



## TECHNICAL DIGEST

3<sup>rd</sup> IS-PALD International Symposium 2013  
Physics and Applications of Laser Dynamics

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Tuesday / Thursday, October 29-31, 2013  
Télécom ParisTech, Paris, France

### Organized by

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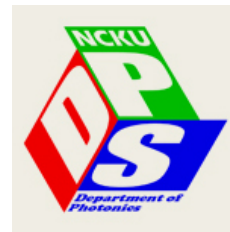
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Frédéric Grillot, co-chairman	Télécom ParisTech, France
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## Preface

Dear participants,

It is our pleasure to welcome you at the International Symposium on Physics and Applications of Laser Dynamics (IS-PALD) 2013!

This symposium is the third one of a series of conferences on laser dynamics organized in cooperation between France and Taiwan and is organized for the first time in France.

The Symposium provides an opportunity to learn advances in physics and applications of laser dynamics through invited talks by renowned scholars and through contributed presentations, both oral and poster, by active researchers. All types of conventional and emerging lasers are covered, such as semiconductor, solid state, fiber, quantum well, quantum dot, quantum cascade, and ring cavity. Meanwhile, the Symposium creates an environment for extensive discussion and potential collaboration with researchers worldwide.

The conference program consists of one plenary and 8 invited talks, as well as 27 oral contributions and 13 poster presentations. The topics covered by the conference include ultrafast laser dynamics, e.g. High-energy and mode-locked short pulses, but also fundamental aspects of nonlinear laser dynamics in presence of optical feedback, optical injection and/or large current modulation; and finally also applications of laser dynamics to sensing, random number generation, and high-frequency all-optical signal generation. A great focus will be made on innovative device structures including nano lasers, photonics crystal lasers, quantum dot and quantum cascade lasers. The large number of received high-quality submissions and therefore the resulting conference program is for us the demonstration that the field of laser dynamics and applications remains one of the most active ones in photonics and still opens up new avenues for device improvements and challenging technological developments.

A selection of the most challenging and fascinating results will be offered to possibility to submit an extended version of their contributions to Optics Express, in the frame of a featured issue where we as conference co-chairs will act as guest editors in collaboration with Prof. Yung-Fu Chen. This journal featured issue will therefore nicely complement this conference proceedings with the most original and innovative results coming out of the conference program.

We thank all our sponsors for their financial support, the members of the conference organizing committee and the members of our international advisory committee for their great involvement in making this conference successful.

We hope you will enjoy the conference and its scientific program as much as we have been happy to organize it!

Yours very sincerely,

Conference co-chairs  
Frédéric Grillot, Télécom ParisTech  
Marc Sciamanna, Supélec



## ISPALD 2013 / ADVANCED PROGRAM

<b>October 29, 2013 (Tuesday)</b>		
09:20   09:50	Symposium Registration	
09:50   10:20	Symposium Opening Session	
10:20   11:10	<b>Fortunato Tito Arecchi</b> (Plenary Talk) Deterministic Chaos in Lasers	
11:10   11:40	Coffee Break	
11:40   12:10	<b>Thomas Erneux</b> (Invited Talk) Nonlinear delay dynamics in photonic systems	
12:10   12:30	<b>Fundamentals of Nonlinear Dynamics</b>	<b>Marc Sciamanna</b> Self-Pulsing External-Cavity Modes in A Laser Diode with Phase-Conjugate Feedback
12:30   12:50		<b>Daan Lenstra</b> Full Rate-equation Description for Multi-mode Semiconductor Lasers
12:50   14:20	Buffet Lunch	

14:20   14:50	<b>Applications of Laser Nonlinear Dynamics</b>	<b>Marek Osinski</b> (Invited Talk) Strongly Injection-Locked Cascaded Microring Lasers for Optical Communications at 100 GHz and beyond
14:50   15:10		<b>Damien Rontani</b> Laser-Based Dynamical Sensor Resolving Two-Dimensional Translations at the Nanoscale
15:10   15:30		<b>Xiao-Zhou Li</b> Chaotic Optically Injected Semiconductor Laser for Random Bit Generation by Electrical Heterodyning
15:30   15:50		<b>L.L. Columbo</b> Complete Set of Logic Gates Based on Dissipative-Conservative Spatial Solitons
15:50   16:10		<b>Yu-Han Hung</b> Semiconductor Lasers at Period-One Dynamics for Amplification of Microwaves in Radio-over-Fiber Links
16:10   16:40	Coffee Break	
16:40   17:10	<b>Optical Injection and Nanolasers</b>	<b>Luke Lester</b> (Invited Talk) Optically-Injected Nanostructure Lasers
17:10   17:30		<b>S. Barbay</b> Self-pulsing and Fast Excitable Response in Semiconductor Micropillar and Nano-lasers
17:30   17:50		<b>Ivan Aldaya</b> Pulse Generation Using Optically Injected DFB Lasers
18:00   20:00	Welcome Drink & Poster Session	

<b>October 30, 2013 (Wednesday)</b>		
09:00   09:30	<b>Ultrafast Optics</b>	<b>Jerome Moloney</b> (Invited Talk) Ultrafast Dynamics and Nonequilibrium effects in Mode-Locked VECSELS
09:30   09:50		<b>C. Robin Head</b> Saturated Gain Spectrum of Optically-Pumped Surface-Emitting Semiconductor Laser determined by Transient Measurement of Lasing Onset
09:50   10:10		<b>Wen-Feng Hsieh</b> Stable Passively Mode-Locked Fiber Lasers by Multi-Layers Graphene and Graphene-Oxide Saturable Absorbers
10:10   10:30		<b>Chao-Kuei Lee</b> A Novel Pattern Recognition Approach For Noisy Frequency-Resolved-Optical-Gating Traces
10:30   10:50		<b>Peter P. Vasil'ev</b> Superluminal Pulse Propagation in Semiconductor Laser Structures during Superradiant Emission Generation
10:50   11:20	Coffee Break	
11:20   11:50	<b>Quantum Dot Laser Dynamics &amp; Phase Amplitude Coupling</b>	<b>Kathy Lüdge</b> (Invited Talk) Quantum-Dot Lasers with Optical Perturbations □ Stability and Amplitude Phase Coupling
11:50   12:10		<b>Martin Virte</b> Optical Feedback Induces Bistability between Ground and Excited States in Quantum Dot Lasers
12:10   12:30		<b>L. Gil</b> On the Dynamical Coupling between Laser Amplitude and Frequency: An Analytical Result
12:30   12:50		<b>Hercules Simos</b> Numerical Investigation of Timing Jitter in Passively Mode Locked Quantum-Dot lasers with Alternative Cavity Design
12:50   14:20	Buffet Lunch	

14:20   14:50	<b>Multimode Laser Dynamics</b>	<b>Jesper Mørk</b> (Invited Talk) Photonic Crystal Lasers: Nonlinear Dynamics and Pulse Generation
14:50   15:10		<b>Kevin Schires</b> Polarisation and Dynamics of Two 1300 nm Spin-VCSELs
15:10   15:30		<b>Marco Romanelli</b> Measuring the Synchronization Properties of Dual-Frequency Lasers in the Bounded-Phase Regime
15:30   15:50		<b>P. Pérez</b> Polarization Switching and Nonlinear Dynamics Induced by Two-Frequency Orthogonal Optical Injection in VCSELs
15:50   16:20	Coffee Break	
16:20   16:40	<b>Optical Feedback</b>	<b>Fadwa Baladi</b> Map of the Low Frequency Fluctuations in A High-Power Diode Laser Submitted to A Filtered Optical Feedback from A Fiber Bragg Grating
16:40   17:00		<b>Andrés Aragoneses</b> Characterizing the Symbolic Dynamics Underlying the Intensity Dropouts of A Semiconductor Laser with Optical Feedback in the Regime of Low Frequency Fluctuations
17:00   17:20		<b>J.S. Suelzer</b> Nonlinear Dynamics of a Semiconductor Laser Subject to Two Filtered Optical Feedbacks
17:20   17:40		<b>Massimo Giudici</b> Square-Wave emission and Dissipative Vectorial Solitons in A Vertical Cavity Surface-Emitting Laser Using Polarisation Degree of Freedom
17:50   18:30	Lab Tour, Télécom ParisTech	
20:00   23:00	Gala Dinner (Seine River Cruise)	



<b>October 31, 2013 (Thursday)</b>		
09:00   09:30	<b>Physics and Simulation</b>	<b>Mariangela Giannini</b> (Invited Talk) FDTW Approach for Simulation of QD Lasers and SOAs
09:30   09:50		<b>Laurent Chusseau</b> Monte Carlo Modelling of the Dual-Mode Regime in Quantum Well or Quantum Dot Semiconductor Lasers
09:50   10:10		<b>Yi Huan Liao</b> Dynamical Scenarios and Their Applications of Semiconductor Lasers Subject to Both Optical Injection and Optical Feedback
10:10   10:30		<b>Kuan-Wei Su</b> CW Self-Mode-Locked Nd:YVO4 Self-Raman Lasers
10:30   10:50		<b>Pramod Kumar</b> Desired Control of Mutually Delay-Coupled Diode Lasers Near Phase-Flip Transition Regimes
10:50   11:20	Coffee Break	
11:20   11:50	<b>Quantum Cascade Laser Dynamics</b>	<b>Carlo Sirtori</b> (Invited Talk) Microwave Stabilization and Modulation of Quantum Cascade Lasers
11:50   12:10		<b>Cheng Wang</b> Dynamical Properties of Quantum Cascade Laser Subject to External Controls
12:10   12:20	Concluding Remark	



## LIST OF POSTERS

**P0** - Anomalous Behavior of 1.55  $\mu\text{m}$  Semiconductor Quantum Dot/Dash Lasers Submitted to Optical Injection, Z. Hao, and P. Besnard.

**P1** - Single and Double Section InAs Quantum Dots Mode-Locked Laser Elaborated on Misoriented (001) InP Substrate, K. Klaime, D. Thiam, R. Piron, C. Paranthoen, T. Batte, O. Dehaese, J. Le Pouliquen, S. Loualiche, A. Le Corre, C. Calo, K Merghem, A. Martinez, A. Ramdane, and K. Yvind.

**P2** - Extraction of the Non-Linear Dynamical Features of Semiconductor Lasers using Asynchronous Technique, C. Gosset, C. Wang, I. Aldaya, and F. Grillot.

**P3** - Impact of the Carrier Dynamics on the Modulation Properties of Optically-Injected Quantum Dot Semiconductor Lasers, F. Grillot, C. Wang, and J. Even.

**P4** - Carrier Lifetime and Relaxation Dynamics in (In)GaAs/GaP Quantum Dots, C. Robert, M. Perrin, C. Cornet, P. Barate, A. Balocchi, X. Marie, H. Folliot, O. Durand, and J. Even.

**P5** - Bistability of Limit Cycles in a Free-Running VCSEL, M. Virte, E. Mercier, K. Panajotov, and M. Sciamanna.

**P6** - Supercontinuum Generation Using Mode-locked Laser for Industry Products, Y.-C. Jheng, W.-P. Linand, and H.-L. Kuo.

**P7** - Two Section Quantum Dot Mode Locked Lasers under Long Delay Optical Feedback: Pulse, Noise and Jitter Dynamics, C. Simos, H. Simos, C. Mesaritakis, A. Kapsalis, and D. Syvridis.

**P8** - Numerical Characterization of the Probability Density Function of the Optical Intensity of Chaotic External-Cavity Semiconductor Lasers, N. Li, B. Kim, A. Locquet, D. S. Citrin, and W. Pan.

**P9** - Experimental Bifurcation Diagram of an External-Cavity Semiconductor Laser, B. Kim, N. Li, A. Locquet, and D. S. Citrin.

**P10** - Existence of a Phase Instability Regime in Semiconductor Lasers, L. Gil, and G. L. Lippi.

**P11** - Linewidth Reduction through Optical Feedback for Photonic Microwave Oscillators Using Optically Injected Semiconductor Laser Dynamics, K.-H. Lo, and S.-K. Hwang.

