Conference Tutorials

META 2024 will feature **several** technical **tutorials** instructed by **world-leading experts** on various topics of interest to the META community. Tutorials are intended to provide a high quality learning experience to conference attendees.

Registration

The tutorials are part of the conference technical program, and are **free of charge to the conference attendees**.

Who Should Attend?

The tutorials will address an audience with a varied range of interests and backgrounds: **beginners**, **students**, **researchers**, **lecturers** and **representatives of companies**, **governments and funding agencies** who wish to learn new concepts and technologies.

When?

July 16-19, 2024.

Where?

Tutorials will be held at the conference venue

Tutorials & Instructors

Tutorial 1: "Topological Origin of Surface Maxwell Waves and Surface Acoustic Modes"

Prof. Franco Nori (https://www.riken.jp/en/research/labs/chief/theor_qtm_phys/), Riken (Japan) and University of Michigan (USA)

Tutorial length: 1 hour

Description: Interfaces between optical media (including dielectrics, metals, negative-index materials) can support surface electromagnetic waves, which now play crucial roles in plasmonics, metamaterials, and nano-photonics. We have shown [K.Y. Bliokh et al., Nat. Commun. 10, 580 (2019) (http://dx.doi.org/10.1038/s41467-019-08397-6)] that surface Maxwell waves at interfaces between homogeneous isotropic media described by real permittivities and permeabilities have a topological origin explained by the bulk-boundary correspondence. This is explained by the nontrivial topology of the non-Hermitian photon helicity operator in the Weyl-like representation of Maxwell equations. The corresponding topological invariant, which determines the number of surface modes, describes the winding of the complex helicity spectrum across the interface. Our theory provides a new twist and insights for several areas of wave physics: Maxwell electromagnetism, topological quantum states, non-Hermitian wave physics, and metamaterials. We have also analyzed [K.Y. Bliokh et al., Phys. Rev. Lett. (2019) (https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.123.054301)] another type of classical waves: longitudinal acoustic waves corresponding to spinless phonons. We show that surface acoustic waves, which appear at interfaces between media with opposite-sign densities, can be explained by similar topological features and the bulk-boundary correspondence. However, in contrast to photons, the topological properties of sound waves originate from the non-Hermitian four-momentum operator in the Klein-Gordon representation of acoustic fields.

Tutorial 2: "Writing and Submitting Your Papers"

Dr. Rachel Won (https://www.nature.com/nphoton/about/editors), Nature Photonics, UK

Tutorial length: 1 hour

Description: This talk covers the detailed information and guidelines on scientific paper preparation and submission, including tips for writing an effective cover letter, an informative abstract, a comprehensive introduction and an attractive paper, and editorial and peer-review processes. You will also get to know how to choose a journal for submission, what editors seek, how your papers are reviewed and how to make an appeal.