THE CHINESE UNIVERSITY OF HONG KONG
Centre for Advanced Research in Photonics & Department of Electronic Engineering

Seminar

Neuromorphic Photonic Computing Devices Based on Electrically Controlled Phase-Change Memory

相变存储电控光算器件研发

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Date: 29th December 2023 (Friday)
Time: 11am - Noon
Venue: Rm 222, Ho Sin Hang Engineering Building, CUHK

Abstract: Neuromorphic computing hardware aims to mimic biological neural networks and has emerged as a viable path in overcoming limitations of the von Neumann architecture. By eliminating the latency and energy losses associated with transferring data between the memory and central processing unit, these systems promise to improve on both speed and energy. Here, we report photonic implementation using on-chip, nonvolatile waveguide memories to deliver energy efficient, high-speed, and high-density data processing within the photonic memory. We developed a non-volatile electronically reprogrammable PCM memory cell with a record-high 4-bit weight encoding levels using a non-resonant waveguide microheater. For system-level application, a compact photonic-electronic dot-product engine for in-memory computing was demonstrated with a high computational precision for image processing and classification.

About the Speaker

Dr. Wen Zhou is currently an Associate Professor in the Center for Alloy Innovation and Design in the Xi'an Jiaotong University. He was a postdoctoral researcher at the University of Oxford, UK, from June 2019 to June 2022. He was a postdoctoral fellow supported by the Hong Kong Postdoctoral Hub—Innovation and Technology Fund from September 2018 to June 2019. He received his PhD degree under supervision of Prof. Hon Ki Tsang in Electronic Engineering from The Chinese University of Hong Kong in 2018. In recent years, he has published more than 40 SCI academic papers in Nature Photonics, Nature Communications, Materials Today, npj Computational Materials, IEEE Journal of Selected Topics in Quantum Electronics, Advanced Science, ACS Photonics, Nanophotonics, Optics Letters, Optics Express, Photonics Research, and more than 20 conference proceedings. His research interests include silicon photonics, phase-change materials, and in-memory photonic computing

** All are welcome to attend. Please contact. Prof H.K.Tsang hktsang@cuhk.edu.hk for enquiries **