澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

應用物理及材料工程研究院
INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

IAPME Newsletter

https://iapme.um.edu.mo/

ISSUE 61

19 November 2025

✧ Content

❖ Ph.D. Student Thesis Oral Defenses

Dan Fang of Prof. Bingpu Zhou's group presented "Design of magnetism-coupled flexible devices for applications in wearable tactile sensing and human-machine interactions" in her oral defense on November 12, 2025.

Congratulations to Dr. Dan Fang!

(from left) Prof. Yinning Zhou (周胤寧), Prof. Songnan Qu (曲松楠),
Dr. Dan Fang (方丹), Prof. Bingpu Zhou (周冰朴),
Prof. Hongchao Liu (劉宏超) and Prof. Yingjie Zhou (周瑩杰, DHU)

Yinman Song of Prof. Shuangpeng Wang's group presented "Interface Engineering for Enhanced Operational Stability in Inverted Quantum Dot Light-Emitting Diodes" in her oral defense on November 13, 2025.

Congratulations to Dr. Yinman Song!

(from left) Prof. Hongchao Liu (劉宏超), Prof. Kar Wei Ng (吳嘉偉), Prof. Shuangpeng Wang (王雙鵬), Dr. Yinman Song (宋音漫), Prof. Guichuan Xing (邢貴川) and Prof. Shuming Chen (陳樹明, SUSTech)

Zhongheng Li of Prof. Hou Ian and Prof. Hui Pan's group presented "Interfacial Design for Zinc-based Energy Storage and Catalytic Systems" in his oral defense on November 13, 2025.

Congratulations to Dr. Zhongheng Li!

(from left) Prof. Huaiyu Shao (邵懷宇), Prof. Shi Chen (陳石),
Prof. Hui Pan (潘暉), Dr. Zhongheng Li (李中恆), Prof. Hou Ian (殷灝)
Prof. Guichuan Xing (邢貴川) and Prof. Zhiyuan Zeng (曾志遠, CityUHK)

澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

應用物理及材料工程研究院
INSTITUTO DE FÍSICA APLICADA E ENGENHARIA DE MATERIAIS
INSTITUTE OF APPLIED PHYSICS AND MATERIALS ENGINEERING

IAPME Newsletter

ISSUE 61 19 November 2025

❖ UM and IAPME held the Global Academic Symposium 2025

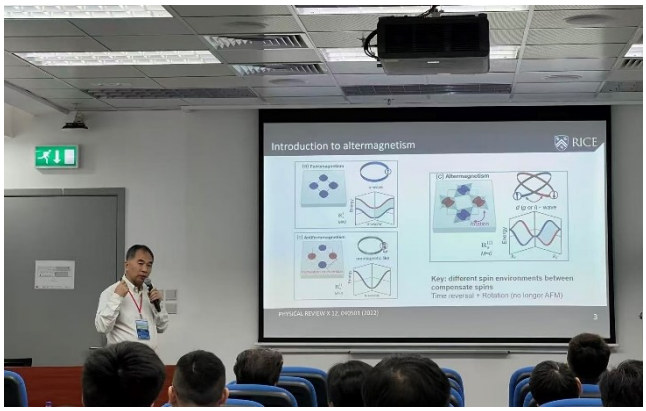
The UM Global Academic Symposium 2025 officially commenced on November 6, 2025, at the University of Macau (UM), marking a significant milestone in the university's efforts to foster global academic exchange and strengthen international partnerships. The three-day event has drawn participation from scholars representing 18 institutions across regions including Mainland China, Portugal, Singapore, Australia, France, the United Kingdom, Canada, New Zealand, the United States, Spain, and South Korea.

Designed to promote dialogue across disciplines and borders, the symposium features four parallel sessions, each focusing on a distinct academic theme. Among them, the IAPME Session, organized by our Institute, has attracted particular attention for its cutting-edge discussions and high-level participation.

The IAPME Session, themed "Applied Physics and Materials Engineering," convened leading scholars and professors from around the world to explore recent breakthroughs and emerging trends in areas such as nanotechnology, optoelectronics and optical control, crystal growth techniques, new energy storage materials, and advanced material development and applications. Through in-depth presentations and interactive discussions, participants exchanged insights on the future of materials science and its role in next-generation technologies.

In addition to the academic sessions, attendees engaged with our researchers and postgraduate students, and toured the our Institute's research facilities. These interactions provided a platform for exploring potential collaborations in joint talent development, faculty and student exchanges, and scientific research partnerships.

The symposium reflects UM's commitment to advancing international academic cooperation and creating a vibrant environment for interdisciplinary innovation.

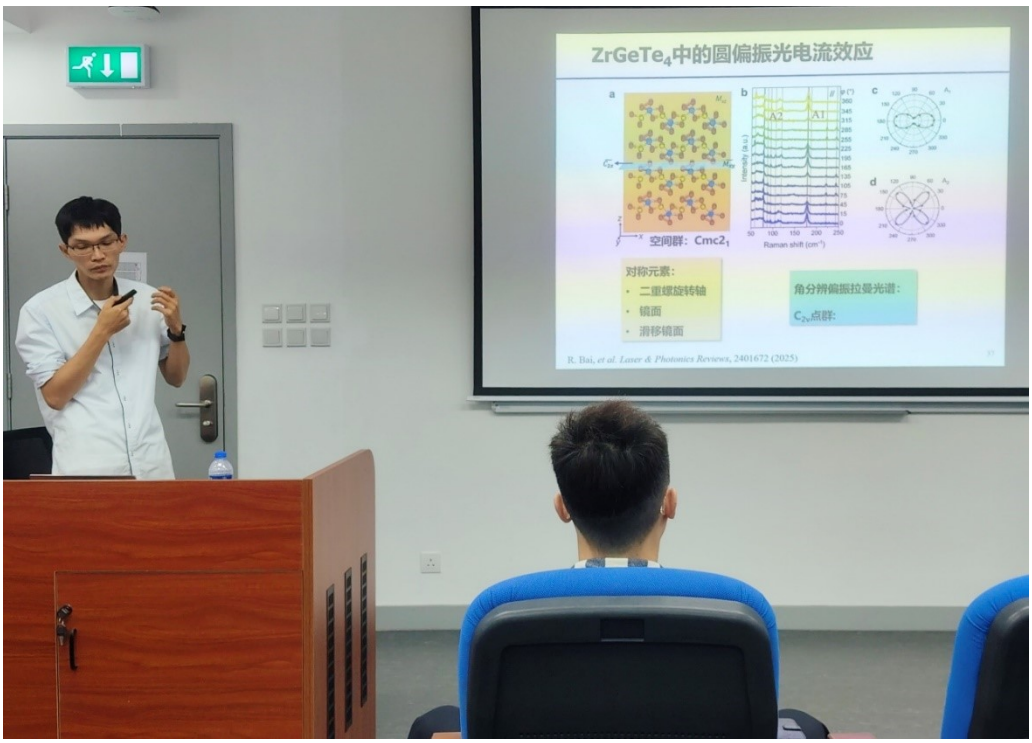


(from left):
Prof. Haifeng Li (李海峰), Prof. Guichuan Xing (邢貴川),
Prof. Handong Sun (孫漢東), Prof. Pengcheng Dai (戴鵬程, RICE),
Prof. Liming Dai (戴黎明, UNSW), Prof. Huiyun Liu (劉會贇, UCL),
Prof. Zhiqun Lin (林志群, NUS), Prof. Songnan Qu (曲松楠),
Prof. Kwun Nam Hui (許冠南) and Prof. Qing Li (李清)

❖ Seminars

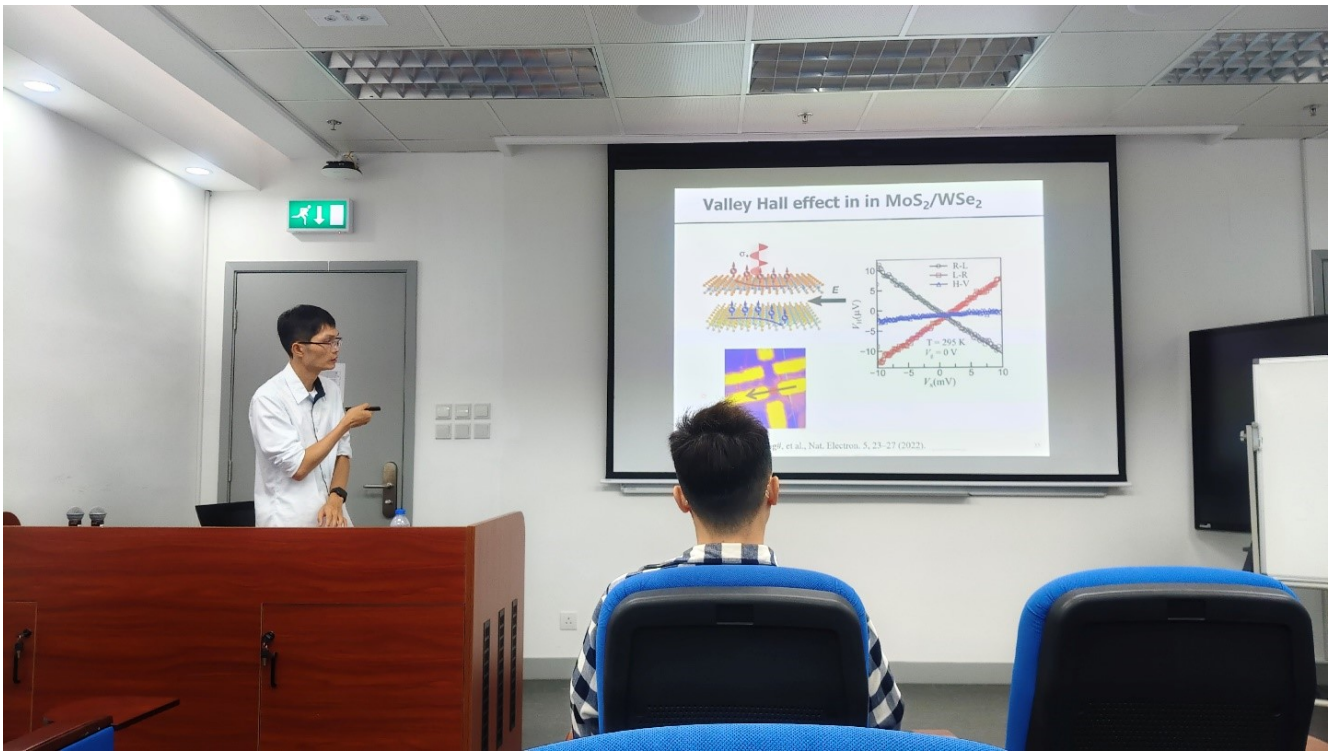
On November 5, 2025, our Institute welcomed Prof. Chongyun Jiang (蔣崇雲) from Nankai University as part of its ongoing IAPME Seminar Series. The seminar was hosted by Prof. Shen Lai, who extended the invitation to Prof. Jiang in recognition of his significant contributions to the field of semiconductor physics.

During his visit, Prof. Jiang delivered a compelling presentation titled "*Weyl-Related Surface Circular Photogalvanic Effect in Nonsymmorphic-Symmetry $ZrGeTe_4$ Semiconductor*". His talk explored the intricate mechanisms behind the surface circular photogalvanic effect (CPGE) in $ZrGeTe_4$, a material characterized by nonsymmorphic symmetry. Using a specialized excitation and detection geometry, Prof. Jiang demonstrated how asymmetric helicity-dependent optical transitions between Kramers-Weyl nodes in the conduction and valence bands give rise to this phenomenon. His findings suggest that the Weyl-related surface CPGE is an intrinsic effect that can be flexibly tuned via an in-plane electric field, offering promising implications for the development of functional topological devices.



Prof. Jiang has served as a professor at Nankai University since 2019. His research focuses on spintronics and photonics in low-dimensional semiconductors, with recent work delving into photogalvanic and anomalous Hall effects in van der Waals heterostructures. His studies have been published in prestigious journals such as *Nature Electronics, ACS Nano, and Laser & Photonics Reviews.*

The seminar provided attendees with valuable insights into the emerging field of Weyl semiconductors and their potential applications in next-generation optoelectronic technologies. Prof. Jiang's visit not only enriched academic exchange at IAPME but also underscored the institute's commitment to fostering dialogue around frontier research in materials science.



❖ Inner Mongolia Tangu Technology Delegation Visited IAPME

On October 27, 2025, a delegation from Inner Mongolia Tangu Technology Ltd. (内蒙古碳谷科技有限公司), led by its President Mr. Yongqing Sun (孫永青), visited our Institute to discuss potential research collaboration and industrial partnerships.

The delegation also included Academician Yongmin Zhang (張勇民), a member of the French Academy of Pharmaceutical Sciences and Chief Scientist of Tangu Technology. The visit was hosted by Prof. Guichuan Xing, who welcomed the guests and provided an overview of our Institute's mission, development, and recent achievements in advanced materials research.

During the meeting, Mr. Sun presented the company's progress in graphene industrialization, highlighting its applications and collaborative potential in perovskite solar cell technologies. Both parties engaged in discussions on the feasibility of graphene supply for IAPME's ongoing research and explored models for joint industrialization of perovskite optoelectronic devices.

The visit also featured academic exchanges between Prof. Huaiyu Shao and Academician Zhang, who are alumni of the same institution. Their dialogue focused on potential collaborative research in chemistry and biochemistry, further strengthening the academic dimension of the visit.

In addition, the delegation and our Institute's representatives discussed the possibility of organizing an international forum or workshop on fullerene research in Macao. This initiative aims to foster global dialogue and cooperation in the field of new carbon materials, paving the way for future joint efforts in research and application.

The visit marked a meaningful step toward building a strategic partnership between academia and industry, reinforcing IAPME's commitment to advancing innovation through interdisciplinary collaboration.

❖ Delegation from Tianjin University Visited IAPME

A delegation from Tianjin University (TU), led by Prof. Ying Wang (王穎), Deputy Director of the Human Resources Department, visited our Institute recently to explore potential avenues for academic and research collaboration.

The TU delegation included several senior academic leaders:

- Prof. Nan Jin (靳楠), Dean of the School of Marine Science and Technology
- Prof. Hongchun Zhu (朱紅春), Deputy Dean of the School of Education
- Prof. Yanmei Zhao (趙艷梅), Deputy Dean of the School of Disaster and Emergency Medicine

The visitors were warmly received by Prof. Handong Sun in the institute's exhibition room. Prof. Sun provided a brief overview of our university and the development of our Institute, highlighting the institute's current research focus areas and achievements.

During the meeting, members of the TU delegation also shared their respective research accomplishments and outlined their ongoing academic initiatives. The exchange fostered a productive dialogue on potential collaboration opportunities, including student and faculty exchange programs, joint research projects, and interdisciplinary cooperation.

The visit underscored the mutual interest in strengthening ties between Tianjin University and our Institute, paving the way for future academic partnerships that could benefit both institutions.

❖ Upcoming Events

澳門大學
UNIVERSIDADE DE MACAU
UNIVERSITY OF MACAU

應用物理及材料工程研究院

IAPME Seminar

Seeing the Unseeable: A Neutron and X-Ray Vision into Energy Storage Materials

26 November 2025
Prof. Kun QIAN
Great Bay University
Venue: N23-4018
Time: 16:00 - 17:00
Hosted by: Prof. Qing LI

Abstract

The electrochemical performance of batteries is intrinsically governed by the structural dynamics of their constituent materials. Establishing a precise correlation between structure and function is therefore paramount for advancing battery technology. This endeavor, however, is significantly challenged by the difficulty in characterizing lithium-containing materials, as the light Li element is weak in scattering X-rays. To overcome this limitation, combined neutron-based and X-ray-based techniques emerge as powerful, complementary probes. This talk showcases a suite of such advanced characterization methods: Neutron Depth Profiling (NDP) for mapping the spatial distribution and diffusion of lithium in materials; Neutron Powder Diffraction (NPD) for precise analysis of bulk crystal structure evolution in cathode materials; and Small-Angle Neutron Scattering (SANS) combined with Small-/Wide-Angle X-ray Scattering (SAXS/WAXS) to probe solvation structures of liquid electrolytes. The synergistic application of these techniques provides a comprehensive, multi-scale perspective, bridging the critical knowledge gap between material degradation and performance fade in lithium batteries.

Biography

Prof. Kun QIAN is an Assistant Professor and Doctoral Supervisor at Great Bay University. His research focuses on the application of advanced characterization techniques, particularly those based on synchrotron and neutron sources, to study material structures, interfaces, and degradation mechanisms. With over seven years of hands-on experience at large-scale facilities, he has conducted numerous experiments at beamlines 11-ID-C, 12-ID-B, 12-ID-C, 11-BM, and 20-BM of the Advanced Photon Source (APS) at Argonne National Laboratory (USA), as well as at the Shanghai Synchrotron Radiation Facility (SSRF) and the China Spallation Neutron Source (CSNS). Prof. Qian has authored 37 publications in leading journals such as *Nature Energy*, *Energy & Environmental Science*, *Advanced Materials*, and *Advanced Energy Materials*. His research has been supported by multiple competitive grants, such as the Young Scientists Fund (Category C) from the National Natural Science Foundation of China (NSFC), Guangdong Provincial Fund, and industrial partnerships.

Enquiry: iampe.enquiry@um.edu.mo

Contact Us

Email
iapme.enquiry@um.edu.mo