THE CHINESE UNIVERSITY OF HONG KONG
Department of Electronic Engineering

Seminar

Quantum photon conversion with integrated nonlinear photonics

Prof. Linran Fan

Assistant Professor

College of Optical Sciences, University of Arizona

Date: **18 December 2018 (Tuesday)**
Time: **11.00 am - Noon**
Venue: **Rm 222, Ho Sin Hang Engineering Building, CUHK**

Abstract: The ability to manipulate photons is of critical importance for both fundamental quantum optics studies and practical quantum communication applications. While integrated photonic circuits provide the unprecedented power to realize complex photon control with minimized structures, most materials used in integrated photonic circuits lack the preferred second-order optical nonlinearity, which limits photon control functionalities. On the other hand, the wurtzite crystal structure gives rise to the strong second-order optical nonlinearity and piezoelectric effect in aluminum nitride. Together with its low optical and mechanical losses, integrated aluminum nitride photonics can provide new aspects and enable novel methods for quantum photon control.

In this talk, I will present our effort in developing quantum photon control technology based on nonlinear nanophotonics. First, piezo-optomechanical systems will be discussed, with which cascaded optical transparency, adiabatic single photon frequency shifting, and time lens are demonstrated. Then, I will introduce superconducting cavity electro-optics, and the coherent photon conversion between microwave and optical frequencies will be exhibited.

About the Speaker

Linran Fan received his B.S. in physics from Peking University in 2011, and his PhD in electrical engineering from Yale University in 2017. He finished his postdoctoral research at Caltech from 2017 to 2018. He is now an assistant professor in College of Optical Sciences at University of Arizona. His research interests focus on the development of on-chip photon control technology using nonlinear optical, mechanical, and electro-optic effects at nanometer scale with applications targeting quantum and classical information processing.

*** All are welcome to attend. Please contact Prof. Xiankai Sun for enquiries ***