UNIVERSIDADE DE MACAU
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INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

IAPME Seminar

Heterogeneous Integration of GaN optoelectronics with Si microelectronics

7 August 2025

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Venue: N23-4018
Time: 15:00 - 16:00
Hosted by: Prof. Handong SUN

Abstract

In the past decades, GaN and its AlN, and InN alloys have been attracting the interests of the optoelectronics industries. GaN optoelectronic devices, including LEDs, photo-detectors (PD), micro-LED displays, etc., have been demonstrated to have advantages over their counterparts in the aspects of efficiency, and lifetime, amongst others.

To operate the GaN optoelectronic devices, systems involving such devices also include Si microelectronics in the form of integrated circuits (IC), such as drivers, amplifiers and many other types of ICs. Conventionally, the GaN optoelectronic devices and Si microelectronics are individually packaged, which are then soldered onto printed circuit boards (PCB) to form functional circuits, as illustrated in Fig. 1(a). Although commonly adopted, such types of integration tend to make the circuits and systems more bulky than is needed.

In this talk we present the heterogeneous integration GaN optoelectronics devices (such as LEDs and photodiodes) with Si-based electronics at the chip-scale level. This includes the integration of GaN LEDs and LED arrays with CMOS driving circuit, and GaN photodetectors with CMOS transimpedance amplifiers.

Biography

Prof. Anthony H.W. CHOI is Professor and Associate Head with the Department of Electrical and Electronic Engineering at The University of Hong Kong. He received his PhD from the National University of Singapore under the supervision of Professor Soo Jin Chua and completed his postdoctoral training in Professor Martin Dawson's team at the University of Strathclyde, Glasgow, where he contributed to pioneering development work on III-Nitride emissive micro-light-emitting diode arrays, demonstrating applications in the areas of micro-displays and high-efficiency light sources. His current research interests include microdisk lasers, chipscale color micro-LED displays and GaN-Si heterogeneous integration.