

Plasmonics - Fundamentals and Applications

SCOPE: This course will provide an introduction into the fields of plasmonic and plasmonic metamaterials. Starting with elementary descriptions of these two revolutionary concepts of nanophotonics, a survey of the current state-of-the-art will be provided. This will include descriptions of nanophotonic waveguides and cavities, surface-enhanced sensing devices, phenomena such as extraordinary transmission and superlensing, as well as first examples of active devices. In addition, the transformative force of plasmonics for a variety of disciplines ranging from materials research to biological sensing and imaging will be demonstrated.

BENEFITS AND LEARNING OBJECTIVES

This course will enable you to:

- understand the basic concepts of plasmonics and metamaterials
- design and assess the properties of nanophotonic cavities and waveguides based on nanostructured metals
- use plasmonic designs in various regimes of the spectrum in order to create functional sub-wavelength components, and investigate technology-transitions into biology, chemistry, and materials science

INTENDED AUDIENCE

Postgraduate students, postdocs, researchers, and device engineers working in photonics, nanotechnology, and related fields where light is a prominent ingredient (biophotonics, imaging, optical analysis of materials).

COURSE LEVEL

Beginner to Intermediate. A basic knowledge in electromagnetism would be of benefit.

INSTRUCTOR

Dr Stefan Maier is a Reader in Nanophotonics in the Department of Physics at Imperial College. He has held previous positions at the University of Bath and been educated at the California Institute of Technology. His main research areas are plasmonics and metamaterials, where he is a frequent invited speaker at international conferences. In 2007 he published one of the first concise introductions into the subject “Plasmonics – Fundamentals and Applications” (Springer, NY).