



**THE CHINESE UNIVERSITY OF HONG KONG**  
**Department of Electronic Engineering**  
**Seminar**



**Controlling Ion Migration for High-Performance and  
Stable Perovskite X-ray Detectors**

**Dr. Yunlong Li**  
**Associate Professor**  
**Shenzhen Institute of Advanced Technology, Chinese  
Academy of Sciences**

**Date: 10 Dec 2024 (Tuesday)**

**Time: 2:00 p.m. – 3:00 p.m.**

**Place: Rm 222, Ho Sin Hang Engineering Building, CUHK**

**Abstract**

Metal halide perovskites (MHPs) have garnered significant attention in X-ray detection due to their strong X-ray attenuation coefficients, high carrier mobility-lifetime ( $\mu\tau$ ) product, exceptional detection efficiency for imaging applications, and solution-processable scalability. These attributes position MHPs as promising candidates for next-generation high-performance semiconductor materials for radiation monitoring. However, uncontrollable ion migration within MHPs leads to inconsistent response and limited stability, posing significant challenges to their implementation in imaging applications, particularly in 3D perovskite systems. This presentation will explore the underlying mechanisms of ion migration contributing to nonlinear response behaviors and discuss the development of advanced strategies to address this issue. Specifically, approaches such as heterojunction design, molecular engineering, dimensional control, and composite material innovation will be highlighted, aiming to achieve high-performance, stable direct-conversion X-ray detectors suitable for practical imaging applications.

**Biography**

Yunlong Li received his B.Sc. degree from Soochow University in 2012 and his Ph.D. from Peking University in 2017, both in China. From February 2018 to February 2021, he held a postdoctoral fellow at the University of Saskatchewan, SK, Canada, where he focused on metal halide perovskites for high-performance direct-conversion X-ray detectors and imaging systems.

Dr. Li is currently an Associate Professor at the Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences. His research encompasses the design and fabrication of perovskites and their analogues, the development of high-performance and stable direct radiation detectors, imaging applications, and energy conversion technologies, including photovoltaics and thermoelectrics. He has authored over 50 peer-reviewed publications and conference papers and holds 6 patents. He has been awarded the CAS Hundred Talents Program, the Pearl River Talent Award, and the Young Elite Scientist from the Chinese Academy of Sciences (CAS), the Guangdong Province, and the China Association for Science and Technology (CAST), respectively.

**\*\*\* ALL ARE WELCOME \*\*\***

*For enquiries: Prof. Martin Stolterfoht (mstolterfoht@ee.cuhk.edu.hk), Tel: +852 3943 8456*