



Department of
Mechanical Engineering
The University of Hong Kong



SEMINAR

Bioinspired Optical Metamaterials

Date: 24 June, 2024 (Monday)
Time: 10:30 a.m.
Venue: CPD-G.02, Centennial Campus
HKU

Speaker: Professor Mingzhu Li
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and Interface Science
Technical Institute of Physics and Chemistry
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Language: Mandarin (Putonghua)

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. [1-5] 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.

References:

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- [3] X. Lai, Q. Ren, F. Vogelbacher, W. E. I. Sha, X. Hou, X. Yao, Y. Song, M. Li*, Bioinspired quasi-3D multiplexed anti-counterfeit imaging via self-assembled and nanoimprinted photonic architectures, *Adv. Mater.* 2021, 33, e2107243.
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- [5] Y. Zhan, Y. Wang, Q. Cheng, C. Li, K. Li, H. Li, J. Peng, B. Lu, Y. Wang, Y. Song, L. Jiang, M. Li*, A butterfly-inspired hierarchical light-trapping structure towards a high-performance polarization-sensitive perovskite photodetector, *Angew. Chem. Int. Ed.* 2019, 58, 16456-16462.

Biography:

Mingzhu Li received her PhD degree in Chemistry from Institute of Chemistry, Chinese Academy of Sciences (ICCAS) in 2008. She worked in the CAS Key Laboratory of Green Printing, ICCAS from 2008 to 2023 and has been a full Professor since 2016. She joined Key laboratory of Bio-inspired Materials and Interface Science, Technical Institute of Physics and Chemistry since September, 2023.

Her research interest focuses on self-assembly and functionalization of optical materials for photonics and optoelectrics, such as optical sensors, anti-counterfeiting, lasers, photodetectors and solar cells. She has published more than 90 peer-reviewed SCI journal articles, including *Science*, *Science Advances*, *Nature Communications*, *Angew. Chem. Int. Ed.*, *J. Am. Chem. Soc.*, *Adv. Mater.* and so on. Her articles have been cited more than 5300 times and her H index is 42. She has received several awards including the National Science Fund for Distinguished Young Scholars, the first prize of Beijing Science and Technology Award, and the outstanding member of the Youth Innovation Promotion Association of Chinese Academy of Sciences. She has joined the Editorial Boards of *Journal of Materials Chemistry C* and *Materials Advances* as an Associate Editor since April, 2023.

ALL INTERESTED ARE WELCOME

For further information, please contact Prof. L.Z. Xu at 3917 2628.