



The Abdus Salam
International Centre for Theoretical Physics



WINTER COLLEGE on OPTICS: ADVANCES in NANO-OPTICS and PLASMONICS

6 - 17 February 2012
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: Advances in Nano-Optics and Plasmonics**, which will be held at ICTP, Trieste, Italy, from **6 to 17 February, 2012**.

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The **Winter College** will present the new advances in nano-optics and nanophotonics with emphasis on plasmon physics and plasmonic devices. Surface plasmon polaritons (SPPs) are electromagnetic excitations on the surface of a good metal whose electromagnetic field is confined to the vicinity of the dielectric-metal interface. This confinement leads to an enhancement of the electromagnetic field at the interface, and the resulting increase in sensitivity is extensively used in chemo- and bio-sensors. The field enhancement is also responsible for surface enhancement of optical phenomena such as Raman scattering, second harmonic generation, fluorescence, etc. Light manipulation using SPPs can be effectively reduced from three to two dimensions and SPPs also allow scaling down optical and electronic devices to nanometric dimensions as well as providing a great deal of flexibility in photonic integration in all-optical circuits. Innovative integrated components combining photonics and electronics can therefore be devised and the manipulation of optical signals on a sub-wavelength scale is made possible. They play a role in an increasing number of applications, including in the field of energy, and new lasers and nonlinear devices are possible. Plasmons are also needed to explain the behavior of nanoscale systems and devices.

MAIN TOPICS

- Introduction to nano-optics
- Basic plasmon physics
- Nonlinear optics at nanoscale
- Modelling and simulation
- Experimental methods and tools
- Techniques to make structures
- Quantum plasmonics
- Applications: bio-sensors, energy, communications
- Nano lasers and nonlinear devices

An ICTP **PREPARATORY SCHOOL** will be organized the week before the College (from **30 January to 3 February 2012**) for a limited number of selected participants. The Preparatory School will provide background tutorials and exercises in areas of electromagnetism, general optics and Fourier transforms.

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 an oral presentation, and the program will be finalized sufficiently prior to the start of the College.

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?2328>

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

Secretariat: e-mail: smr2328@ictp.it phone: +39-040-2240-9932; fax: +39-040-2240-7932
College's web page: <http://agenda.ictp.it/smr.php?2328> ICTP Home Page: www.ictp.it

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