

Lecture on Nano-Optics

國立中央大學光電所與奈米中心將於 4 月 27 日 (星期三) 上午 9:00 起, 於中央光電所 214 廳, 舉辦為期一天的 Lecture on Nano-Optics (暨中大 90 週年校慶活動), 將邀請到德國 Fraunhofer Institute of Applied Optics and Precision Engineering in Jena (<http://www.iof.fhg.de>) 主任 **Prof. A. Tuennermann** 來台演講。由於 Jena 市是德國光學的重鎮, 著名之德國光學大廠如 Zeiss 與 Leica 皆以當地為研發中心, 而 Fraunhofer 應用光學中心又是當地與產業最密切的研究機構。因此, 能邀請到中心主任來台講學, 實為難得之機會。

此課程並邀請本校光電所 **樂丕綱教授** 演講奈米光學中最熱門的課題-光子晶體, 樂教授將講授有關光子晶體異常折射與光子晶體透鏡之現象。

敬請擁躍參加

國立中央大學奈米中心主任 徐子民
國立中央大學光電科學研究所所長 張正陽 敬邀

活動地點: 中央大學科二館二樓光電所 214 廳

活動時間: 中華民國九十四年四月二十七日星期三

9:00-9:20	報到
9:20-9:30	開幕式
9:30-11:00	Micro- and nano-optics (Prof. Tuennermann)
11:00-11:15	Coffee break
11:15-12:15	光子晶體異常折射與光子晶體透鏡之現象 (樂丕綱教授)
12:15-13:00	午餐
13:00-14:30	Micro- and nano-optics (Prof. Tuennermann)
14:30-14:45	Coffee break
14:45-15:45	光子晶體異常折射與光子晶體透鏡之現象 (樂丕綱教授)

報名免費, 報名時請將您的下列資料於 4 月 24 日 (星期日) 24:00 前寄至 httang@ios.ncu.edu.tw 湯小姐收, 報名可獲演講資料及當日之午餐。本課程報名人數上限為 100 人, 敬請及早報名。(入校停車費用煩請自理)

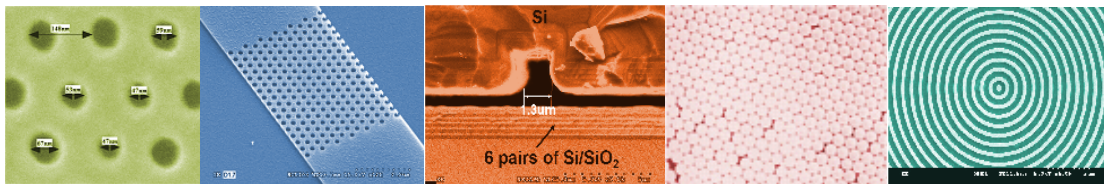
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是否為您準備素食:



● Prof. A. Tuennermann 目前的研究領域為

1. Design and manufacturing of novel micro- and nano-optical photonic devices using high-end microlithography and its application for generation, amplification, steering and switching of light.
2. High power diode pumped fiber and waveguide lasers is widely recognized. novel developments in solid state laser technology and utilizing high power femtosecond lasers for materials processing for a precise microstructur technology.

Professor Tuennermann 也是 German Physical Society, Optical Society of America 與 Institute of Electrical and Electronics Engineers 會員。他於 1997 年獲得 Roentgen-Award, 1998 年獲得 WLT-Award 1998, 於 2003 年獲得 Otto-Schott-Award。

● 樂丕綱教授之研究領域為光子晶體、聲子晶體、左手介質、以及負折射相關之物理現象與應用元件之理論分析與模擬研究。樂教授實驗室網站:

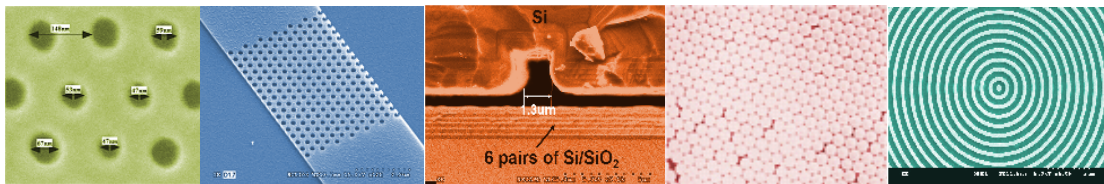
<http://140.115.40.128>

Lecture on Nano-Optics

科二館二樓光電所 214 廳

國立中央大學校園地圖





Curriculum Vitae of Prof. A. Tuennermann

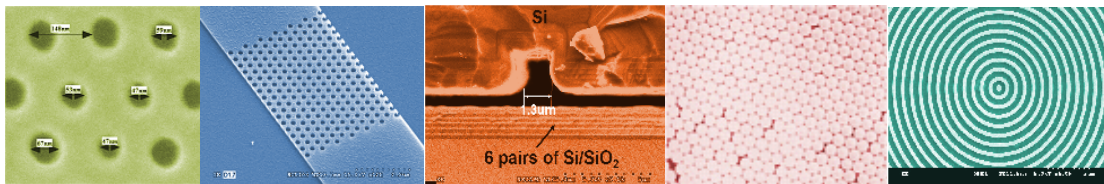
Andreas Tuennermann was born in Ahnsen, Germany, on June 10th, 1963. He received the diploma and Ph.D. degrees in physics from the University of Hannover in 1988 and 1992, respectively. His Ph.D. work was focused on nonlinear processes with emphasis on the interaction of high intensity laser sources with matter for the generation of short wavelengths lasers. In 1997 he received the habilitation for his work on ultrastable light sources for interferometric gravitational wave detectors.

He was head of the department of development at the Laser Zentrum Hannover from 1992 to 1997. In 1994 he has become the national scientific coordinator for the the topic diode pumped solid state lasers within the LASER 2000 programme. In the beginning of 1998 he joined the Friedrich-Schiller-University in Jena, Germany as a Professor and Director of the Institute of Applied Physics. In 2003 he became the Director of the Fraunhofer Institute of Applied Optics and Precision Engineering in Jena.

His main research interests include scientific and technical aspects associated with light in strong spatial and temporal confinement. Research topics are the design and manufacturing of novel micro- and nanooptical photonic devices using high-end microlithography and its application for generation, amplification, steering and switching of light.

In particular, his work on (ultrashort pulse) high power diode pumped fiber and waveguide lasers is widely recognized. This work has become already strong impact on novel developments in solid state laser technology. Not unmentioned should be his pioneering work in utilizing high power femtosecond lasers for materials processing. In collaboration with his coworkers he demonstrated new prospects for a precise microstructur technology. Due to the rapid progress in this field, nowadays one starts to think about "real world" industrial applications of those lasers.

Professor Tuennermann is member of the German Physical Society, the Optical Society of America, and the Institute of Electrical and Electronics Engineers. His research activities on applied quantum electronics have been awarded with the Roentgen-Award 1997, WLT-Award 1998 and the Otto-Schott-Award 2003.



Publications (selection)

D. Golla, M. Bode, S. Knoke, W. Schöne, A. Tünnermann

62W-cw TEM₀₀ Nd:YAG laser side-pumped by fiber-coupled diode lasers

Opt. Lett. **21**, 210 (1996)

B. N. Chichkov, C. Momma, A. Tünnermann, S. Meyer, T. Menzel,

B. Wellegehausen

Hard-x-ray emission from short-pulse laser-produced plasmas

Appl. Phys. Lett. **68**, 2804 (1996)

D. Wandt, K. Przyklenk, M. Laschek, A. Tünnermann, H. Welling

External cavity laser diode with 40nm continuous tuning range around 825nm

Opt. Commun. **130**, 81 (1996)

B. N. Chichkov, C. Momma, S. Nolte, F. von Alvensleben, A. Tünnermann

Femtosecond, picosecond and nanosecond laser ablation of solids

Appl. Phys. A **63**, 109 (1996)

C. Momma, B. N. Chichkov, S. Nolte, S. von Alvensleben, A. Tünnermann,

H. Welling, B. Wellegehausen

Short-pulse laser ablation of solid targets

Opt. Commun. **129**, 134 (1996)

I. Freitag, A. Tünnermann, H. Welling, C. C. Harb, D. E. McClelland, H.-A. Bachor,
and T. C. Ralph

Experimental and Theoretical Investigations on the Intensity Noise Properties of Injection-Locked Lasers

in: Trends in Optics and Photonics, Advanced Solid-State Laser

Editor: S. A. Payne, C. R. Pollack, **TOPS 1**, 401 (1996)

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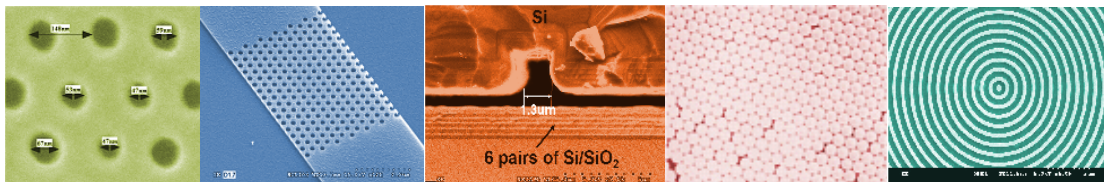
High power operation of Nd:YAG rod lasers pumped by fiber-coupled diode lasers

in: Trends in Optics and Photonics, Advanced Solid-State Laser

Editor: S. A. Payne, C. R. Pollack, **TOPS 1**, 198 (1996)

I. Freitag, R. Henking, F. von Alvensleben, A. Tünnermann

Miniature Nd:YAG ring lasers with high single-frequency output power at 946nm



in: Trends in Optics and Photonics, Advanced Solid-State Laser

Editor: S. A. Payne, C. R. Pollack, **TOPS 1**, 387 (1996)

C. Momma, A. Tünnermann

Ergebnisse zum Abtrag mit ns- bis fs-Pulsen sichtbarer Laserstrahlung

Handbuchreihe: Laser in der Materialbearbeitung;

Präzise optische Bearbeitung von Festkörpern Bd. 5

VDI-Verlag, ISBN 3-18-401599-8 (1996)

A. Tünnermann, H. Zellmer, H. Welling

Faserlaser -

Neuartige Laserstrahlquellen mit Emissionen im sichtbaren Spektralbereich

Physikalische Blätter **52**, 1123 (1996)

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High power cw Nd:YAG lasers pumped with fiber-coupled diode lasers

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Editor: M. C. Gupta, W. J. Kozlovsky, D. C. MacPerson, Proc. SPIE **2700**, 314 (1996)

C. Momma, S. Nolte, B. N. Chichkov, F. von Alvensleben, A. Tünnermann

Precise laser ablation with ultrashort pulses

Appl. Surf. Sci. **109**, 15 (1997)

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Continuously tunable external cavity diode laser with a double-grating arrangement

Opt. Lett. **22**, 390 (1997)

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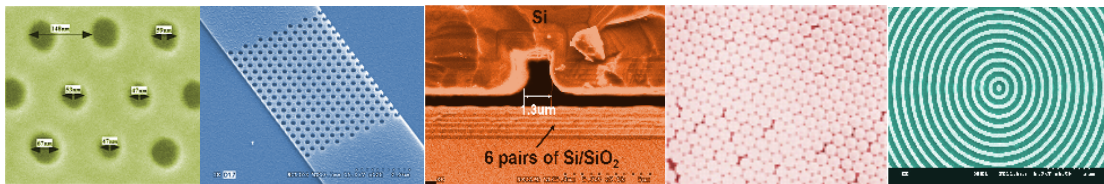
Opt. Lett. **22**, 706 (1997)

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Intensity stabilized Nd:YAG ring laser with 1.5W single frequency output power at 1.357 μ m

Electron Lett. **33**, 777 (1997)

J. W. Czarske, H. Zellmer, A. Tünnermann, H. Welling, H. Müller



Novel high-power laser Doppler anemometer using a diode-pumped fiber laser
Appl. Phys. B **64** 119 (1997)

S. Nolte, C. Momma, H. Jacobs, A. Tünnermann, B. N. Chichkov, B. Wellegehausen,
 H. Welling

Ablation of metals by ultrashort laser pulses
JOSA B **114**, 2716 (1997)

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Frequency tunable 500mW cw all-solid-state single-frequency source in the blue spectral region
Opt. Lett. **22**, 1220 (1997)

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Rapid Communication Appl. Phys. B **64**, 119, (1997)

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Intensity and frequency stable light sources with high single-frequency output power in the visible spectral region

in: Trends in Optics and Photonics, Advanced Solid-State Laser
 Editor: C. R. Pollock, W. R. Bosenberg, **TOPS 10**, 50 (1997)

I. Freitag, P. K. Lam, A. Tünnermann

Gütegeschaltete Miniatur-Ringlaser mit Frequenzkonversion
Laser und Optoelektronik **29** (5), 70 (1997)

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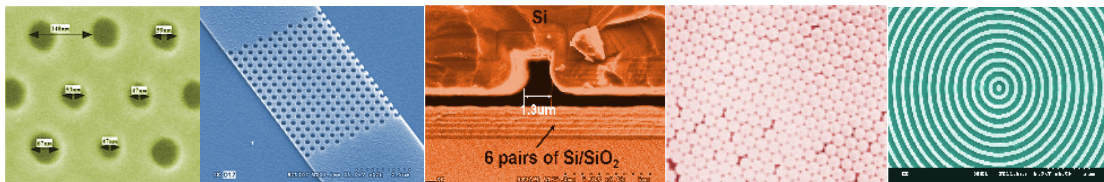
Passively q-switched, miniature Nd:YAG ring lasers with high single-frequency Output Power at 1064nm

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I. Freitag, A. Tünnermann, H. Welling, C. C. Harb, T. C. Ralph, D. E. McClelland, H.-
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Intensity noise transfer in diode-pumped Nd:YAG lasers

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C. Momma, S. Nolte, B. N. Chichkov, F. von Alvensleben, A. Tünnermann
Präzise Mikro-Bearbeitung mit Femtosekunden-Laserpulsen
 Laser und Optoelektronik **29** (3), 82 (1997)

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 Electron. Lett. **33**, 1383 (1997)

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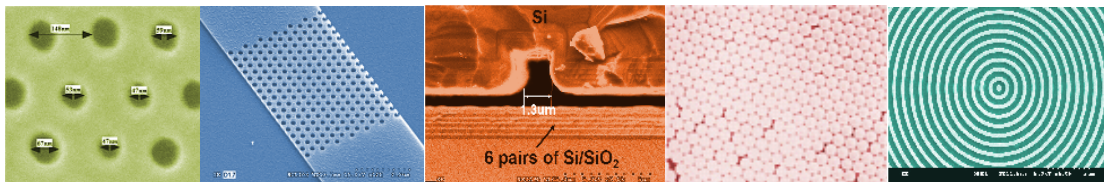
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Diodengepumpte Festkörperlaser: Neue Laser höchster Leistung
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H. Zellmer, A. Tünnermann, H. Welling, V. Reichel
Double clad fiber laser with 30 W output power
 in: Trends in Optics and Photonics, Optical Amplifiers and Their Application
 Editor: M. N. Zervas, A. E. Willner, S. Sasaki, **TOPS 16**, 137 (1997)

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Continuously-tunable resonant optical parametric oscillator
 Opt. Comm. **148**, 117 (1998)

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Continuously tunable 0.5 W single-frequency diode laser source
 Opt. Commun. **148**, 261 (1998)



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Heat transport in metals irradiated by ultrashort laser pulses

Phys. Rev. B **57** (23),14698 (1998)

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Electro-optical frequency modulation of an external cavity diode laser

Opt. Commun. **153**, 59 (1998)

H. Zellmer, K. Plamann, G. Huber, H. Scheife, A. Tünnermann

Visible double-clad upconversion fibre laser

Electron. Lett. **34**, 565 (1998)

C. Momma, S. Nolte, G. Kamlage, F. von Alvensleben, A Tünnermann

Beam delivery of femtosecond laser radiation by diffractive optical elements

Appl. Phys. A **67**, 517 (1998)

K. Plamann, H. Zellmer, J. Czarske, A. Tünnermann

Directional discrimination in laser Doppler anemometry (LDA) without frequency shifting using twinned optical fibres in the receiving optics

Meas. Sci. Technol. **9**, 1840 (1998)

M. Reich, F. Korte, C. Fallnich, H. Welling, A. Tünnermann

Electrode geometries for periodic poling of ferroelectric materials

Opt. Lett. **23**, 1817 (1998)

J.-R. Ruske, B. Zeitner, W. Biehlig, E. Werner, A. Tünnermann

Integriert-optische Intensitätsmodulatoren für das sichtbare Spektrum

Integrated-optical intensity modulators for the visible spectrum

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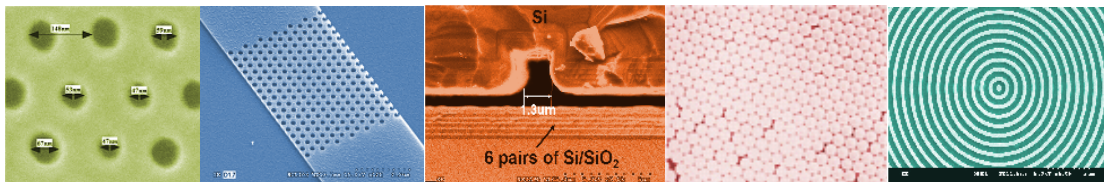
Randzonenmodifikation durch Bestrahlung mit Femtosekundenpulsen

in: Kurzzeitmetallurgie, DFG (1999) ISBN 300 005280 1

Editor: H. W. Bergmann

I. Zawischa, K. Plamann, C. Fallnich, H. Welling, H. Zellmer, A. Tünnermann

All-solid-state neodymium-based single-frequency master-oscillator fiber



power-amplifier system emitting 5.5 W of radiation at 1064 nm

Opt. Lett. **24**, 2469 (1999)

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Visible upconversion lasers in praseodymium-ytterbium-doped fibers

Appl. Phys. B **69**, 417 (1999)

J. Limpert, H. Zellmer, P. Riedel, A. Tünnermann, G. Mazé

Laser oscillation in yellow and blue spectral range in Dy³⁺:ZBLAN

Electron. Lett. **36**, 1386 (2000)

F. Korte, S. Adams, A. Egbert, C. Fallnich, A. Ostendorf, S. Nolte, M. Will, J.-P. Ruske, B. N. Chichkov, A. Tünnermann

Sub-diffraction limited structuring of solid targets with femtosecond laser pulses

Optics Express **7**, 2, 41 (2000)

A. Liem, D. Nickel, J. Limpert, H. Zellmer, U. Griebner, S. Unger, A. Tünnermann, G. Korn

High average power ultrafast fiber chirped pulse amplification system

Appl. Phys. B **71**, 889 (2000)

D. M. Costantini, H. G. Limberger, T. Lasser, C. A. P Muller, H. Zellmer, P. Riedel, A. Tünnermann

Actively mode-locked visible upconversion fiber laser

Opt. Lett. **25**, 1445 (2000)

A. Tünnermann, H. Zellmer, W. Schöne, A. Giesen, K. Contag

New Concepts for diode-pumped solid-state lasers

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High-Power Diode Lasers; Fundamentals, Technology, Applications

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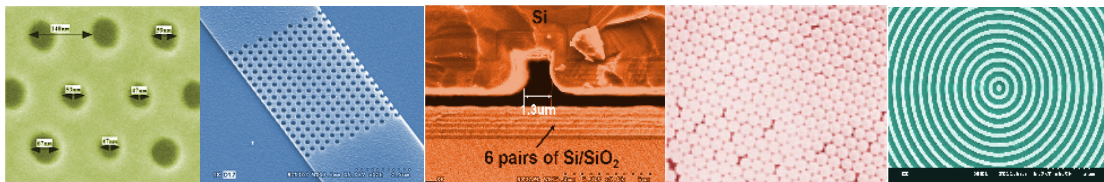
Editor: R. Diehl

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Tunable continuous wave DFG-based gas sensor using fibre amplified 1.5 µm

external

cavity diode laser and high power 1 µm diode laser



Electron. Lett. **36**, 1739 (2000)

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Fiber based high repetition rate, high energy laser source applying chirped pulse amplification

Opt. Commun. **190**, 309 (2001)

C. Dubs, J. P. Ruske, E. Werner, A. Tünnermann

Epitaxial grown $K_{1-x}Rb_xTiOPO_4$ films with extremely flat surfaces for waveguiding

J. of Opt. Materials **17**, 477 (2001)

J. Limpert, A. Liem, T. Gabler, H. Zellmer, A. Tünnermann, S. Unger, S. Jetschke,
H.-R. Müller

High-average-power picosecond Yb-doped fiber amplifier

Opt. Lett. **26**, 1849 (2001)

J. Limpert, T. Gabler, A. Liem, H. Zellmer, A. Tünnermann

SPM-induced spectral compression of picosecond pulses in a single-mode Yb-doped fiber amplifier

Appl. Phys. B **74**, 191 (2002) (rapid communication)

J. Limpert, S. Höfer, A. Liem, H. Zellmer, A. Tünnermann, S. Knoke, H. Voelckel

100 W average power, high energy nanosecond fiber amplifier

Appl. Phys. B **75**, 477 (2002)

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A. Tünnermann

High-power femtosecond Yb-doped fiber amplifier

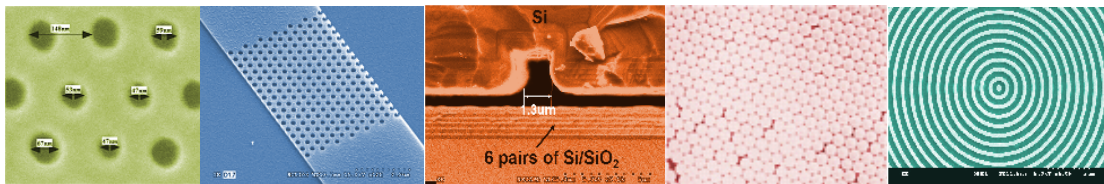
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Editor: Martin E. Fermann and Larry R. Marshall, **TOPS 68**, 112 (2002)



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High average power femtosecond fiber CPA system

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Optical properties of waveguides fabricated in fused silica by femtosecond laser pulses

Appl. Opt. **41**, 21, 4360 (2002)

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Integrated-optical wavelength sensor with self-compensation of thermally induced phase shifts by use of a LiNbO₃ unbalanced Mach-Zehnder interferometer

Appl. Opt. **41**, 29, 1 (2002)

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High power diode-pumped up-conversion fiber lasers in the red and green spectral range

Electron. Lett. **38**, 1250 (2002)

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Appl. Phys. A **76**, 309 (2003)