



WINTER COLLEGE on OPTICS: TRENDS in LASER DEVELOPMENT and MULTIDISCIPLINARY APPLICATIONS to SCIENCE and INDUSTRY

4 - 15 February 2013

Miramare - Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP), in collaboration with the International Commission for Optics (ICO), the Optical Society of America (OSA), the International Society for Optics and Photonics (SPIE), the European Optical Society (EOS), the Società Italiana di Ottica e Fotonica (SIOF), the US National Academy of Sciences (NAS), the Photonics Society (IEEE), and the International Society on Optics Within Life Sciences (OWLS) will organize a **Winter College on Optics: Trends in Laser Development and Multidisciplinary Applications to Science and Industry**, which will be held at ICTP, Trieste, Italy, from 4 to 15 February, 2013.

DIRECTORS: **R. Ramponi** (Politecnico di Milano, Italy)
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LOCAL ORGANIZERS: **J. Niemela** (ICTP, Italy), **M. Danailov** (Elettra, Trieste)

The **Winter College** consists of two parts. The first one presents trends in the development of laser sources, including both new laser media and laser regimes. Lectures will focus on solid state, fiber, semiconductor, and quantum cascade lasers, with an emphasis on the latest developments and emerging schemes and materials. Both state-of-the-art laser sources with extreme parameters (in terms of temporal and spectral characteristics, and power) as well as compact low cost systems will be considered.

The second part of the course will be dedicated to multidisciplinary applications of lasers in science, technology and industry. The potential of the laser as a tool for high precision measurements and to investigate material properties and radiation-matter interaction will be presented. Advanced micromachining with femtosecond laser pulses for the realization of photonic and micro-optofluidic devices with unprecedented flexibility and intrinsic 3D capabilities will be explored. Finally, the impact of lasers and related technologies in different fields (ICT, life science, domotics, environment, energy saving and energy production, security and safety) will be presented with particular attention to technology transfer issues and industrial applications. Hands-on laboratory sessions will be included in the program.

MAIN TOPICS

- Trends in the development of laser sources
- Laser media and regimes
- Nonlinear optics
- Applications to life science, TLC, sensing, spectroscopy, material science, metrology, and fabrication
- Technology transfer
- Laser safety

An ICTP **PREPARATORY SCHOOL** will be organized the week before the College (from **28 January to 1 February 2013**) for a limited number of selected participants. The Preparatory School will provide background tutorials and exercises in areas of electromagnetism and fundamentals of physical and laser optics.

The **LAMP** (Laser, Atomic and Molecular Physics) program is intended for presentations by the participants. All participants are encouraged to present their own research, either in poster form or as a short oral presentation, and the program will be finalized sufficiently prior to the start of the College. Poster prizes will be awarded, sponsored by the International Society for Optics and Photonics (SPIE).

PARTICIPATION

Scientists and students from all countries that are members of the United Nations, UNESCO or IAEA may attend the Workshop. As it will be conducted in English, participants should have an adequate working knowledge of this language. As a rule, travel and subsistence expenses of the participants should be borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). However, limited funds are available for some participants, who are nationals of, and working in, a developing country. Such support is available only for those who attend the entire activity. There is no registration fee.

HOW TO APPLY

The application form can be accessed at the activity website:

<http://agenda.ictp.it/smr.php?2443>

Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form.



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