EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

Exploratory Workshops Scheme

Standing Committee for Physical and Engineering Sciences (PESC)

ESF Exploratory Workshop on

Slow and Fast Light: Fundamental Issues and Applications

Venice, Italy, 7 - 10 October 2007

Convened by:

Marco Santagiustina and Carlo Someda

Department of Information Engineering, University of Padova, INFM

Co-sponsored by:

DEPARTMENT OF INFORMATION ENGINEERING
UNIVERSITY OF PADOVA

The European Science Foundation (ESF) is an association of 76 Member Organisations devoted to scientific research in 30 European countries. The Mission of ESF is to provide a common platform for its Member Organisations in order to advance European research and to explore new directions for research at the European level. Through its activities, the ESF serves the needs of the European research community in a global context.

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The Exploratory Workshops scheme is one of the key instruments of the Science Strategy "pillar". Each year, ESF supports approximately 50 Exploratory Workshops across all scientific domains. The focus of the scheme is on workshops aiming to explore an emerging and/or innovative field of research or research infrastructure, also of interdisciplinary character. Workshops are expected to open up new directions in research or new domains. It is expected that a workshop will conclude with plans for specific follow-up research activities and/or collaborative actions or other specific outputs either within the frame of ESF (e.g. prepare the ground to develop a Forward Look, a Research Networking Programme or a EUROCORES proposal; publication of a Policy Briefing…) or for submission to the EU 7th Framework Programme or to other European or international funding organisations.

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Main Objectives of the Workshop:

The search for variable time-delay/phase-shift lines, for photonic and microwave applications, has fostered numerous studies in recent years in what is known as slow and fast light research. The group velocities of optical signals are controlled by linear or nonlinear optical phenomena in different media. The crucial issues of the ultimate limits and the real perspectives for the applications are still open issues that need to be explored in detail.

The aim of the Workshop is to review the state-of-the-art of the room temperature, photonic technologies for slow and fast light, to underline their advantages and limitations, to identify the possible application fields and the real chances to bring the slow and fast light delay lines into the realm of practical devices.

PRELIMINARY PROGRAMME

Sunday 7 October 2007

Evening	*Arrival*
20.00	*Dinner at Venice International University (VIU) Campus Cafeteria*

Monday 8 October 2007

09.00	**Welcome** **Presentation of the European Science Foundation (ESF)** **Patrick Bressler** (Standing Committee for Physical and Engineering Sciences)
09.20	**Opening remarks** **M. Santagiustina** and **C. G. Someda**, University of Padova, Italy
09.30	**Invited Talk** **J. P. Reithmaier**, University of Kassel, Germany Semiconductor quantum dots waveguides for slow and fast light
10.15	**Invited Talk** **C. Chang-Hasnain**, University of California at Berkeley, USA The bandwidth Slow and Fast Light in Semiconductor Optical Amplifiers
11.00	*Coffee Break*
11.30	**Invited Talk** **C.C. Phillips**, Imperial College London, United Kingdom Quantum Optics and Slow Light Experiments with Artificial-atom Semiconductor Nanostructures
12.15	**Open discussion** During this session the features and problems of semiconductor devices for slow and fast light devices will be discussed, based on the results presented during the first two talks.
13.00	*Lunch at VIU*
14.30	**Invited Talk** **J. Moerk**, Technical University of Denmark, Denmark Light slow-down in semiconductor waveguides due to population pulsations
15.15	**Invited Talk** **A. De Rossi**, Thales Research and Technology, France Dispersion engineering in III-V based membrane photonic crystals for slow-wave applications
16.00	*Coffee Break*
16.30	**Invited Talk** **A. Melloni**, Politecnico di Milano, Italy Topic: Coupled resonators slow wave structures: potentiality and limits
17.15	Day wrap-up Semiconductor effects and waveguides: the fundamental limitations for slow and fast light devices and the perspective for real applications will be discussed
20.00	*Workshop dinner in Venice*

Tuesday 9 October 2007

09.00	**Invited Talk** **G. Eisenstein**, Technion, Israel On the balance of delay bandwidth and signal fidelity in fiber based slow light systems; Implementation in parametric amplification and bandwidth broadened Brillouin scattering.
09.45	**Invited Talk** **L. Thévenaz**, École Polytechnique Fédérale de Lausanne, Switzerland. Efficient and optimized slow and fast light in optical fibres using stimulated Brillouin scattering
10.30	*Coffee Break*
11.00	**Invited Talk** **L. Schenato**, **M. Santagiustina**, **C.G. Someda**, Universita' di Padova, Italy Polarization effects in slow and fast light fiber amplification
11.45	**Open discussion** During this session the features and problems of fiber devices for slow and fast light devices will be discussed, also stimulated by the previous presentations.
12.30	*Lunch at VIU*
14.00	**Invited Talk** **J. Capmany**, **S. Sales**, Universidad Politecnica de Valencia, Spain Topic: Microwave Photonics applications of the slow light effects
14.45	**Invited Talk** **S. Tonda-Goldstein**, **P. Berger**, **D. Dolfi**, **J.-P. Huignard**, Thales Research and Technology, France Slow light in semi-conductor amplifiers: application to programmable time delays for optically carried microwave signals
15.30	Day wrap-up During this part of the Workshop clear and realistic applications to optical and microwave signal processing will be defined
16.15	*Coffee Break*
16.45	**Workshop Final Discussion** Realisation of slow and fast light devices. Overview of the realistic perspective for applications in optical and microwave signal processing. Possible actions for Research Programs
20.00	*Informal Dinner*

Wednesday 10 October 2007

Morning	*Departure*

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Objectives of the ESF Standing Committee for Physical and Engineering Sciences (PESC)

The **ESF Standing Committee for Physical and Engineering Sciences (PESC)** covers a broad number of fields from physics, chemistry, mathematics, informatics and computer sciences, to engineering, material and technical sciences. PESC has the following responsibilities and tasks:

- to develop scientific initiatives within the ESF operational framework;
- to make proposals for 'a la carte' scientific initiatives;
- to undertake studies on large research facilities and assist in the evaluations and assessments and other special reviews requested by Member Organisations;
- to provide specialist advice and input on a wide range of ESF actions and contribute to the development of the ESF science policy agenda and take a strategic view of the scientific area for which it has responsibility; and
- where appropriate, to work with other Committees and groups in promoting multidisciplinary and interdisciplinary activities.

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