

welcome to



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Facts About IEEE

- The IEEE is a non-profit organization, the world's leading professional association for the advancement of electrical technology.
- Has ~380.000 members, including 68,000 students, in over 150 countries,
- grouped into 42 Societies by technical interests
- 128 journals and magazines
- 680 conferences held each year



IEEE Xplore®

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The screenshot displays the IEEE Xplore website interface for the IEEE/OSA Journal of Display Technology. The top navigation bar includes links for Home, Login, Logout, Access Information, Alerts, Sitemap, and Help. Below the navigation bar, there are tabs for BROWSE, SEARCH, IEEE XPLORE GUIDE, and SUPPORT. The main content area features the journal title "IEEE/OSA JOURNAL OF DISPLAY TECHNOLOGY" and the issue information "Volume: 2 Issue: 1 Date: March 2006". A search section allows users to view articles, select other years (2006), and other issues (Volume 2, Issue 1), with a "Go To Issues" button. A search box is provided for finding articles within the issue. The left sidebar contains navigation links for Publication Information (Cover, Table of Contents, Editorial Board, Section Break) and Announcements (Content Announcements). The main article list includes:

- Analytical Solutions for Uniaxial-Film-Compensated Wide-View Liquid Crystal Displays**
Zhu, X.; Ge, Z.; Wu, S.-T.
Page(s): 2-20
Digital Object Identifier 10.1109/JDT.2005.863599
[Abstract](#) | Full Text: [PDF](#) (1040 KB)
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- IPS-LCD Using a Glass Substrate and an Anisotropic Polymer Film**
Lin, Y.-H.; Ren, H.; Gauza, S.; Wu, Y.-H.; Zhao, Y.; Fang, J.; Wu, S.-T.
Page(s): 21-25
Digital Object Identifier 10.1109/JDT.2005.863777
[Abstract](#) | Full Text: [PDF](#) (1824 KB)
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- Characteristic Parameters of Liquid Crystal Cells and Their Measurements**
Tang, S.T.; Kwok, H.S.
Page(s): 26-31
Digital Object Identifier 10.1109/JDT.2005.862197
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The screenshot shows the IEEE Xplore website interface. At the top, there are navigation links for Home, Login, Logout, Access Information, Alerts, Sitemap, and Help. Below this is a banner for 'Welcome IEEE Society Presidents and Executive Directors' with the IEEE logo. The main navigation bar includes 'AbstractPlus', 'BROWSE', 'SEARCH', 'IEEE Xplore GUIDE', and 'SUPPORT'. There are also links for 'View TOC', 'Previous Article', and 'Next Article'. On the left side, there are options to 'Access this document' (Full Text: PDF (1152 KB)), 'Download this citation' (Choose Citation & Abstract, Download ASCII Text), and 'Rights and Permissions'. The main content area displays the article title 'Review of the Properties of Up-Conversion Phosphors for New Emissive Displays' by Rapaport, A., Milliez, J., Bass, M., Cassanho, A., and Jensen, H. It includes the publication date (March 2006), volume (2), issue (1), and page range (68-78). An abstract is provided, along with index terms and a list of references.

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... and accesses almost a third of the world's current EE and CS literature.

JOURNAL OF DISPLAY TECHNOLOGY, VOL. 2, NO. 1, MARCH 2006

Review of the Properties of Up-Conversion Phosphors for New Emissive Displays

Alexandra Rapaport, Janet Milliez, Member, IEEE, Michael Bass, Life Fellow, IEEE, Artete Cassanho, and Hans Jensen

Invited Paper

Abstract—In this paper, we review the properties of up-conversion (UC) materials and assess their potential for a new display technology. UC materials absorb near infrared light and re-emit in the visible. Some of their most appealing characteristics for displays are a wide color gamut with very saturated colors, very high brightness operation without damage to the emitters, long lifetimes, and efficiencies comparable to those of existing technologies. Other advantages include simplicity of fabrication, versatility of operation modes, and the potential for greatly reduced display weight and depth.

Index Terms—Displays, fluorescence spectroscopy, luminescence, optical frequency up-conversion (UC), optical scattering, rare-earth (RE) compounds.

1. BACKGROUND

THE concept of frequency up-conversion (UC) of infrared-to-visible light in rare-earth (RE) doped materials was reported more than 40 years ago [1], [2]. The efficiency that was observed or expected for this process was low in singly doped media, but it was quickly noticed that the mechanism could be made one or two orders of magnitude more efficient by using ytterbium (Yb³⁺) as a sensitizer ion in addition to the active ion: erbium (Er³⁺), holmium (Ho³⁺), or thulium (Tm³⁺) [3]–[8]. Efficient UC materials were extensively investigated, as they could be used for several potentially important photonic applications including UC lasers [9]–[14] (visible lasers that are pumped by infrared diode lasers), and displays. However, because no powerful and narrow spectrum source existed in the 980-nm region to efficiently excite such up-converters no practical product came out of the research. With the development of powerful 980-nm diode lasers for the telecommunication industry and as part of the Super High Efficiency Diode Sources or SHEDS program [15] led by the Defense Advanced Research Projects Agency or DARPA (a projected diode laser efficiency of 85% optical-to-electrical is expected at the end of this program), the up-conversion technology which appeared to be too inefficient in the past now has legitimate practical applications. Other work useful as background to what we report can be found in [16] and [17].

On the similar side, fabrication processes leading to materials of higher purity have been successfully explored by coated fluorophors, A. Cassanho. She now uses a process of hydrochlorination during the growth of the various fluoride crystals which results in materials of better quality, better reproducibility, and higher up-conversion efficiency than have been studied in the past.

Finally our recent investigation [18]–[22] of those materials has enabled us to understand the optimal conditions for operation (excitation conditions, screen preparation, choice of materials) as discussed in this paper.

The combination of the three factors listed above resulted in a maximum visible light power to incident infrared power efficiency measurement for our UC materials listed in Table I. Those numbers show that UC technology is a realistic alternative to the existing display technologies. Up-conversion offers its own set of advantages listed at the end of this paper.

II. REVIEW OF RESULTS

A. Materials and General Properties

The base materials we use are fluoride crystals doped with Yb³⁺ and an active ion (Er³⁺ or Tm³⁺). In particular, we have found 1% Er, 18 Yb:YF₃; 1% Er, 18% Yb:NaF₂ (NFTF); and 0.4% Tm, 20% Yb:K₂F₄ to be desirable red, green and blue up-conversion emitters, respectively. To make the technology scalable, we grind these materials into powder and disperse the powdered material in a polymeric host. The mixture is then coated on a substrate to form a screen. Common polymethyl methacrylate (PMMA) was used at first but samples quickly flaked off as the different thermal expansion coefficients between the crystallites and the polymer caused stress and separation. A phosphorylated version of PMMA that was developed in collaboration with Prof. Kevin Belfield [23] has shown much improved properties with sample screens in use for over 4 years showing no signs of deterioration.

An infrared laser beam is scanned (direct writing) or projected (projection display) onto the UC screen to form an image. This can be done in transmission where the infrared excitation is incident on one side and the visible emission is viewed on the other side of the screen (similar to a cathode ray tube (CRT) emissive display) or in reflection where the infrared is incident

Manuscript received July 1, 2005; revised November 11, 2005. This work was supported by the U.S. Army Research Office under Grant DAAL01932024.

A. Rapaport, J. Milliez, and M. Bass are with the College of Optics and Photonics, University of Central Florida, Orlando, FL 32816 USA. E-mail: rapaport@unicon.rockwell.com; jmilliez@mail.ucf.edu; mbass@optics.ucf.edu.

A. Cassanho is with the UC Materials, Ottawa, ON, K1J 9K2, Canada. Digital Object Identifier 10.1109/JDT.2005.863781.

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The screenshot displays a web browser window with two tabs. The left tab is titled "Interactive Course Map" and shows a sidebar menu for the course "SOLID STATE LIGHTING (PARTS I & II)". The right tab is titled "Solid State Lighting (Parts I & II)" and displays a "Color Temperature" diagram. The diagram is a CIE 1931 chromaticity diagram showing the Planckian locus (black-body radiation spectrum) and various illuminants (A, B, C, D65, E) with their corresponding color temperatures. A navigation toolbar is visible at the bottom of the right window, containing icons for home, back, forward, and search, along with a "COMPLETE" indicator and a "LEARNER" mode selector. An arrow points from the text "Navigation tools" to this toolbar.

Color Temperature

Fig. 11B.11. Chromaticity diagram showing planckian locus, the standardized white Illuminants A, B, C, D₆₅, and E, and their color temperature (after CIE, 1978).

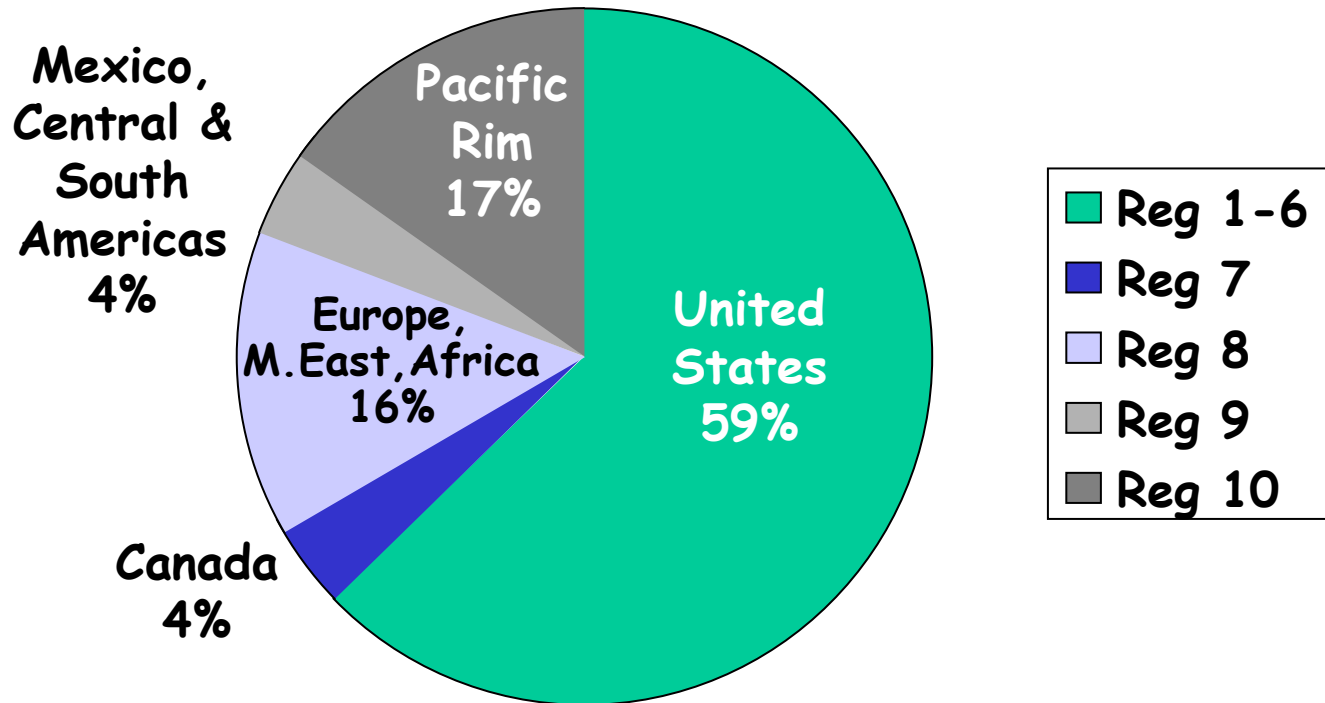
Planckian Spectrum (Black-body Radiation Spectrum)

Navigation tools

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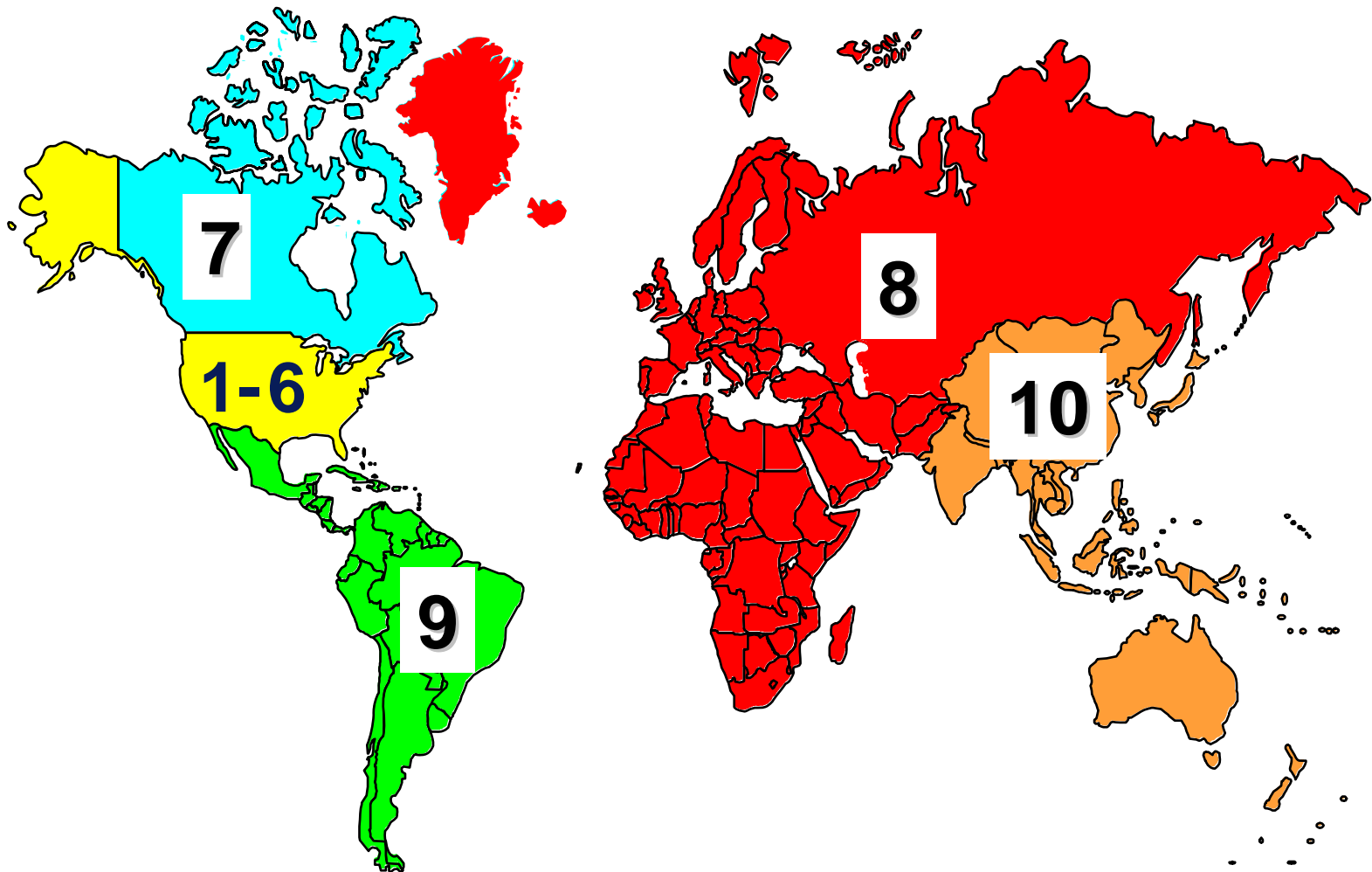
IEEE Membership by Region

Dec. 2008 Total = 382,195



IEEE Regions

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Facts About Photonics Society

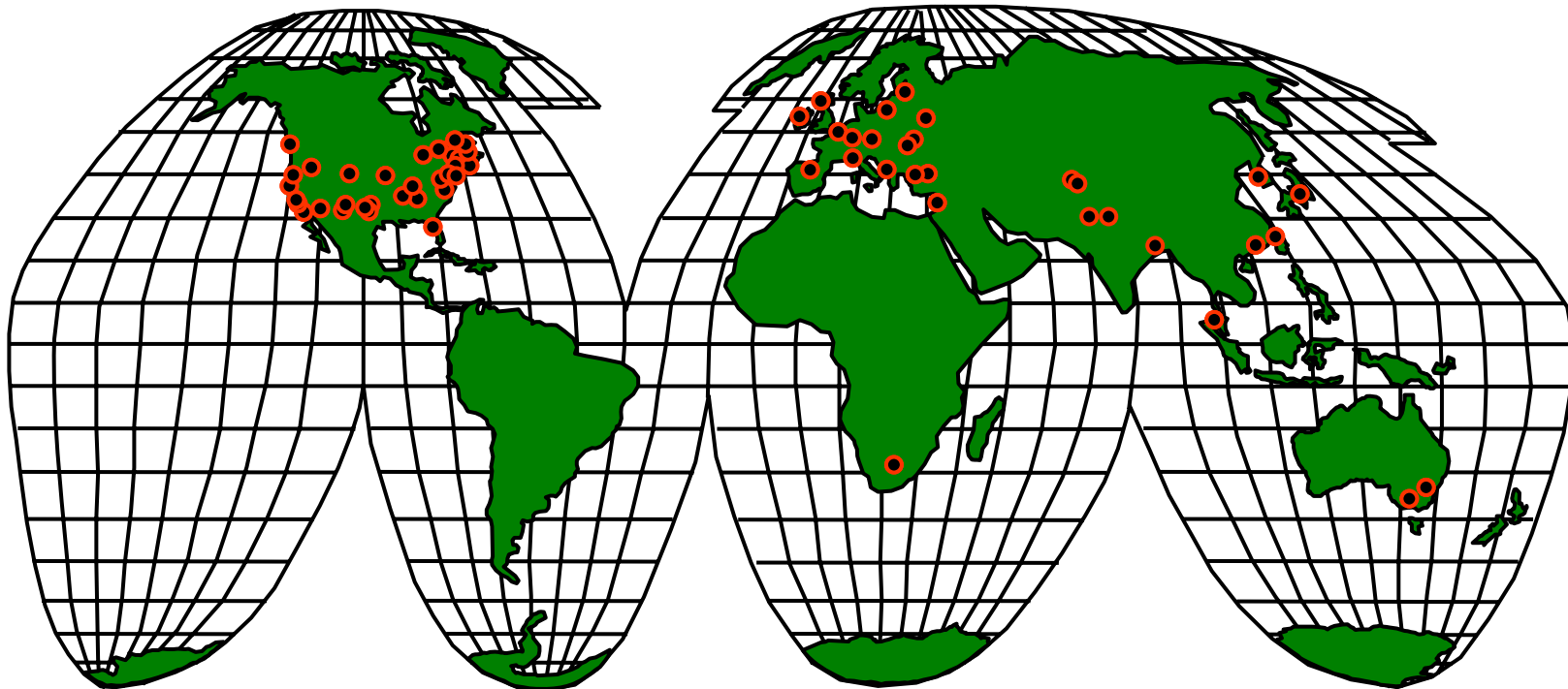
- Technology focus: lasers, optical devices, optical fibers, and associated lightwave technology and their applications in systems and subsystems.
- ~7,600 members in 100 countries, 68 Chapters.
- Key goal: services for members, a few being ...
 - Digital Library, incl. conference proc.
 - DVD-ROMs, annual and 40-year archive
 - Photonics News (bimonthly)
 - i-Photonics.org includes tutorials and conference presentations

Photonics Society Chapters

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71 Chapters as of January 2009
7500 Members

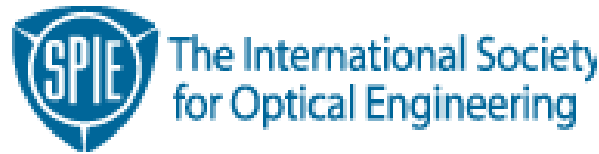


PS Major Conferences

- **OFC/NFOEC - Optical Fiber Communications Conference/Nat. Fiber Optics Engineers Conf.**
 - Cosponsored with IEEE ComSoc and OSA
- **CLEO/QELS - Conference on Lasers and Electro-Optics/Quantum Electronics & Laser Science**
 - Cosponsored with OSA and APS
- **CLEO Europe and CLEO Pacific Rim**
- **LEOS Annual Meeting and Summ/Wint Topicals**

Partnering Societies

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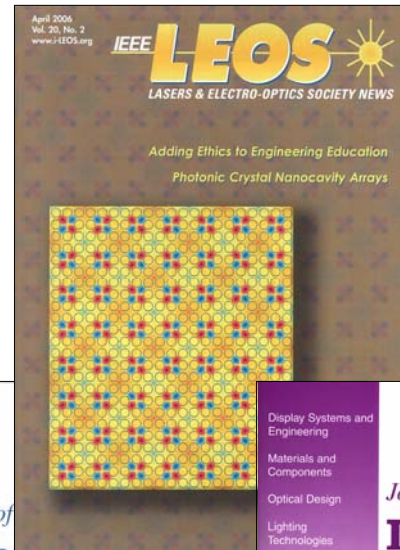
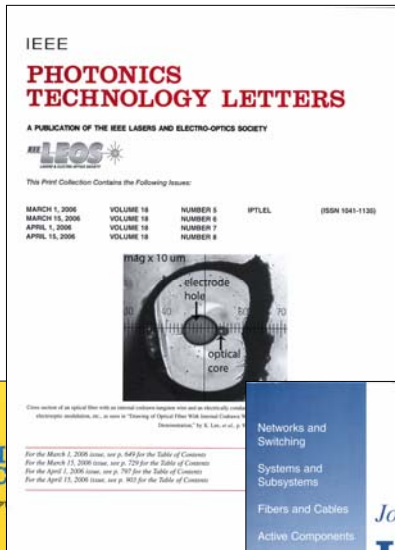
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WHAT'S NEW AT LEOS

Ferenc Krausz wins 2006 LEOS Quantum Electronics Award

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CALL FOR PAPERS

Lighting Technology - 15 July 06

JSTQE Solid State Photonics - 1 Nov 06

JSTQE Optical Micro- & Nano-Systems - 1 Sept 06

JSTQE Single Photon Counting: Detectors & Applications - 2 Jan 07

JSTQE Optical Code in Optical Communications & Networks - 1 Mar 07

JSTQE High Speed Photonic Integration - 1 July 06

QUICK LINKS

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IEEE J. Quantum Electronics



IEEE Photonics Technology Letters



LEOS Newsletter



IEEE J. Selected Topics in QE



IEEE J. of Lightwave Technology



IEEE/OSA J. Display Technology

CONFERENCE ALERTS

[more...](#)

S/C Laser Pre-Registration 05 May
Workshop

UPCOMING CONFERENCES/WORKSHOPS

| | |
|-----------------------------------|------------------|
| IPRM 2006 | 07 - 11 May 2006 |
| HSD | 14 - 17 May 2006 |
| CLEO/OELS 2006 | 21 - 26 May 2006 |
| PhAST | 22 - 26 May 2006 |
| 2006 Semiconductor Laser Workshop | 26 May 2006 |

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Awards

- Quantum Electronics - Engineering Achievement
- William Streifer - Aron Kressel [- John Tyndall Award
- Distinguished Lecturers (8 per year)
- IEEE Photonics Field Award
- Best JQE Paper
- **Graduate Fellowships \$5,000**
- **Student Paper Awards \$1,000**
- **Student Travel Grants up to \$1,500**

LEOS Italy Chapter highlights



is now the



2008-09 activities - Conferences & Workshops

- **"Fotonica 2009"** National Conference on Photonics (Pisa, May 27-29, 2009) (Tech. Sponsorship)
- **Conference on "Installation Techniques and Optical Technologies for New Generation Access Networks"** (Roma, Apr. 29, 2009) (Organized with ComSoc IC)
- For the celebration of LEOS 30th Anniversary, the IEEE-LEOS Italian Chapter organized
 - **Workshop on "Thirty years of electro-optics in Italy: milestones and perspectives"** (Roma, Jan. 30, 2008)
 - **Workshop on "Photonics and Electro-optics instrumentation"** (Pavia, Mar. 14, 2008)
- **"Elettroottica 2008"** National Conference on Electro-optics, (Milano, June 10-12, 2008) (Tech. Sponsorship)
- **OSAV'08** the 2nd International Topical Meeting on Optical Sensing and Artificial Vision (Saint Petersburg May 12-15, 2008) (Tech. Sponsorship)
- **Localized States in physics: a focused workshop 2008** (Chile, Sept. 22-25, 2008) (Tech. Sponsorship)
- **International School on Organic Photovoltaics** (Ventotene-Italy, Sept. 22-26, 2008) (Tech. Sponsorship)

2009 Conference on Access Network Technology

IEEE



Giornata di Studio su

Tecniche impiantistiche e tecnologie ottiche per l'accesso di nuova generazione

29 aprile 2009

8:15- 16:15

Sala del Chiostro – Facoltà di Ingegneria
Sapienza Università di Roma, Via Eudossiana 18



Promosso e Sponsorizzato da: IEEE-LEOS Italy Chapter e IEEE ComSoc/Vehicular Technology Italy Chapter

Co-sponsor tecnici: RadioLabs, CRAT

Sponsor Accademici: Sapienza Università di Roma, Università di Roma Tor Vergata, Università di Roma Tre, Università di Cassino

Comitato Organizzatore Locale: Prof. R. Cusani e Prof. A. D'Alessandro (Sapienza Università di Roma)

Ingresso Libero



Programma

8,15 – 8,50 Registrazione

8,50 – 9,00 Benvenuto del Prof. *Fabrizio Vestroni*, Preside della Facoltà di Ingegneria, Sapienza Univ. di Roma

9,00 – 9,25 Introduzione alla giornata (*C. Attianese, R. Cusani, A. Neri, T. Tambosso, F. Vatalaro*)

I Sessione – Soluzioni tecnologiche e regolamentazione (Chair: *F. Vatalaro* – Università Tor Vergata, ComSoc Italy Chapter)

9,25 – 9,50 *A. Pattavina* (Politecnico di Milano) "Introduzione sulle problematiche dell'accesso in fibra ottica"

9,50 – 10,15 *R. Casale* (RadioLabs-Uniroma2) "Panoramica internazionale sulle soluzioni per l'accesso"

10,15 – 10,40 *F. Ananasso* (AGCOM) "Regolamentazione dell'accesso di nuova generazione"

10,40 – 11,05 Pausa Caffè (offerto dagli Sponsor)

II Sessione – Tecnologie impiantistiche ed infrastrutture (Chair: *T. Tambosso* – LEOS Italy Chapter)

11,05 – 11,30 *G. Cerquozzi* (Consulente) "Dall'accesso in rame all'accesso in fibra: infrastrutture e impianti"

11,30 – 12,00 *F. Montali* (Telecom Italia) "Componentistica per reti PON e le nuove tecniche di realizzazione delle infrastrutture"

12,00 – 12,30 *P. Regio* (Telecom Italia) "Fiber To The Home: soluzioni innovative non invasive per il cablaggio degli edifici"

III Sessione – Alcuni esempi applicativi (Chair: *R. Cusani* – Sapienza Università di Roma)

12,30 – 13,00 *G. Proietti Silvestri* (FASTWEB) "L'esperienza FASTWEB nelle reti d'accesso di nuova generazione"

13,00 – 13,30 *C. Attianese* (Università di Cassino) "L'esperienza UniCasNet: una rete universitaria per il territorio"

13,30 - 14,30 Pausa Pranzo (libero)

14,30 – 16,00 Tavola rotonda su "Reti e sistemi in fibra ottica: realizzazioni in Italia e nel mondo"

Chair: *M. Listanti* (Università di Roma La Sapienza)

Partecipano: *R. Castelli* (Alcatel-Lucent), *R. Sabella* (Ericsson), *E. Valente* (GARR), *D. Cattoni* (Cisco)

16,00 – 16,15 Conclusioni della giornata (*T. Tambosso, F. Vatalaro*)



2008-09 activities Lecture Programme

- **Adele Sassella (Universita' di Milano-Bicocca): "Microscopie a stilo: principi ed esempi applicativi"**, April 22, 2009 - Universita' di Pavia
- **Giuseppe Gabetta (CESI Ricerche, Milano): "Celle solari all'Arseniuro di Gallio per uso spaziale e terrestre"**, April 08, 2009 - Università di Pavia
- **Roberto Sabella (Manager Technology & Innovation ERICSSON):** "Nuove tecnologie verso una nuova generazione di Reti Ottiche", December 15, 2008 - Sapienza Università di Roma
- **Silvano Donati (Universita' di Pavia): "Coupling dynamics in semiconductor lasers and applications to self-mixing interferometry and chaotic cryptography"**, July 17, 2008 - Sapienza Univ. Roma
- **Iam-Choon Khoo (Pennsylvania State University): "Nano-Dispersed Liquid Crystalline Structures for Tunable Sub-unity/negative Index Meta-Materials"**, June 10, 2008 - "Sapienza" Università di Roma
- **Adele Sassella (Universita' di Milano-Bicocca): "Microscopie a stilo: principi e esempi di applicazione"**, June 10, 2008 - Università di Pavia
- **Silvano Donati (Universita' di Pavia): "Accoppiamento in laser a semiconduttore ed applicazioni all'interferometria"**, June 03, 2008 - Politecnico di Milano
- **Lorenzo Pavesi (Universita' di Trento): "Silicon Photonics: Challenges and Future"**, May 27, 2008 - Università di Pavia
- **Masaya Notomi (NTT Basic Research Laboratories, Japan): "All-Optical Control of Photonics"**, January 18, 2008 - INOA-CNR Pozzuoli-Napoli

2008-2009 activities - Awards and Web

IEEE

Awards to attract and support young students and researchers

- The € 500 **Best PhD thesis Award** continues to be appreciated by PhD graduating students, and one of them has been awarded by our Chapter in 2008.
Two new awards were founded:
- **Best LEOS Journal Paper Award** recognizes distinguished papers published on LEOS Journals by young researchers in the field of Photonics/Optoelectronics.
- **Distinguished Student Award** recognizes distinguished students graduated cum laude with a Master thesis in the field of Photonics/Optoelectronics.

Web site

The LEOS Italian Chapter web site content has been enriched with:

- a new menu "**Job Opportunities**"
- a completely **New Voting Procedure** for CEC Officers renewal and budget approval
- LEOS Society Events held in Italy were listed on the Chapter website in order to better publicize them among Italian members.

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