

TUJ12 Ultrafast diode laser pulse separation by dispersive fibers suitable for novel hybrid time/wavelength division multiplexing Y. T. LEE, R. TAKAHASHI, H. F. LIU, R. NAGARAJAN, T. KAMIYA	80
TUJ13 Reliability of a 1.55- μm distributed feedback laser diode K. CHINEN, H. SUHARA, T. HOSOKAWA, A. TANAKA, T. MATSUYAMA, K. GEN-EI	80
TUJ14 Improved LED and laser packaging using uptapered single-mode fibers W. RIDEOUT, A. D. BRIERE, T. WEI	82
TUJ15 Single-mode fiber coupling to a traveling-wave laser amplifier L. A. REITH, J. W. MANN, C. E. ZAH, G. R. LALK, C. CANEAU, F. FAVIRE	82
TUJ16 Fabrication tolerance of Ti:LiNbO ₃ waveguides F. S. CHU, P. L. LIU, JANE E. BARAN	84
TUJ17 Laser trimming adjustment of waveguide birefringence in silica integrated-optic ring resonators MASAO KAWACHI, NORIO TAKATO, KANAME JINGUJI, AKIO SUGITA	84
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Pochi Yeh, Rockwell International Science Center, Presider

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Robert Bonner, National Institutes of Health, Presider

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Mark Ewbank, Rockwell International Science Center, Presider

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Gerard A. Mourou, University of Michigan, Presider

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Jack L. Bufton, NASA Goddard Space Flight Center, Presider

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Kenneth B. Eisenthal, Columbia University, **Presider**

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Hyatt M. Gibbs, University of Arizona, **Presider**

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Adelbert Owyong, Sandia National Laboratories, **Presider**

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WB4 Hyperfine structure measurement and labeling of high lying levels of uranium using a line narrowing technique in a hollow cathode discharge **FUCHENG LIN, SHIFANG LI, CHUNYANG JIN, QIQUAN HU, XIAXING XIONG, YIQING SHEN, JIANAN QU (9:15 AM)** 162

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8:30 AM High Power AlGaAs Single Emitters

Larry C. Coldren, University of California, Santa Barbara, Presider

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James F. Young, Stanford University, Presider

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Norman Bobroff, IBM T. J. Watson Research Center, Presider

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WEDNESDAY

AFTERNOON

26 April 1989

JF

CONVENTION CENTER ROOM 317

2:30 PM Joint CLEO/QELS Symposium on Nonlinear Optics in Quantum Confined Structures: 1

David A. B. Miller, AT&T Bell Laboratories, Presider

JF1 Physics and applications of optical processes in modulation-doped quantum wells DANIEL S. CHEMLA, I. BAR-JOSEPH, M. WEGENER, J. M. KUO, T. Y. CHANG (2:30 PM)	216
JF2 Optical nonlinearities in semiconductors from charge carrier transport ALAN KOST, ELSE M. GARMIRE (3:00 PM)	218
JF3 Electrooptical properties of staggered alignment AlGaAs heterostructures B. A. WILSON, R. C. SPITZER, CARL BONNER, L. PFEIFFER, ALASTAIR M. GLASS (3:30 PM)	218

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26 April 1989 WG

CONVENTION CENTER ROOM 309

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C. Henry, AT&T Bell Laboratories, Presider

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WG2 Gain nonlinearities due to carrier density dependent dispersion in semiconductor lasers DAG ROAR HJELME, ALAN ROLF MICKELSON (2:45 PM) 218

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WG4 Nonlinear gain effect and modulation dynamics in quantum well lasers Y. ARAKAWA, T. TAKAHASHI (3:30 PM) 220

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Peter Esherick, Sandia National Laboratories, Presider

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WH5 Optimized cavities for single transverse-mode solid state lasers S. DE SILVESTRI, V. MAGNI, O. SVELTO, P. LAPORTA (3:30 PM) 224

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James H. Glowina, IBM T. J. Watson Research Center, Presider

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WI2 Infrared picosecond pulse diagnostics using photorefractive beam coupling ANTHONY M. JOHNSON, ALASTAIR M. GLASS, W. M. SIMPSON, D. H. OLSON (3:00 PM) 226

WI3 Use of femtosecond square pulses to eliminate pulse break-up in all-optical switching ANDREW M. WEINER, Y. SILBERBERG, H. FOUCKHARDT, D. E. LEAIRD, M. A. SAIFI, M. J. ANDREJCO, P. W. SMITH (3:15 PM) 226

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Paul J. Titterton, GTE Government Systems, Presider

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WJ2 Laser remote sensing of surface roughness through the atmosphere JOHN S. PEACOCK, J. FRED HOLMES, DOUGLAS DRAPER (3:00 PM) 230

WJ3 Measurement of stimulated thermal Rayleigh scattering instability T. J. KARR, M. C. RUSHFORD, J. R. MURRAY (3:15 PM) 230

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WK2 Sub-Angstrom sensitive techniques for determining surface roughness of high quality optical surfaces and thin films LARS MATTSSON (3:00 PM) 232

WK3 Photonic solid state photography JOSEPH LINDMAYER (3:30 PM) 234

WK4 Realization of a conoscopic television system DIDIER CHARLOT, DEMETRI PSALTIS (3:45 PM) 234

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Nasser Peyghambarian, University of Arizona, Presider

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William F. Krupke, Lawrence Livermore National Laboratory, Presider		
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Robert T. Menzies, Jet Propulsion Laboratory, Presider		
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WO2 Electrical switching in superconducting YBCO thin films using picosecond optical pulses W. DONALDSON, P. BALLENTINE, A. KADIN (5:00 PM) 248

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8:30 AM **Visible and Near Infrared Lasers**

James G. Eden, University of Illinois, Presider

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THA2 Scaling studies of the XeF(C \rightarrow A) excimer laser C. B. DANE, G. J. HIRST, W. L. WILSON, JR., R. SAUERBREY, FRANK K. TITTEL, W. L. NIGHAN (8:45) 250

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David M. Pepper, Hughes Research Laboratories, Presider

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Frank K. Tittel, Rice University, Presider

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THC4 High efficiency operation of the XeF(B → X) laser using a low pressure and room temperature Ar/Xe/F₂ mixture pumped by a short pulse electron beam TOSHIKI TAKASHIMA, FUMIHIKO KANNARI, MINORU OBARA (9:45 AM) 260

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27 April 1989 THD

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Irving P. Herman, Columbia University, Presider

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THE3 Two-photon-excited stimulated emission from atomic oxygen in flames and cold gases J. E. M. GOLDSMITH, MARCUS ALDEN, ULF WESTBLOM (9:15 AM) 266

THE4 Nonlinear optical spectra from liquid droplets RICHARD K. CHANG (9:30 AM) 266

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B. B. Snavely, Eastman Kodak Company, Presider

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Nasser Peyghambarian, University of Arizona, *Presider*

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Chris Schaus, University of New Mexico, *Presider*

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THM2 Performance characteristics of strained InGaAs/AlGaAs quantum well lasers **D. P. BOUR, G. A. EVANS, NILS W. CARLSON, D. B. GILBERT, L. ELBAUM, M. G. HARVEY (2:45 PM)** 330

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Marlo Dagenais, University of Maryland, Presider

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Joseph F. Figueira, Los Alamos National Laboratory, Presider

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THP4 Comparisons of recent E-beam pumped KrF laser experiments with model predictions WAYNE D. KIMURA, J. F. SEAMANS, FUMIHIKO KANNARI, D. E. HANSON (3:15 PM) 340

THP5 Absorption at 248 nm in electron beam-pumped noble gases A. W. McCOWN, D. E. HANSON, E. A. ROSE, S. J. CZUCHLEWSKI, T. M. BELL, J. A. B. GODARD (3:30 PM) 342

THP6 Demonstration of >100 ns pulse lengths in a KrF discharge laser WAYNE D. KIMURA, M. VON DADELSZEN, K. R. RATHBUN, E. G. SERGOYAN, J. S. DEMBOSKI (3:45 PM) 342

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Jean-Marc Halbout, IBM T. J. Watson Research Center, Presider

J11 Propagation of 1-THz bandwidth electrical pulses on high- T_c superconducting transmission lines **MARTIN C. NUSS, P. M. MANKIEWICH, R. E. HOWARD, T. E. HARVEY, C. D. BRANDLE, B. L. STRAUGHN, P. R. SMITH (4:30 PM)** 344

J12 Studies of a low noise, laser actuated superconducting switch **CHARLES E. CUNNINGHAM, BLAS CABRERA (5:00 PM)** 346

J13 High speed characterization of InGaAs/InAlAs MODFETs using phase-space absorption quenching **J. M. WIESENFELD, M. S. HEUTMAKER, I. BAR-JOSEPH, DANIEL S. CHEMLA, C. A. BURRUS, J. S. PERINO, J. M. KUO, T. Y. CHANG (5:15 PM)** 346

J14 Single picosecond pulse generation in low temperature MBE grown GaAs photoconductors **S. GUPTA, J. A. VALDMANIS, GERARD A. MOUROU, F. W. SMITH, A. R. CALAWA (5:30 PM)** 346

J15 Femtosecond excitonic electroabsorption sampling in free-standing GaAs coplanar quantum well striplines **WAYNE H. KNOX, J. E. HENRY, B. TELL, K. D. LI, DAVID A. B. MILLER, DANIEL S. CHEMLA (5:45 PM)** 348

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Howard Schlossberg, U.S. Air Force Office of Scientific Research, Presider

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THQ2 Applications and features of a new nonlinear crystal: lithium triborate **J. T. LIN, C. E. HUANG, J. Q. YAO (5:00 PM)** 348

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THQ4 Second harmonic generation of green light in a periodically poled lithium niobate waveguide **E. J. LIM, MARTIN M. FEJER, ROBERT L. BYER (5:30 PM)** 350

THQ5 KTiOAsO_4 : a new nonlinear material **JOHN D. BIERLEIN, HERMAN VANHERZEELE, A. A. BALLMAN (5:45)** 350

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John Goldsmith, Sandia National Laboratories, Presider

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THR2 Velocity profiles and density cross sections in supersonic shear layers by simultaneous flow tagging and Rayleigh scattering **RICHARD MILES, JOHN CONNORS, EDWARD MARKOVITZ, MICHAEL SMITH, VINOD KUMAR, GREGORY ROTH, ALEXANDER SMITS (4:45 PM)** 352

THR3 Laser illumination of aluminum through lenticular arrays for narrowing the bandwidth of generated ultrasound **A. D. W. MCKIE, J. W. WAGNER, C. MURRAY PENNEY (5:00 PM)** 354

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David F. Welch, Spectra Diode Laboratories, Presider

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THS2 Integrated injection locking of high power cw diode laser arrays J. P. HOHIMER, D. R. MYERS, T. M. BRENNAN, B. E. HAMMONS (4:45 PM) 358

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THS4 Fifty-five watt continuous-wave monolithic laser diode arrays MASAMICHI SAKAMOTO, DAVID F. WELCH, JOHN G. ENDRIZ, WILLIAM STREIFER, DONALD R. SCIFRES (5:15 PM) 358

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Dennis K. Killinger, University of South Florida, Presider

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THT2 Receiving efficiency of pulsed coherent lidars YANZENG ZHAO, M. J. POST, R. M. HARDESTY (4:45 PM) 362

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THU6 Line-narrowed industrial excimer laser for microlithography R. K. BRIMACOMBE, T. J. McKEE, E. D. MORTIMER, B. MORRIS, J. REID, T. A. ZNOTINS (5:45 PM) 366

THURSDAY **EVENING**

27 April 1989 **CLEO-PD**

CONVENTION CENTER ROOM 307

7:30 PM **Postdeadline Papers**

Jack L. Bufton, NASA Goddard Space Flight Center and **William F. Krupke**, Lawrence Livermore National Laboratory, Presiders

Postdeadline papers will be printed and distributed during the meeting. 368

FRIDAY **MORNING**

28 April 1989 **JJ**

HYATT REGENCY BALLROOM C/D

8:30 AM **Joint CLEO/QELS Symposium on Free Electron Lasers: 1**

John M. J. Madey, Stanford University, Presider

JJ1 Broadband operation of a free electron laser in the infrared **STEPHEN V. BENSON, JOHN M. J. MADEY (8:30 AM)** 370

JJ2 High gain free electron lasers **DONALD PROSNITZ (9:00 AM)** 370

JJ3 Coherent optical harmonic production in the Los Alamos free electron laser oscillator **BRIAN E. NEWNAM, ROGER W. WARREN, DONALD W. FELDMAN, LAWRENCE C. HAYNES, JON E. SOL-LID (9:30 AM)** 370

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28 April 1989 **FA**

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8:30 AM **Ultrashort Pulse Generation**

James G. Fujimoto, Massachusetts Institute of Technology, Presider

FA1 Generation of terahertz-rate pulse trains by phase-only filtering **ANDREW M. WEINER, J. P. HERITAGE, D. E. LEAIRD, E. M. KIRSCHNER (8:30 AM)** 370

FA2 Thirty-one picosecond pulses from a harmonically mode-locked Nd:YAG laser at 0.5-GHz repetition rate **THEODORE SIZER II (8:45 AM)** 372

FA3 Mode-locked erbium fiber laser **J. D. KAFKA, THOMAS M. BAER, D. W. HALL (9:00 AM)** 372

FA4 Parametric soliton laser **KAZUNORI SUZUKI, MASATAKA NAKAZAWA, HERMANN A. HAUS (9:15 AM)** 372

FA5 Tunable ultrashort pulse generation with a fiber grating Raman laser **R. SCHULZ, M. KUCKARTZ, H. HARDE (9:30 AM)** 374

FA6 Femtosecond spectroscopy using broadband soliton emission from fibers **G. SUCHA, M. N. ISLAM, I. BAR-JOSEPH, M. WEGENER, J. P. GORDON, DANIEL S. CHEMLA (9:45 AM)** 374

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28 April 1989 **FB**

CONVENTION CENTER ROOM 310

8:30 AM **High Speed Devices for Optical Communication**

Ronald D. Esman, U.S. Naval Research Laboratory, Presider

FB1 High speed quaternary InGaAsP/InP quantum well waveguide optical intensity modulator **THOMAS H. WOOD, RODNEY S. TUCKER, UZIEL KOREN, CHARLES A. BURRUS, JR. BARRY I. MILLER, LYN M. OSTAR, ELIZABETH C. CARR (8:30 AM)** 376

- FB2** Dispersionless transmission and compression of chirped 1.3- μm DFB ps laser pulses in dispersion shifted single-mode fibers H. IZADPANA, C. M. OLSEN, CHINLON LIN (8:45 AM) 376
- FB3** Dynamic characteristics of an optical intensity modulator monolithically integrated with a DFB laser under 5-Gbit/s modulation H. SODA, M. FURUTSU, K. SATO, M. MATSUDA, H. ISHIKAWA (9:00 AM) 376
- FB4** Optical devices for high speed transmission including widely tunable DFB/DBR lasers HAJIME IMAI (9:15 AM) 378
- FB5** Very low noise, large gain-bandwidth AlGaSb avalanche photodiodes T. MIKAWA, S. MIURA, H. KUWATSUKA, N. YASUOKA, T. TANAHASHI, O. WADA, T. SAKURAI (9:45 AM) 378

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28 April 1989 FC

CONVENTION CENTER ROOM 317

8:30 AM Surface Emitting Lasers: 1

Nils W. Carlson, David Sarnoff Research Center, Presider

- FC1** Room temperature cw vertical cavity surface emitting laser and high power 2-D laser array F. KOYAMA, S. KINOSHITA, K. IGA (8:30 AM) 380
- FC2** Low threshold current-density vertical-cavity surface emitting AlGaAs/GaAs diode lasers D. BOTEZ, L. M. ZINKIEWICZ, T. J. ROTH, L. J. MAWST, G. PETERSON (9:00 AM) 380
- FC3** Effect of periodic gain in continuous-wave (Al, Ga)As epitaxial surface emitting lasers P. L. GOURLEY, TOM M. BRENNAN, B. E. HAMMONS, S. W. CORZINE, R. S. GEELS, R. H. YAN, J. W. SCOTT, LARRY A. COLDREN (9:15 AM) 380
- FC4** Surface emitting lasers: a comparison of resonant-periodic gain and conventional structures M. Y. A. RAJA, STEVE R. J. BRUECK, MAREK OSINSKI, C. F. SCHAUS, J. G. McINERNEY, TOM M. BRENNAN, B. E. HAMMONS (9:30 AM) 382
- FC5** Lasing at $\sim 1 \mu\text{m}$ from $\text{In}_{0.2}\text{Ga}_{0.8}\text{As}/\text{GaAs}$ quantum well surface emitting resonators with GaAs/AlAs mirrors K. TAI, K. F. HUANG, J. L. JEWELL, R. J. FISCHER, S. L. McCALL, A. Y. CHO (9:45 AM) 382

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28 April 1989 FD

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Jeff Giddstone, Rockwell International Science Center, Presider

- FD1** Stimulated vibration-rotational Raman scattering in hydrogen pumped by an alexandrite laser DA-WUN CHEN (8:30 AM) 384
- FD2** Theory of degenerate rotational Raman scattering SHAM DIXIT, MARK HERMANN (8:45 AM) 384
- FD3** Efficient rotational Raman conversion in hydrogen, deuterium, and hydrogen/deuterium mixes using a phase conjugate pump laser E. GREGOR, O. KAHAN, D. W. MORDAUNT (9:00 AM) 384
- FD4** Wavefront preservaton in a transient Raman amplifier M. D. DUNCAN, R. MAHON, L. L. TANKERSLEY, J. REINTJES (9:15 AM) 384
- FD5** Time-resolved investigation of stimulated rotational Raman scattering in hydrogen METIN S. MANGIR, DAVID A. ROCKWELL (9:30 AM) 386
- FD6** Observation of spontaneous generation of solitons in stimulated Raman scattering KATSUMI MIDORIKAWA, HIDEO TASHIRO, YASUHIRO AJIYAMA, MINORU OBARA (9:45 AM) 386

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28 April 1989	JK
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Brian E. Newnam, Los Alamos National Laboratory, Presider	
JK1	Status of the tandem FEL project development in Israel I. BEN-ZVI, J. SOKOLOWSKI, D. CHOMSKI, E. JERBY, S. RUSCHIN, A. FRIEDMAN, A. GOVER, A. ROSENBERG, J. SHILOH (10:30 AM) 386
JK2	Development of a 10-m wedged-pole undulator KEM E. ROBINSON, STEPHEN C. GOTTSCHALK, FRANK E. JAMES, DAVID C. QUIMBY, JACK M. SLATER, ART S. VALLA (10:45 AM) 388
JK3	Self-focusing of laser beams in magnetized relativistic electron beams M. H. WHANG, S. P. KUO, A. Y. HO (11:00 AM) 388
JK4	Effect of beam velocity spread on the efficiency of an optical klystron MING CHANG WANG, V. L. GRANATSTEIN, B. LEVUSH (11:30 AM) 388
JK5	Laser driven photocathode studies for high gradient accelerators T. SRINIVASAN-RAO, J. FISCHER, T. TSANG (11:45 AM) 388

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10:30 AM	Optical Parametric Oscillators
Robert L. Byer, Stanford University, Presider	
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FE2	Design of an injection seeded infrared optical parametric oscillator for narrow bandwidth operation D. C. HOVDE, B. PATE, K. K. LEHMANN (10:45 AM) 390
FE3	Broadly tunable optical parametric oscillation in β -BaB ₂ O ₄ C. L. TANG, W. R. BOSENBERG, W. PELOUCH (11:00 AM) 390
FE4	Q-switched Nd:YAG laser operation with beta barium borate C. T. MUELLER, N. D. DUONG (11:30 AM)
FE5	Tunable single-frequency 215-235-nm radiation by barium borate intracavity doubling in the stilbene-3 ring dye laser T. F. JOHNSTON, JR., TIMOTHY J. JOHNSTON (11:45 AM) 392

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10:30 AM	Laser Processing Applications
R. J. von Gutfeld, IBM T. J. Watson Research Center, Presider	
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FF2	Thin film transistor using α -Si:H film deposited by laser-induced chemical vapor deposition Y. HIURA, H. UCHIDA, S. KANEKO, YUKIO MORISHIGE, SHUNJI KISHIDA (10:45 AM) 392
FF3	Excimer laser and Hg-Xe arc lamp driven low temperature deposition of gallium arsenide D. P. NORTON, P. K. AJMERA (11:00 AM) 394
FF4	Laser direct writing of integrated optical components M. N. RUBERTO, A. E. WILLNER, D. V. PODLESNIK, R. M. OSGOOD, JR. (11:15 AM) 394
FF5	Reduced laser power for aluminum film damage using multiple pulses G. H. CHAPMAN, S. S. COHEN (11:30 AM) 396
FF6	Laser patterning of superconducting YBa ₂ Cu ₃ O _{7-x} films J. P. ZHENG, Q. Y. YING, D. T. SHAW, H. S. KWOK (11:45 AM) 396

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28 April 1989 FG

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10:30 AM **Devices for High Capacity Multichannel Communication Systems**

Paul R. Prucnal, Princeton University, Presider

FG1 Novel relative frequency stabilization technique for multichannel optical communication systems M. W. MAEDA, L. G. KAZOVSKY (10:30 AM) 396

FG2 Coherent crosstalk mechanism in multiwavelength switching of an integrated acoustooptic tunable filter M. M. CHOY, K. W. CHEUNG, D. A. SMITH, JANE E. BARAN (10:45 AM) 396

FG3 Self-locked optical time-division switch PAUL R. PRUCNAL, PHILIPPE A. PERRIER, MICHEL W. CHBAT (11:00 AM) 396

FG4 Five gigabit per second direct optical differential phase shift keying modulation of a 1530-nm distributed feedback laser R. S. VODHANEL (11:15 AM) 396

FG5 Wavelength division multiplexing integrated waveguide components on Si substrates MASAO KAWACHI (11:30 AM) 400

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28 April 1989 FH

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James R. Leger, MIT Lincoln Laboratory, Presider

FH1 Theory, design, and characteristics of AlGaAs and InGaAsP grating surface emitting laser arrays S. L. PALFREY, NILS W. CARLSON, R. AMANTEA, G. A. EVANS, J. M. HAMMER, M. LURIE (10:30 AM) 400

FH2 Coherent operation of injection locked 2-D monolithic surface emitting laser diode arrays M. JANSEN, J. J. YANG, L. HEFLINGER, S. S. OU, M. SERGANT, J. HUANG, J. WILCOX, E. ANDERSON, L. EATON, W. W. SIMMONS (11:00 AM) 402

FH3 High power 2-D arrays of surface emitting distributed feedback lasers S. H. MACOMBER, J. S. MOTT (11:15 AM) 402

FH4 Properties of broad area grating coupled surface emitters DAVID F. WELCH, ROSS PARKE, WILLIAM STREIFER, AMOS HARDY, DONALD R. SCIFRES (11:30 AM) 402

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Geoffrey L. Burdge, Laboratory for Physical Science, Presider

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FI2 Advances in Pb vapor stimulated Raman conversion of XeCl laser radiation BARRY A. SWARTZ, BARRY G. CHARLES, ELIYAHU MARGALITH (10:45 AM) 404

FI3 Efficient blue light production via coherent anti-Stokes conversion in gases JOHN J. UTTUSCH, METIN S. MANGIR, DAVID A. ROCKWELL (11:00 AM) 404

FI4 Stimulated Rayleigh-Kerr scattering from a CS₂ liquid-core fiber system G. S. HE, P. N. PRASAD (11:15 AM) 406

FI5 Effects of turbulent aberrations on optical phase conjugation by stimulated Brillouin scattering S. TAYLOR, H. A. SAYADIAN, P. SCHATZLE, E. HOOVER (11:30 AM) 406

FI6 Reduction of threshold for stimulated Brillouin scattering phase conjugation through use of multiple sequential foci C. W. CLENDENING, R. APRAHAMIAN, M. TREPKA, R. WAGNER, H. A. SAYADIAN (11:45 AM) 408

FI7 Observation of instabilities of laser beams due to the Brillouin interaction ALEXANDER L. GAETA, MARK D. SKELDON, ROBERT W. BOYD, PAUL NARUM (12:00 M) 408

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28 April 1989 **JL**

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Jonathan P. Heritage, Bellcore, Presider

JL1 Paper withdrawn

JL2 Femtosecond study of optical nonlinearities in GaSe C. HIRLMANN (1:15 PM) 408

JL3 Photon echoes in condensed matter with 6-fs optical pulses CHARLES V. SHANK, P. C. BECKER, H. FRAGNITO, J. BIGOT, C. BRITO CRUZ (1:30 PM) 408

JL4 Exciton ionization dynamics of InGaAs quantum wells M. WEGENER, I. BAR-JOSEPH, G. SUCHA, M. N. ISLAM, N. SAUER, T. Y. CHANG, DANIEL S. CHEMLA (2:00 PM) 410

JL5 Ultrafast carrier relaxation in amorphous semiconductors D. HULIN, A. MOURCHID, C. TANGUY, P. M. FAUCHET, R. VANDERHAGHEN (2:15 PM) 410

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28 April 1989 **JM**

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George R. Neal, Lawrence Livermore National Laboratory, Presider

JM1 Paladin: a 10.6- μ m free electron laser amplifier T. J. ORZECHOWSKI (1:00 PM) 410

JM2 Status of rf linac free electron lasers ROGER W. WARREN (1:30 PM) 412

JM3 Optical klystron FELs based on tandem electrostatic accelerators A. GOVER, A. FRIEDMAN (2:00 PM) 412

JM4 Short pulse effects and coherence in a far infrared free electron laser D. OEPTS, A. F. G. VAN DER MEER, R. W. B. BEST, P. W. VAN AMERSFOORT, W. B. COLSON (2:15 PM) 412

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Allister I. Ferguson, University of Strathclyde, U. K., Presider

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FJ3 High efficiency diode array pumped YAG, LYAG, and GSGG DAVID P. CAFFEY, WAYNE W. HOVIS, RICHARD UTANO, TOOHEMA H. ALLIK (1:45 PM) 414

FJ4 Diode-pumped Q-switched single frequency Nd:YAG ring laser W. A. CLARKSON, DAVID C. HANNA (2:00 PM) 414

FJ5 High efficiency diode bar-pumped solid state laser using a tightly folded resonator THOMAS M. BAER, DAVID F. HEAD, MASAMICHI SAKAMOTO (2:15 PM) 416

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FK1 Optical parametric oscillators pumped by excimer lasers M. EBRAHIMZADEH, M. H. DUNN (1:00 PM)	416
FK2 Monolithic MgO:LiNbO ₃ optical parametric oscillator pumped by a cw frequency doubled diode laser-pumped Nd:YAG C. D. NABORS, R. C. ECKHARDT, W. J. KOZLOVSKY, ROBERT L. BYER (1:30 PM)	416
FK3 Singly resonant synchronously pumped optical parametric oscillator using potassium titanyl phosphate A. GUY, L. J. BROMLEY, D. C. HANNA (1:45 PM)	418
FK4 Ultraviolet generation based on copper vapor lasers D. W. COUTTS, M. D. AINSWORTH, JIM A. PIPER (2:00 PM)	418
FK5 One-kilowatt average power KD*P second harmonic generator M. NORTON, D. EIMERL, S. VELSKO, C. EBBERS (2:15 PM)	418

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28 April 1989	FL
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Connie J. Chang-Hasnain, Bellcore, Presider	
FL1 Coherent operation of AlGaAs laser arrays with high Strehl ratio using coupled microcavities and binary optical elements JAMES R. LEGER, MARSDEN GRISWOLD, PHILIP BUNDMAN (1:00 PM)	420
FL2 Diffraction-limited operation from a monolithically integrated linear array and self-imaging (Talbot) cavity M. JANSEN, JANE J. YANG, S. S. OU, J. WILCOX, D. BOTEZ, L. MAWST, W. W. SIMMONS (1:15 PM)	420
FL3 Self-imaging cavities for phase locking of laser diode arrays and fill factor enhancement F. X. D'AMATO, E. T. SIEBERT, C. ROY-CHOUDHURI (1:30 PM)	420
FL4 (GaAl)As quantum well semiconductor lasers tunable over 105 nm with an external grating DAVID MEHUYS, MICHAEL MITTELSTEIN, AMNON YARIV, RONA SARFATY, JEFFREY E. UNGAR (1:45 PM)	422
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FM2 Optical frequency exchange utilizing semiconductor laser amplifiers and Mach-Zehnder filters KYO INOUE, NORIO TAKATO (1:15 PM)	426
FM3 Packaged laser amplifiers at 1.5 μm for submarine systems K. H. CAMERON, P. E. BARNESLEY, S. M. WEBSTER, W. J. DEVLIN, J. C. REGNAULT, D. J. MALYON, W. A. STALLARD (1:30 PM)	426
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28 April 1989 **FN**

HYATT REGENCY BALLROOM B

1:00 PM Mechanisms and Optical Diagnostics of Laser Processing

Peter Brewer, Hughes Research Laboratories, Presider

FN1 Diagnostics of gas phase processes in a laser CVD environment by laser spectroscopy T. OKADA, H. ANDOU, M. MAEDA (1:00 PM) 428

FN2 Micron-dimension optical diagnostics of localized laser-induced etching HUA TANG, IRVING P. HERMAN (1:15 PM) 428

FN3 Laser assisted CVD and MOCVD growth of semiconductor film J. J. COLEMAN, JAMES G. EDEN (1:30 PM) 428

FN4 Emission spectroscopy of plasmas generated in CO₂ laser etching of fused silica K. C. HSIAO, YUN-YEN J. YANG, SUSAN D. ALLEN (2:00 PM) 430

FN5 Microscopic photoemission probing of doped regions on semiconductor surfaces B. QUINIOU, R. SCARMOZZINO, Z. WU, R. M. OSGOOD JR. (2:15 PM) 430

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28 April 1989 **FO**

CONVENTION CENTER ROOM 309

2:30 PM Low Threshold Diode Lasers and Novel Substrates

Jane J. Yang, TRW Space & Technology Group, Presider

FO1 Low threshold GaAs/AlGaAs patterned quantum well lasers grown by organometallic chemical vapor deposition E. KAPON, R. BHAT, S. SIMHONY, C. P. YUN, D. M. HWANG, N. G. STOFFEL (2:30 PM) 430

FO2 Low threshold quantum well lasers and laser arrays grown by MOCVD on nonplanar substrates K. M. DZURKO, E. P. MENU, P. D. DAPKUS, C. A. BEYLER, J. S. OSINSKI (2:45 PM) 432

FO3 Low threshold current ridge waveguide etched facet short cavity AlGaAs/GaAs laser C. SHIEH, J. MANTZ, K. ALAVI, R. ENGELMANN (3:00 PM) 432

FO4 Thin film double heterostructure GaAs lasers on glass substrates E. YABLONOVITCH, E. KAPON, T. J. GMITTER, C. P. YUN, R. BHAT (3:15 PM) 432

FO5 High quality GaAs quantum well lasers grown in InP substrates with two orientations by OMCVD CONNIE J. CHANG-HASNAIN, Y. H. LO, R. BHAT, N. G. STOFFEL, D. M. HWANG (3:30 PM) 434

FO6 High power GaAs/AlGaAs diode lasers grown on Si substrates by single-step metalorganic chemical vapor deposition J. C. CONNOLLY, N. A. DINKEL, R. MENNA, D. B. GILBERT, M. G. HARVEY (3:45 PM) 434

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FP

CONVENTION CENTER ROOM 310

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Daniel A. Nolan, Corning Glass Works, Presider

- FP1** Performance characteristics of miniature external cavity semiconductor lasers J. MELLIS, S. A. AL-CHALABI, K. H. CAMERON, R. WYATT, J. C. REGNAULT, W. J. DEVLIN, J. A. PERROTTO, M. H. JOHNSON (2:30 PM) 436
- FP2** Novel FSK heterodyne single filter detection system using no IF frequency-locking loop Y. C. CHUNG, R. W. TKACH, T. L. KOCH (2:45 PM) 436
- FP3** Squeezed states and subshot noise optical detection scheme P. GRANGIER, RICHARD E. SLUSHER, B. YURKE, A. LA PORTA (3:00 PM) 436
- FP4** GaAs-on-InP heteroepitaxial long wavelength OEIC transmitter Y. H. LO, R. BHAT, C. CANEAU, CONNIE J. CHANG-HASNAIN, T. P. LEE (3:30 PM) 438
- FP5** Measurement of the probability distribution of DFB laser phase-induced intensity noise M. TUR, E. L. GOLDSTEIN (3:45 PM) 438

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FQ

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Arthur L. Smlrl, University of Iowa, Presider

- FQ1** Exploitation of optical nonlinearities for enhanced mode-locking in coupled cavity lasers W. SIBBETT (2:30 PM) 440
- FQ2** Additive pulse mode-locking: a mechanism for femtosecond pulse generation with coupled nonlinear resonators L. Y. LIU, J. MARK, HERMANN A. HAUS, ERICH P. IPPEN (3:30 PM) 440
- FQ3** Additive pulse mode-locked NaCl:OH⁻ laser CHRISTOPHER P. YAKMYSHYN, JOSEPH F. PINTO, CLIFFORD R. POLLOCK (3:15 PM) 442
- FQ4** Mode-locked Ti:Al₂O₃ laser with a nonlinear coupled external cavity J. GOODBERLET, J. WANG, JAMES G. FUJIMOTO, P. A. SCHULZ, S. HENION (3:30 PM) 442
- FQ5** Coupled cavity mode-locking of a Nd:YAG laser using second harmonic generation J. R. M. BARR, D. C. HANNA, D. W. HUGHES (3:45 PM) 442