香港浸會大學
HONG KONG BAPTIST UNIVERSITY
FACULTY OF SCIENCE

Department of Physics & IAM Joint Seminar

High Temperature Quantum Phenomena in Hybrid Perovskites

Speaker: Professor Franky So
Department of Materials Science and Engineering
North Carolina State University

Date: October 14, 2022 (Friday)
Time: 10:30am – 11:30am
Venue: RRS905, HSH Campus

Abstract:

Metal halide perovskites are an emerging class of semiconducting materials that have drawn tremendous attention due to their outstanding optoelectronic properties, along with their low-cost solution processability and wide wavelength tunability. In addition to the rapid development in solar cells, perovskites are recently considered as promising light-emitting materials for light-emitting diodes (LEDs) due to the high photoluminescence quantum yield (PLQY), narrow emission bandwidth, and widely tunable emission wavelength range. In this seminar, we will present our recent discovery of high temperature superfluorescence in halide perovskites. Superfluorescence is a low temperature quantum phenomenon in which an ensemble of photoexcited dipoles are spontaneously synchronized leading to the formation of a macroscopic quantum coherence phase. Based on our analysis, we propose a model describing how the quantum phase is protected by polarons in hybrid perovskites and explain why high temperature superfluorescence can be observed in this unique material system.

Professor Franky So received his PhD degree in electrical engineering from the University of Southern California in 1991. He has previously worked on development of OLEDs at Motorola Corporate Research Laboratories and was the group manager there. In 2001, he joined OSRAM Opto Semiconductors and became the Head of OLED Research. He joined the University of Florida in 2005 and became the Rolf E. Hummel Professor in Electronic Materials in the Department of Materials Science and Engineering at the University of Florida. He joined the Department of Materials Science and Engineering at the North Carolina State University where he is currently the Walter and Ida Freeman Distinguished Professor. While at Motorola, he was named the Distinguished Innovator and Master Innovator. Dr. So holds 120 issued patents. He is the Editor-in-Chief of the journal Materials Science and Engineering Reports and serves as on the editorial boards of IEEE Journal of Display Technology, ACS Applied Electronic Materials, and Organic Electronics. So is a Distinguished Lecturer of the IEEE Photonics Society, a Fellow of the National Academy of Inventors, and a Fellow of IEEE, MRS, SID, OSA and SPIE.

All Interested Are Welcome!