The Abdus Salam International Centre for Theoretical Physics

IAEA International Atomic Energy Agency

unesco United Nations Educational, Scientific and Cultural Organization

Winter College on Optics: Theoretical and Applied Aspects of Metamaterials and Metasurfaces

Description:

Metamaterials are artificially engineered structures with sub-wavelength spatial dimensions in general. The fundamental building block of a certain metamaterial is known as meta–atom whose specific arrangement in a periodic or aperiodic array provides a unique way of tailoring the properties and response of incident waves.

The main applications of metamaterials are found in the industrial sectors like information and communication technologies (ICT), space sciences & defense, but new applications are emerging in health, energy, and environmental areas. Some notable examples of devices realized during the past few years are sensors, super-lensing, cloaking, and light-emitting diodes using dynamic, reconfigurable, and tunable metamaterials.

This technology is being improved further in the marketplace by metamaterials that provide added value over and above state-of-the-art approaches. The World Economic Forum listed plasmonic metamaterials as one of the ten emerging technologies in 2018. Also, the Global Metamaterials Market survey by Mforesight in 2018 predicts a compound annual growth of 36.4% in the next five years.

Keeping this unprecedented potential of metamaterials in view, the ICTP Winter College of 2025 will cover various types of metamaterials such as electromagnetic, planer/flat (metasurfaces), acoustics, thermal, mechanical, low-dimensional, etc.

TOPICS:

- Physics and Engineering of Complex Electromagnetic Metamaterials
- Analytical, Semi-analytical, and Numerical Modelling of Metamaterials and Metasurfaces
- Fabrication and Experimental Characterization of Metamaterials
- Intelligent Design for Metamaterials and Metasurfaces
- Engineering Non-linear Light-matter Interactions Through Metasurfaces
- Tunable and Reconfigurable Metamaterial and Metasurfaces
- Reconfigurable Intelligent Surfaces for 6G (and beyond) Applications
- Plasmonics Metamaterials and Metasurfaces to Engineer Resonances and Scattering
- Metamaterials for Super-resolution and Near-field Imaging: Effects and Devices
- Device to System level Meta-optics for Next-generation Imaging and Sensing Applications
- RF and Microwave Metamaterials: Design, Properties, Applications
- Millimeter Wave/THz Metamaterials and Applications
- Extraordinary Absorption and Transmission through Acoustic Metamaterials
- Chiro-optical and Asymmetric Phenomena through Metamaterials and Metasurfaces
- 2D and Transdimensional Metasurfaces for Enchanted Light-matter Interactions
- Photonics Crystals for Light Confinement and Guiding

24 February - 7 March 2025

An ICTP Meeting

Deadline:
24 November 2024

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FURTHER INFORMATION:

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Female scientists are encouraged to apply.

GRANTS:

A limited number of grants are available to support the attendance of selected participants, with priority given to participants from developing countries.
There is no registration fee.

EOS European Optical Society www.jeos.org

International Commission for Optics Commission Internationale d'Optique

OPTICA Formerly OSA

SIOF Società Italiana di Ottica e Fotonica

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