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INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

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IAPME Seminar

Celebrating the 45th Anniversary of the University of Macau: Bioinspired Micro-nano Photonic Materials

9 April 2026

Prof. Mingzhu LI
Chinese Academy of Sciences

Venue: N23-1004b
Time: 14:00 - 15:00
Hosted by: Prof. Guoxing SUN

Abstract

Controlling the interaction between light and matter through optical structures has laid the foundations for a broad spectrum of applications, ranging from colors, lasers, and optoelectronics, to quantum information processing. Optical metamaterials, 2D or 3D structures comprising subwavelength metallic or dielectric pixels, are a new class of material that enable precision tailoring of light–matter interactions. Optical metamaterials present properties beyond those found in natural materials that is possible to explore novel light–matter interaction phenomena. These salient features have unveiled an impressive assemblage of potential applications including the generation of ‘flat optics’ (e.g. metalenses) and ‘cloaking’ materials.

Inspired by the natural hierarchical optical structures, we developed a series of optical metamaterials with a low spatial footprint and enhanced light-matter interaction. Deep-strong coupling of different optical structures, such as Fabry-Pérot interferometers, distributed Bragg reflectors, photonic crystals and grating structures, unlocks a large variety of novel phenomena spanning traditionally distant research areas. Moreover, we emerge compound optical structure materials with surface-functionalization, chemical regulation, and optoelectronic device which open prospects for diverse applications, including anti-counterfeiting, encryption, sensing, displays, photovoltaics and imaging.

Biography

Prof. Mingzhu LI is a Full Professor at Technical Institute of Physics and Chemistry, Chinese Academy of Sciences (TIPC- CAS) and Fellow of the Royal Society of Chemistry (FRSC). Her interests lie in the design, fabrication, and application of bioinspired micro/nano photonic materials. She received her PhD degree from Institute of Chemistry, Chinese Academy of Sciences (ICCAS), and joined the Key Laboratory of Green Printing, ICCAS in 2008. In 2023, she moved to Laboratory of Bio-inspired Smart Interface Science, TIPC-CAS. She has published more than 100 peer-reviewed SCI journal articles, including Science, PNAS, Sci. Adv., and so on. She has received several awards including the National Science Fund for Distinguished Young Scholars, the first prize of Beijing Science and Technology Award, etc. She has joined the Editorial Boards of Journal of Materials Chemistry C and Materials Advances as an Associate Editor since April, 2023.