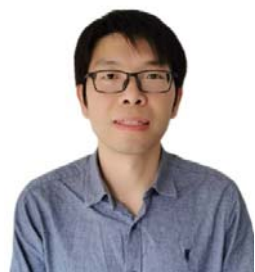




THE CHINESE UNIVERSITY OF HONG KONG
Department of Electronic Engineering
Seminar



**Optoelectronic Characterization and Device
Considerations of Next-generation Solution-processed
Semiconductors**

Professor Qianqian LIN
Wuhan University

Date: 21 Oct 2024 (Monday)

Time: 2:00 p.m. – 3:00 p.m.

Place: ERB 215, William M W Mong Engineering Building, CUHK

Abstract

Along with the remarkable progress in the field of organic, quantum dot based- and recently emerged perovskite optoelectronics, solution-processed semiconductors have shown unprecedented successes. However, the characterization of these novel semiconductors is very challenging due to the highly disordered structure, low conductivity and relatively short charge carrier lifetimes. In this talk, I will present the optoelectronic characterization of these novel materials systems, mainly including transient absorption (TAS), time-resolved microwave conductivity (TRMC) and optical-pump terahertz-probe (OPTP) spectroscopy. I will also introduce deep-level transient spectroscopy (DLTS) to evaluate the fundamental properties of trap states, charge recombination and extraction based on operational devices. I will start with the basic principles and the set-up of these techniques. Then, the obtained optoelectronic properties, including real and imaginary conductivity, mobility, recombination rates, trap density and carrier lifetime, will be introduced for the design and optimization of various devices, such as single photon counting, X-ray detection and imaging. At the end, I will discuss the key challenges facing optoelectronic characterization, and will also point out the opportunities, which are promising to explore and may require more research activities.

Biography

Qianqian Lin is currently a professor of materials physics at the School of Physics and Technology, Wuhan University, China. He received his PhD degree (Dean's Award) from The University of Queensland with the support of International Postgraduate Research Scholarship (IPRS, Australia). In 2016, he also received Materials Research Society (MRS) Graduate Student Gold Award. After a postdoc in the Clarendon Laboratory at University of Oxford with Prof. Laura Herz, he joined Wuhan University as a principal investigator in 2017. His research focuses on functional materials and optoelectronic devices. He has published >140 papers in high impact journals, such as *Nat. Photonics* (3), *Nat. Energy* (5), *Nat. Commun.* (3), *Appl. Phys. Rev.* (3), *Matter, Device, Adv. Mater.* (6), *Angew. Chem. Int. Ed.* (3), *Nano Lett.*, *ACS Energy Lett.*, *Adv. Energy Mater.* (2) and *Adv. Funct. Mater.* (7), with a citation of >9200 and H-index of 39. He has also served as an editorial board member of *Scientific Reports* and *Journal of Materials Science- Materials in Electronics*, and as a guest editor of *JPhys Photonics* and *APL photonics*.

*** ALL ARE WELCOME ***

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