



THE CHINESE UNIVERSITY OF HONG KONG
Department of Electronic Engineering and Department of Physics
Joint Seminar

**Nanophotonics in Multidimensional Platforms: From Artificial
Metasurfaces To Natural Crystals**

Dr Guangwei HU
Research Fellow
National University of Singapore

Date: January 5, 2022
Time: 2:00 pm

Zoom Meeting:

<https://cuhk.zoom.us/j/91967855398?pwd=OFBrVmgrMnc3TGdaV2g0cWRtMjlqZz09>

Abstract

Nanophotonics is a rapidly growing research frontier that studies and engineers light-matter interactions at the nanoscale. Central in nanophotonic technologies are material platforms. In this talk, I will show our recent results on molding the light at the nanoscale, covering from visible to infrared to terahertz frequency ranges, in multi-dimensional material systems. I will start from artificially designed structural materials in two dimensions such as metasurfaces [1] to its integration with natural 2D materials [2] for nonlinear light manipulation in free space. After that, near-field manipulation of light will be discussed in the platform from low-dimensional ultrathin quantum materials [3,4] to three-dimensional bulky traditional crystals [5,6] for compact on-chip nanophotonic technologies. Several physical and engineering concepts such as hyperbolic responses, topological transitions, flat band, non-Hermitian photonics and polaritonics will be included in this talk. Those engineered novel nanophotonic platforms in multi-dimensions will be important for various applications such as infrared sensing, bio-imaging, optical computations, quantum optics, lasing, photonic circuits and many others.

[1]. *Nano Letters* 20, 3217-3224, 2020; [2]. *Nature Photonics* 13, 467-472, 2019. [3]. *Nature* 582, 209-213, 2020; [4]. *Nature* 597, 187-195, 2021; [5]. *Nature* 596, 362-366, 2021. [6]. *Nature* in press.

Biography

Dr. Guangwei Hu is currently a research fellow in National University of Singapore (NUS). He received the B.Sc. in physics from Harbin Institute of Technology in July 2016 and PhD from NUS in Oct. 2020. His current research interests are developing novel nanophotonic platforms by combining metasurfaces with low-dimensional quantum nanomaterials and traditional crystals for nonlinear, valleytronic, polaritonic, topological, twistrionic and other new concepts and applications. He has published more than 50 papers, including 4 in *Nature*, 1 in *Nature Photonics*, 4 in *Nature Communications*, 1 in *PRL* (corresponding author) and many others. His work has been featured as Top 10 Breakthrough in Physics of 2020 by *Physics World*, *Optics and Photonics News* (Year of Optics in 2021) and many others. He received the Rising Star of Light in 2020 by *Light: Science & Applications*, NUS President's Graduate Fellowships and various other awards.

*** ALL ARE WELCOME ***

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