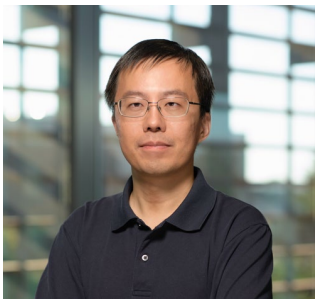
THE CHINESE UNIVERSITY OF HONG KONG
Department of Electronic Engineering
Seminar



High-performance III-V nonlinear photonics for quantum information and networking

Prof. Kejie FANG
Associate Professor
Department of Electrical and Computer Engineering
University of Illinois Urbana-Champaign

Date: 20 May 2025 (Tuesday)
Time: 10:30 a.m. – 11:30 a.m.
Place: Rm 222, Ho Sin Hang Engineering Building, CUHK

Abstract

Nonlinear optics plays a crucial role in various scientific and technological fields. In this talk, I will introduce an emerging III-V nonlinear photonics platform based on indium gallium phosphide (InGaP), with a record-high nonlinearity-to-loss ratio. This enables nonlinear optical conversion efficiencies nearly two orders of magnitude higher than the current state of the art. Leveraging this high-performance platform, we achieved several unprecedented experimental results, including quantum frequency conversion with milliwatt-level pump power, creation of quantum correlations between photons via passive nonlinearity, and quantum teleportation via nonlinear-optical Bell state measurement. These results have significant implications for advancing quantum information processing and quantum networking with integrated nonlinear photonic platforms.

Biography

Prof. Kejie Fang received BS in physics from Peking University and PhD in physics from Stanford University (with Prof. Shanhui Fan). He then worked in Caltech as a postdoctoral researcher in the Department of Applied Physics and Material Science (with Prof. Oskar Painter). He is an Associate Professor and Y.T. Lo Faculty Fellow in the Department of Electrical and Computer Engineering and is affiliated with the Department of Physics, University of Illinois Urbana-Champaign. His research focuses on integrated photonics and devices for classical and quantum information processing, quantum sensing and quantum networking. He received NSF CAREER Award.

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

For enquiries: Prof. SUN Xiankai (xksun@ee.cuhk.edu.hk), Tel: +852 3943 8264