

Photonics Research Institute (PRI)

光子技術研究院



PHOTONICS
RESEARCH INSTITUTE
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About PRI 關於我們

The establishment of the Photonics Research Institute in May 2021 has provided a platform for colleagues from different faculties and departments to carry out interdisciplinary research in the area of photonics. It also enables us to explore the synergy between the fundamental sciences and various engineering applications of light. We welcome colleagues and collaborators around the world to work together to make important advances in the fundamental knowledge of photonics and develop new technology applications. We aspire to establish PolyU as an Asia-Pacific hub for University-Industry collaboration and spin-offs in optics for the benefit of Hong Kong, China and the World.

光子技術研究院在2021年5月成立，此後為不同院系和部門的同仁開展光子學領域的跨學科研究提供了優質的平台。同時，也使得我們能夠在光學領域內實現基礎科學與工程應用之間的協同作用。我們歡迎與世界各地的同行和合作者共同努力，在光子學基礎理論方面取得重要突破，並將新技術用於實際的應用中。希望將理工大學打造成亞太地區的大學與產業合作中心，以及光學領域衍生產品的孵化中心，從而造福香港、中國和世界。

Vision 願景

To be a leading institute worldwide in advancing fundamental knowledge and applications of photonics in various science and engineering disciplines.

成為推進光子學基本理論研究及在各種科學及工程領域應用的全球領先的研究機構。

Mission 使命

To pursue impactful multidisciplinary research for the benefit of Hong Kong, China and the World. To foster a university photonic research community in which members can interact to generate new ideas and applications.

追求有影響力的多學科研究，造福香港、中國和世界。培育大學光子研究社區，成員可以在當中互動以產生新的想法和應用。



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Research Directions 研究方向

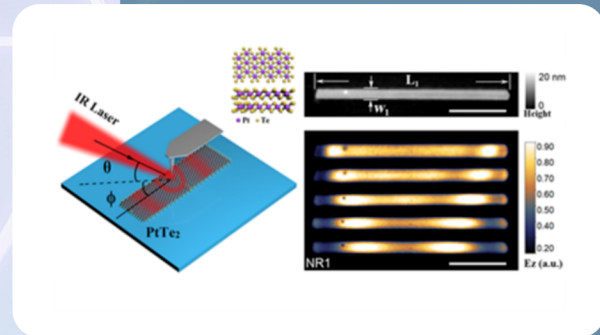
1

Photonic materials and fundamental science

光子材料與基礎科學

The research focus will be on physics and the characterization of new materials that enable new photonic devices and systems. These include topological photonics, photochemical physics, and plasmonics, which provide new physical mechanisms to obtain new functions. In addition, metamaterials, 2D materials and photoluminescent materials are critical to realizing new functionalities of photonic devices and systems.

研究重點將在新材料的物理特性及其表徵上，並基於這些新材料研製新型光子器件和系統。研究包括拓撲光子學、光化學物理學和等離子體激元學等領域。這些研究將提供新的物理機制以實現新的功能。同時，超材料、二維材料和光致發光材料將在實現光子器件和系統的新功能上起關鍵作用。

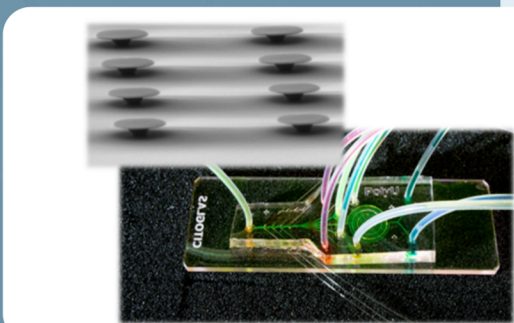


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Photonic devices 光子器件

The research will focus on devices based on metasurfaces, 2D/3D nanostructures, organic semiconductors and metal halide perovskite semiconductors to enable new functionalities. These include nanophotonic devices, optical imaging devices for digital holography, optical wavefront shaping, phase retrieval and optical metrology; colour management of imaging pipelines; lighting and O/E and E/O conversion devices; Flexible photonics based on photonic materials and photonic crystal structure.

研究將集中在超表面、2D/3D 納米結構、有機半導體和金屬鹵化物鈣鈦礦半導體等領域以實現具有新功能的光子學器件。研究包括納米光子器件、用於數字全息術的光學成像器件、光波前整形、相位恢復和光學計量；成像流水線的色彩管理；照明和光電和電光轉換裝置；基於光子材料和光子晶體結構的柔性光子學。

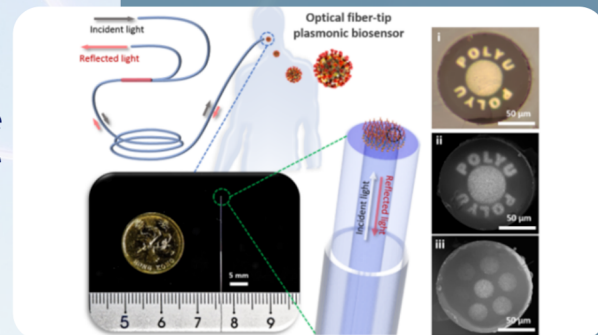


Research Directions 研究方向

3 Photonic sensing 光子傳感

The research will be carried out to study photonic techniques for sensing physical, chemical and biomedical parameters. Optical fiber sensors based on FBG, Rayleigh scattering, Brillouin scattering and interferometry will be studied for ultra-sensitive structural monitoring, railway monitoring, power line monitoring, communication network monitoring and earthquake monitoring.

研究將集中在光學傳感技術方面，用來實現對物理、化學和生物醫學等領域中相關參數的探測和監控。通過對基於FBG、瑞利散射、布裡淵散射和干涉儀的光纖傳感技術研究以實現超靈敏土木結構監測、鐵路監測、電力線監測、通信網絡監測和地震監測。



4 Laser spectroscopy 激光光譜

Precision laser spectroscopy has important applications in environmental monitoring, medical instrumentation and industrial safety protection. Research is being carried out to investigate light-matter and light-structure interactions in micro and nanostructures and develop highly sensitive nonlinear laser spectroscopy techniques and instrumentations for gas and liquid analysis.

精密激光光譜在環境監測、醫療儀器和工業安全防護方面具有重要的應用。通過分析微結構和納米結構中的光物質和光結構的相互作用，此研究將開發出高靈敏度非線性激光光譜技術及儀器並將其用於氣體和液體的分析 and 探測領域上。

5 Photonics and information communications technology 光子學和信息通訊技術

Studies will be carried out to investigate optical transmission techniques and intelligent optical networking techniques that can meet our information age's ever-increasing network capacity requirement. The focus will be on advanced transmission techniques and optical performance monitoring techniques.

研究光通信技術和智能光網絡技術，以滿足信息時代不斷增長的網絡通信容量需求。重點集中在先進的傳輸技術和光學性能監測技術上。

