

PROCEEDINGS OF SPIE

# **Pulse Single-Frequency Lasers: Technology and Applications**

**William K. Bischel  
Larry A. Rahn  
Editors**

**11 -17 January 1988  
Los Angeles, California, USA**

*Published by*  
**SPIE**

**Volume 912**

Proceedings of SPIE 0277-786X, V. 912

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at [SPIEDigitalLibrary.org](http://SPIEDigitalLibrary.org).

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

ISSN: 0277-786X  
ISSN: 1996-756X (electronic)

ISBN: 9780892529476

Published by

**SPIE**

P.O. Box 10, Bellingham, Washington 98227-0010 USA  
Telephone +1 360 676 3290 (Pacific Time)· Fax +1 360 647 1445  
[SPIE.org](http://SPIE.org)  
Copyright © 1988, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$21.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at [copyright.com](http://copyright.com). Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 0277-786X/20/\$21.00.

Printed in the United States of America by Curran Associates, Inc., under license from SPIE.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL LIBRARY**  
[SPIEDigitalLibrary.org](http://SPIEDigitalLibrary.org)

---

## TABLE OF CONTENTS

Polarization Effects In Laser-Pumped Nd:YAG Lasers .....	2
<i>Peter Esherick, Adelbert Owyong</i>	
Characteristics And Reliability Of High Power Laser Diodes For Solid-State Lasers Pumping.....	8
<i>Takayoshi Mamine, Kazuo Honda, Nozomu Yamaguchi, Masaaki Ayabe, Osamu Yoneyama</i>	
Monolithic Nonplanar Ring Lasers: Resistance To Optical Feedback .....	13
<i>Alan C Nilsson, Thomas J Kane, Robert L Byer</i>	
Frequency Stability Of Diode-Pumped Single-Mode Oscillators.....	20
<i>Thomas J Kane</i>	
Injection Seeding Of A Nd:YAG Laser Utilizing A Radially Variable Reflectivity Output Coupler .....	21
<i>A Caprara, S Butcher, R Aubert</i>	
High-Power 80-Ns Transform-Limited Nd:YAG Laser.....	32
<i>Mark J Dyer, William K Bischel, David G Scerbak</i>	
Effects Of A Single Axial Mode Pulsed Nd:YAG Pump Source On Wavelength Extending Accessories .....	37
<i>Bryce E Perry, Jan-Willem J Pieterse, Mark A Enright, Larry R Wolford, Bert C Johnson</i>	
A Line-Narrowed, Blue Solid State Laser For Narrow Band Optical Filter Diagnostics .....	46
<i>Thomas A Driscoll</i>	
OPO Performance With A Long Pulse Length, Single Frequency Nd:YAG Laser Pump .....	50
<i>W J Kozlovsky, E K Gustafson, R C Eckardt, R L Byer</i>	
Excimer Pumped Pulsed Tunable Dye Laser .....	56
<i>Michael G Littman</i>	
Quenched-Laser Operation Of A Littman Dye Oscillator.....	67
<i>T D Raymond, C Reiser, P Esherick, R B Michie</i>	
Sideband Generation In Saturated Pulsed Dye Amplifiers With Multiple Cw Single Mode Injection .....	73
<i>B Comaskey, T Daily, C Haynam, J Morris, J Paisner, R Young</i>	
Injection-Locked Flashlamp-Pumped Dye Lasers Of Very Narrow Linewidth .....	78
<i>Jean P Boquillon</i>	
Single-Frequency Dye Laser With 50 Ns Pulse Duration .....	87
<i>D Basting, B Burghardt, P Lokai, W Muckenheim, Zs. Bor</i>	
Narrowband Tunable VUV Radiation Generated By Frequency Mixing With Pulsed Single-Frequency Lasers.....	96
<i>G Hilber, A Lago, R Wallenstein</i>	
Coherent VUV Source At 130 nm: Theory And Modeling .....	100
<i>A V Smith, G R Hadley, W J Alford</i>	
Coherent VUV Laser At 130nm: Experiment .....	106
<i>C H Muller III, D D Lowenthal, M A DeFaccio, M Cimolino, J P Hauck</i>	

Production Of Intense, Coherent, Tunable, Narrow-Band Lyman-Alpha Radiation.....	116
<i>R S Turley, R A McFarlane, J Remillard, D G Steel</i>	
Pulse-Train Amplification Of Subnanosecond Near-Transform-Limited KRF Laser Pulses.....	122
<i>T D Raymond, C Reiser, R G Adams, R B Michie, C Woods</i>	
A High Energy Narrowband XeCl Laser.....	127
<i>Cheryl J White, Douglas Weidenheimer, Timothy L Boyd, Richard M Kremer, Kenneth Y Tang, Robert B Michie, John W Keto</i>	
Precise Two And Three-Photon Spectroscopy Of H <sub>2</sub> [/sub].....	132
<i>E E Eyler</i>	
Measurement Of Two-Photon Absorption Cross Sections In Atomic 0 At 226 nm: Single-Frequency Versus Multimode Lasers .....	139
<i>Douglas J Bamford, William K Bischel, Albert P Hickman, Mark J Dyer</i>	
XUV Source For Ultra-High Resolution Spectroscopy.....	145
<i>E Cromwell, A H Kung, T Trickl, Y T Lee</i>	
Stark Level-Crossing Spectroscopy Of Highly vibrationally Excited Molecules.....	150
<i>William F Polik, Dean R Guyer, C.Bradley Moore</i>	
High Resolution Coherent Anti-Stokes Raman Spectroscopy (CARS) Of O <sub>2</sub> [/sub] And CO <sub>2</sub> [/sub] .....	160
<i>Jean P Boquillon</i>	
High Resolution Inverse Raman Spectroscopy Of The CO Q Branch .....	171
<i>G J Rosasco, L A Rahn, W S Hurst, R E Palmer, J P Looney, J W Hahn</i>	
Coherent Anti-Stokes Raman Scattering (CARS) And Raman Pumping Lineshapes In High Fields .....	184
<i>R B Miles, J J Connors, E C Markovitz, G J Roth</i>	
UV Generation Using Multiwave Raman Mixing In H <sub>2</sub> [/sub] With Single-Frequency Lasers .....	191
<i>William K Bischel, Douglas J Bamford, Mark J Dyer</i>	
Measurement Of Atomic Oscillator Strengths Using Pulsed Single-Frequency Dye Lasers .....	200
<i>C Haynam, B Comaskey, M Johnson, J Paisner, E Worden</i>	
Permanent-Magnet Faraday Isolators For Q-Switched Nd:YAG Laser Applications .....	206
<i>R L Schmitt, L A Rahn</i>	
Modern Pulsed Wavemeters.....	214
<i>Christopher Reiser</i>	
Laser Mode Beating Effects In Stimulated Brillouin Scattering .....	226
<i>L P Schelonka</i>	
A Precision Pulsed UV Wavemeter.....	234
<i>Cheryl J White, Timothy L Boyd, Robert B Michie, John W Keto</i>	

#### **Author Index**