

# 1987 CLEO SUBJECT INDEX

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#### NONLINEAR OPTICS AND SPECTROSCOPY

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TUHH	Joint Session on Clusters and Materials: 3 Tuesday, 2:30 PM-4:00 PM	84
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WI	Poster Session: 2 (WI42-50) Wednesday, 1:00 PM-2:30 PM	140
WL	Lightwave Systems and Components: 1 Wednesday, 2:30 PM-4:00 PM	180
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THS	Lightwave Systems and Components: 2 Thursday, 4:30 PM-6:00 PM	302
FA	Fiber-Optic Sensors and Components Friday, 8:30 AM-10:00 AM	306

#### OPTICAL SIGNAL PROCESSING, SWITCHING, STORAGE, AND BISTABILITY

MB	Optoelectronic Devices Monday, 8:30 AM-10:00 AM	6
THK	Poster Session: 3 (THK29-39) Thursday, 1:00 PM-2:30 PM	242
THO	Optical Switches and Couplers Thursday, 2:30 PM-4:00 PM	284
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FJ	Quantum Well Modulators and Switches Friday, 10:30 AM-12:00 M	334
FM	Optical Logic and Bistability Friday, 1:30 PM-3:00 PM	346
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#### ULTRAFAST OPTICS AND ELECTRONICS

MD	Generation and Measurement of Ultra-short Pulses Monday, 8:30 AM-10:00 AM	12
MH	Ultrafast Fiber Raman Generation and Detection Monday, 10:30 AM-12:00 M	26
TUK	Poster Session: 1 (TUK39-44) Tuesday, 1:00 PM-2:30 PM	58
WI	Poster Session: 2 (WI16-20) Wednesday, 1:00 PM-2:30 PM	140
THL	Ultrafast Optics and Electronics Thursday, 2:30 PM-4:00 PM	276
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FN	Ultrafast Optoelectronic Sampling Friday, 1:30 PM-3:00 PM	350
FR	Amplifiers for Ultrashort Pulses Friday, 3:00 PM-4:30 PM	366

#### OPTICAL MATERIALS

TUC	Laser Materials Tuesday, 8:30 AM-10:00 AM	36
TUH	Materials for Frequency Conversion Tuesday, 10:30 AM-12:00 M	48
TUK	Poster Session: 1 (TUK1-7) Tuesday, 1:00 PM-2:30 PM	58
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#### SEMICONDUCTOR DIODE LASERS

MF	Laser Diode Spectral Properties Monday, 10:30 AM-12:00 M	20
TUE	Diode Lasers: 1 Tuesday, 8:30 AM-10:00 AM	40
TUJ	Diode Lasers: 2 Tuesday, 10:30 AM-12:00 M	54
TUK	Poster Session: 1 (TUK26-27) Tuesday, 1:00 PM-2:30 PM	58
TUN	25th Anniversary Symposium—Laser Diodes in 1962 and 2012 Tuesday, 2:30 PM-6:00 PM	94
WC	Quantum Well Diode Lasers Wednesday, 8:30 AM-10:00 AM	116
WG	Surface-Emitting Laser Diodes Wednesday 10:30 AM-12:00 M	132

WI	Poster Session: 2 (WI7-10) Wednesday, 1:00 PM-2:30 PM	140	TUK	Tuesday, 11:45 AM-12:00 M Poster Session: 1 (TUK1-44)	58
THK	Poster Session: 3 (THK16-20) Thursday, 1:00 PM-2:30 PM	242	TUMM	Joint Symposium on Free-Electron Lasers: 1	92
FD	Externally Stabilized Laser Diode Ar- rays Friday, 8:30 AM-10:00 AM	314	TUN	Tuesday, 4:30 PM-6:00 PM 25th Anniversary Symposium—Laser Diodes in 1962 and 2012	94
FI	Laser Diode Arrays Friday, 10:30 AM-12:00 M	328	TUSPEC	Special Session on Laser Optoelecton- ics Business Trends	111
<b>MISCELLANEOUS</b>					
MI	CLEO/IQEC Joint Plenary Session Monday, 1:45 PM-5:30 PM 1:45 PM Opening Remarks 2:00 PM Awards Ceremony 2:30 PM R. V. Pole Memorial Lecture 3:15 PM Plenary Talks	30	WAA	Tuesday, 8:00 PM-10:00 PM Joint Symposium on Free-Electron Lasers: 2	112
TUA	Joint Session on Clusters and Materials: 1 Tuesday, 8:30 AM-10:00 AM	32	WEE	Wednesday, 8:30 AM-9:45 AM Joint Symposium on Free-Electron Lasers: 3	124
TUF	Joint Session on Clusters and Materials: 2 Tuesday, 10:30 AM-12:00 M	44	WI	Wednesday, 10:30 AM-12.00 M Poster Session: 2 (WI1-60)	140
TUHH	Joint Session of Clusters and Materials: 3 Tuesday, 2:30 PM-4:00 PM	84	WQ2	Report of the Workshop on Integrated Optics Wednesday, 5:00 PM-5:15 PM	198
TUJ6	Report of the Fourth International Work- shop on Semiconductor Laser De- vice Physics	56	THK	Poster Session: 3 (THK1-50) Thursday, 1:00 PM-2:30 PM	242
			THT	Postdeadline Papers: 1 Thursday, 8:00 PM	304
			THU	Postdeadline Papers: 2 Thursday, 8:00 PM	304





**MF2** Integrated external cavity lasers N. K. DUTTA, T. CELLA, A. S. PICCIRILLI, R. L. BROWN (11:00 AM) 22

**MF3** Mode-locking and instability-threshold resonances in synchronously modulated external-cavity semiconductor lasers A. SCHREMER, T. FUJITA, C. L. TANG (11:15 AM) 22

**MF4** Analysis of optical self-locking of semiconductor lasers to optical cavities B. DAHMANI, A. CLAIRON, P. LAURENT, L. HOLLBERG (11:30 AM) 22

**MF5** Mode-hopping suppression of short-coupled-cavity semiconductor lasers HANYI ZHANG, JIANGLIN WANG, QUN WU, BINGKUN ZHOU (11:45 AM) 22

**MONDAY MORNING**  
 27 April 1987 **MG**  
 ROOM 308

10:30 AM **Metal Vapor Lasers**  
 John C. Miller, Lawrence Livermore National Laboratory, Presider

**MG1** Optimization of resonator design for large volume short-pulse copper vapor lasers A. J. KEARSLEY, G. A. NAYLOR, R. R. LEWIS (10:30 AM) 24

**MG2** Compact room temperature metal vapor laser R. C. TOBIN, A. K. ANDERS, E. C. HARVEY (10:45 AM) 24

**MG3** Gold vapor laser with Ne-H<sub>2</sub> as the buffer gas Z. G. HUANG, H. Y. SHAN, Y. HUO, H. WANG (11:15 AM) 24

**MG4** Lasing properties of the copper vapor laser with Ne-He buffer gas T. YAMANAKA, E. FUJIWARA, T. SHIMOTSU, C. YAMANAKA, Y. MURAKAMI, T. TAKEDA, M. NAKATSUKA, C. YAMANAKA (11:30 AM) 24

**MG5** Recent advances in the performance of gold vapor lasers R. R. LEWIS, A. P. R. HARPIN, A. J. KEARSLEY (11:45 AM) 26

**MONDAY MORNING**  
 27 April 1987 **MH**  
 ROOM 309

10:30 AM **Ultrafast Fiber Raman Generation and Detection**  
 L. F. Mollenauer, AT&T Bell Laboratories, Presider

**MH1** Pulse compression, high order solitons, and soliton-Raman generation in optical fibers A. S. GOUVEIA-NETO, A. S. L. GOMES, J. R. TAYLOR (10:30 AM) 26

**MH2** Nd:YAG pumped fiber Raman soliton laser J. D. KAFKA, T. BAER (11:00 AM) 26

**MH3** Combined action of stimulated Raman scattering and self-phase modulation in single-mode fibers and the implications on pulse compression M. KUCKARTZ, R. SCHULZ, H. HARDE (11:15 AM) 28

**MH4** Development of a subpicosecond streak camera YU-TAKE TSUCHIYA (11:30 AM) 28

**MONDAY AFTERNOON**  
 27 April 1987 **MI JOINT**  
 ROOM 307-310

1:45 PM **CLEO/IQEC Joint Awards/Plenary Session**

**Introductory Remarks**  
 DAVID H. AUSTON, AT&T Bell Laboratories, and RALPH R. JACOBS, Spectra-Physics, CLEO '87 General Cochairs; DANIEL GRISCHKOWSKY, IBM T. J. Watson Research Center, and

THEODOR W. HANSCH, Max-Planck Institute for Quantum Optics, IQEC '87 General Cochairs 30

**Awards Ceremony**

Presentation of the 1987 Charles Hard Townes Award of the Optical Society of America to Herman A. Haus, Massachusetts Institute of Technology  
 ROBERT G. GREENLER, OSA President, presider 30

Presentation of the 1987 Quantum Electronics Award of the Lasers and Electro-Optics Society of the Institute of Electrical and Electronics Engineers  
 PAUL L. LIAO, IEEE/LEOS President, Presider 30

Presentation of the OSA fellow certificates  
 Presentation of the IEEE/LEOS fellow certificates

**MI1** R. V. Pole Memorial Lecture: The renaissance in solid-state lasers ROBERT L. BYER (2:30 PM) 30

**MI2** Optical molasses, laser traps and ultracold atoms STEVEN CHU (3:15 PM) 30

**MI3** Lasers at the frontiers of materials science and engineering R. M. OSGOOD, JR. (4:00 PM) 30

**MI4** Review of the American Physical Society report on directed energy weapons NICHOLAAS BLOEMBERGEN, C. KUMAR, N. PATEL (4:45 PM) 30

**TUESDAY MORNING**  
 28 April 1987 **TUA JOINT**  
 ROOM 301

8:30 AM **CLEO/IQEC Joint Session on Clusters and Materials: 1**  
 Wayne C. Danen, Los Alamos National Laboratory, Presider

**TUA1** Photoelectron spectroscopy of mass-selected cluster anions W. C. LINEBERGER (8:30 AM) 32

**TUA2** Size selective chemical and physical properties of clusters A. KALDOR, D. M. COX, M. R. ZAKIN (9:00 AM) 32

**TUA3** Picosecond excited-state dynamics of jet cooled molecules and clusters DAVID DEMMER, JIM HAGER, GARY LEACH, STEPHEN C. WALLACE (9:30 AM) 32

**TUA4** Predissociation lifetime measurements from high resolution infrared spectra of ethylene clusters K. G. H. BALDWIN, R. O. WATTS (9:45 AM) 32

**TUESDAY MORNING**  
 28 April 1987 **TUB**  
 ROOM 305

8:30 AM **Sensitive/Selective Detection**  
 John C. Stephenson, U.S. National Bureau of Standards, Presider

**TUB1** Single molecule detection in fluid solution DINH C. NGUYEN, RICHARD A. KELLER, JAMES H. JETT, JOHN C. MARTIN, JIMMIE D. PARSON (8:30 AM) 34

**TUB2** Multiphoton ionization in supersonic beams of nitric oxide JOHN C. MILLER (9:00 AM) 34

**TUB3** Laser separation of zirconium isotopes HUGH D. MORRISON, PETER A. HACKETT, DAVID M. RAYNER, ORSON L. BOURNE (9:15 AM) 34

**TUB4** Pressure broadening of the overtone lines of HCl  
C. B. CARLISLE, H. RIRIS, G. R. JANIK, T. F. GAL-  
LAGHER (9:30 AM)

34

**TUB5** Anomalous pulsewidth dependence of the quasicon-  
tinuum absorption spectrum H. S. KWOK, P. MUKHER-  
JEE (9:45 AM)

34

## TUESDAY

## MORNING

28 April 1987

## TUC

ROOM 307

## 8:30 AM Laser Materials

R. D. Burnham, Amoco Research Center, Presider

**TUC1** Optoelectronic devices grown by metallorganic  
chemical vapor deposition R. D. DUPUIS (8:30 AM)

36

**TUC2** Progress in the growth of large diameter, flat interface  
YAG:Nd A. M. BROWN, R. C. MORRIS, J. E. MARION  
(9:00 AM)

36

**TUC3** Two-photon absorption cross-section of Nd<sup>3+</sup> in  
Y<sub>3</sub>Al<sub>5</sub>O<sub>12</sub> and LiYF<sub>4</sub> hosts near 1.06 μm STEPHEN A. PAYNE,  
L. L. CHASE (9:15 AM)

36

**TUC4** Optical absorption and photoluminescence of Ti:Sc-  
BO<sub>3</sub> R. L. AGGARWAL, A. SANCHEZ, R. E. FAHEY, M. M.  
STUPPI, A. J. STRAUSS (9:30 AM)

36

**TUC5** New Cr<sup>3+</sup> tunable laser crystal candidate: beryllium  
hexa-aluminate XIAOSHAN MA, PEICONG PAN, ZHIWEI HU,  
GUANGZHAO WU (9:45 AM)

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## TUESDAY

## MORNING

28 April 1987

## TUD

ROOM 308

## 8:30 AM Laser Fusion Experiments: 1

S. Obenschain, U.S. Naval Research Laboratory, Presider

**TUD1** Implosion experiments at Nova MICHAEL D.  
CABLE (8:30 AM)

38

**TUD2** X-ray backlight streak method for laser fusion experi-  
ments Y. IZAWA, H. NISHIMURA, K. SHIMADA, M. MURA-  
KAMI, K. KONDO, H. SAKURAI, M. NAKAI, K. NISHIHARA, K.  
MIMA, M. NAKATSUKA, Y. KATO, C. YAMANAKA (9:00  
AM)

38

**TUD3** High-damage-fluence laser glass for Nova E. P.  
WALLERSTEIN, J. H. CAMPBELL, J. Z. GRENS, G. J. GREINER,  
C. W. HATCHER, J. F. KIMMONS, J. E. MARION, D. MILAM, J.  
H. PITTS, C. D. WALMER (9:15 AM)

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**TUD4** Composite polymer/glass edge claddings for new  
Nova laser disks H. T. POWELL, J. H. CAMPBELL, G. ED-  
WARDS, F. O. FRICK, D. S. GEMMELL, B. M. GIM, K. S.  
JANCAITIS, E. S. JESSOP, M. K. KONG, R. E. LYON, J. E.  
MURRAY, H. G. PATTON, J. H. PITTS, M. O. RILEY, E. P.  
WALLERSTEIN, C. R. WOLFE, B. W. WOODS (9:30 AM)

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## TUESDAY

## MORNING

28 April 1987

## TUE

ROOM 317

## 8:30 AM Diode Lasers: 1

Ken Iga, Tokyo Institute of Technology, Presider

**TUE1** Circular beam AlGaAs laser with multi-quantum-well  
self-aligned bent active layer TAKASHI MURAKAMI, KUNI-  
HIKO ISSHIKI, YOSHIHIRO KOKUBO, KANAME OTAKE, YU-

TAKA NAGAI, YUTAKA MIHASHI, HISAO KUMABE, WATARU  
SUSAKI (8:30 AM)

40

**TUE2** AlGaAs/GaAs lateral current injection MQW la-  
ser M. MAKIUCHI, A. FURUYA, O. WADA, T. FUJII, H. NOBU-  
HARA (8:45 AM)

42

**TUE3** Recent progress in visible-light semiconductor lasers  
TOHRU SUZUKI (9:00 AM)

42

**TUE4** Extremely low-threshold zinc-diffused mesa BH multi-  
quantum well lasers HIDETO FURUYAMA, ATSUSHI KUR-  
OBE, SHIGEYA NARITSUKA, NAOHARU SUGIYAMA, YOSHI-  
HIRO KOKUBUN, MASARU NAKAMURA, YUTAKA UE-  
MATSU (9:30 AM)

42

**TUE5** Analysis of astigmatism in high-power semiconductor  
lasers T. OHTOSHI, K. YAMAGUCHI, N. CHINONE (9:45  
AM)

44

## TUESDAY

## MORNING

28 April 1987

## TUF JOINT

ROOM 301

10:30 AM CLEO/IOEC Joint Session on Clusters and  
Materials: 2

W. C. Lineberger, University of Colorado, Presider

**TUF1** Electronic structure, spectroscopy, and dynamics of  
semiconductor clusters LOUIS BRUS (10:30 AM)

44

**TUF2** Semiconductor composites: linear and nonlinear op-  
tical properties YING WANG, N. HERRON, W. MAHLER, A.  
SUNA (11:00 AM)

44

**TUF3** Synthesis of ceramic powders and thin films from  
laser heated gases JOHN S. HAGGERTY (11:15 AM)

44

**TUF4** Laser synthesis of transition metal compounds  
GARY W. RICE (11:45 AM)

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## TUESDAY

## MORNING

28 April 1987

## TUG

ROOM 305

10:30 AM Photochemical Therapy and Fluorescence  
Diagnostics

Thomas F. Deutsch, Massachusetts General Hospital,  
Presider

**TUG1** Photodynamic therapy: a new modality for localiza-  
tion and treatment of neoplastic disease DAVID KES-  
SEL (10:30 AM)

46

**TUG2** Tissue characterization using laser-induced fluores-  
cence P. S. ANDERSSON, S. MONTAN, S. SVANBERG, J.  
ANKERST, E. KJELLEN, L. G. SALFORD, K. SVAN-  
BERG (11:00 AM)

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**TUG3** Characterization of normal and diseased tissue by  
argon-ion laser-induced fluorescence E. G. CHANG-TUNG,  
C. F. MOUNTAIN, M. P. SARTORI, P. D. HENRY, R. ROBERTS,  
R. C. CHIN, G. L. VALDERRAMA, M. J. BERRY (11:15 AM)

48

**TUG4** Atherosclerotic plaque detection by laser-induced flu-  
orescence using hematoporphyrin derivative as an exogenous  
probe L. G. PREVOSTI, C. G. BECKER, G. TOM SHIRES, J. J.  
WYNNE, R. LINSKER (11:30 AM)

48

**TUG5** Fiber-optic sensors for fluorimmunoassay STAN-  
LEY N. ANGEL (11:45 AM)

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TUESDAY	AFTERNOON	TUESDAY	MORNING
28 April 1987	<b>TUHH JOINT</b>	28 April 1987	<b>TUJ</b>
ROOM 301		ROOM 317	
2:30 PM <b>IQEC/CLEO Joint Session on Clusters and Materials: 3</b>		10:30 AM <b>Diode Lasers: 2</b>	
<b>Steven R. J. Brueck, University of New Mexico, Presider</b>		<b>Charles E. Hurwitz, Lasertron, Presider</b>	
<b>TUHH1 Laser surface modification of magnesium</b> C. A. LANGHOFF, R. L. YATES, P. L. HAGANS (2:30 PM)	84	<b>TUJ1 Fresnel and Fraunhofer fields of phase-locked diode arrays</b> V. J. MASIN, N. W. CARLSON, M. LURIE, J. M. FINLAN, S. L. REINHOLD, W. T. WALKER (10:30 AM)	54
<b>TUHH2 Three-dimensional laser computer-aided photopolymerization</b> M. CABRERA, O. DE WITTE, T. HANAU, A. LEMHAUTE, J. C. ANDRE (3:00 PM)	84	<b>TUJ2 Time-resolved phase sampling of diode laser wavefronts</b> N. W. CARLSON, V. J. MASIN (10:45 AM)	54
<b>TUHH3 Electric-field-induced index-matched harmonic generation in fibers</b> D. A. WEINBERGER, R. W. TERHUNE (3:15 PM)	84	<b>TUJ3 Electron reflectance and leakage of a multiquantum barrier</b> H. UENOHARA, KENICHI IGA, F. KOYAMA (11:00 AM)	56
<b>TUHH4 Phase-matched harmonic generation in single microcrystals</b> STEPHAN P. VELSKO (3:30 PM)	84	<b>TUJ4 Nondestructive evaluation of the corrugation for distributed feedback lasers</b> H. IMAI, M. MATSUDA, H. SODA, H. SUDO, K. KIHARA, H. ISHIKAWA (11:15 AM)	56
<b>TUHH5 Dependence of the stimulated Brillouin scattering threshold in single-mode fibers and the number of longitudinal modes of a pump laser</b> YASUHIRO AOKI, KAZUHIKO TAJIMA (3:45 PM)	86	<b>TUJ5 Measurement of nonradiative currents in 1.3-<math>\mu</math>m buried heterostructure lasers before and after degradation</b> JOANNE LACOURSE, TERRANCE CHOW, ROBERT OLSHANSKY, WILLIAM POWAZINIK (11:30 AM)	56
<b>TUESDAY</b>	<b>MORNING</b>	<b>TUJ6 Report on the Fourth international Workshop on Semiconductor Laser Device Physics, presented by the Technical Committee on Semiconductor Lasers of the IEEE Lasers and Electro-Optics Society</b> (11:45 AM)	56
28 April 1987	<b>TUH</b>		
ROOM 307			
10:30 AM <b>Materials for Frequency Conversion</b>			
<b>D. Eimerl, Lawrence Livermore National Laboratory, Presider</b>			
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