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台灣大學應用力學研究所  
演 講 公 告

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講 題：Non-Hermitian Physics with Mechanical Waves

摘 要： 如附件

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☆☆ 歡迎聽講，敬請張貼 ☆☆

# Non-Hermitian Physics with Mechanical Waves

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## Abstract

Non-Hermitian physics has recently captivated much attention of physicists and engineers across many realms. The realization of non-Hermitian phenomena demands precise control over the energy exchange between the system and external environments, which remain challenging in many areas. In this talk, I will show how to realize Hermitian and non-Hermitian tight-binding models using acoustic and mechanical wave systems. Topics to be discussed include non-Hermitian skin effects and delocalization [1-3], and a generalization of exceptional points[4].

## References

- [1] W. Wang, X. Wang, G. Ma, Non-Hermitian morphing of topological modes, *Nature*, 608 (2022) 50–55.
- [2] W. Wang, X. Wang, G. Ma, Extended State in a Localized Continuum, *Physical Review Letters*, 129 (2022) 264301.
- [3] W. Wang, X. Wang, G. Ma, Anderson Transition at Complex Energies in One-Dimensional Parity-Time-Symmetric Disordered Systems, *Physical Review Letters*, 134 (2025) 066301.
- [4] Z. Li, X. Wang, R. Cai, K. Shimomura, C. Lu, Z. Yang, M. Sato, G. Ma, Exceptional deficiency of non-Hermitian systems: high-dimensional coalescence and dynamics, *arXiv:2504.12238* (2025).

Dr. Guancong Ma is currently a professor of physics at Hong Kong Baptist University. He received his B.Sc. in Applied Physics from the South China University of Technology in 2007, followed by a Ph.D. in Physics from the Hong Kong University of Science and Technology in 2012. After that, he became a postdoctoral fellow at the Institute for Advanced Study and the Department of Physics at the same institution until 2017, when he joined the Department of Physics at Hong Kong Baptist University. He now serves on the Executive Committee of the Physical Society of Hong Kong. Dr. Ma was awarded the “Young Investigator Award 2021” by the International Phononics Society and was selected as one of the “Top 10 Rising Stars in Science and Technology 2021” by the China Association for Science and Technology. He is the recipient of the C. N. Yang Award in 2022, awarded by the Association of Asia Pacific Physical Societies and the Asia Pacific Center for Theoretical Physics. He is currently an associate editor of Science Bulletin and National Science Review.

Dr. Ma conducts research on various topics in topological and non-Hermitian physics using classical-wave platforms, with a focus on acoustics. He is also interested in metamaterials and complex waves. He has published over 70 papers in peer-reviewed journals, including Science, Nature, Nature Research Journals, Physical Review X, Physical Review Letters, etc. His papers have received over 10,000 citations. He also holds 8 US patents, and 9 Chinese invention patents.

馬冠聰博士現於香港浸會大學物理系任職教授。他於 2007 年本科畢業於華南理工大學應用物理系，於 2007 至 2012 年香港科技大學物理學系就讀並取得物理學博士學位。2012-2017 年分別在香港科技大學物理系和高等研究院任博士後研究員。現任香港物理學會理事會成員。他於 2021 年獲評為“十大科技新銳人物”，同年獲國際聲子學協會 (International Phononics Society) 頒發“青年研究者獎”，於 2022 年獲頒“楊振寧獎”。多次入選「全球前 2% 科學家」。馬博士的研究興趣主要集中於人工體系中的拓撲物理、非厄米物理以及聲波超材料等。他在 Science、Nature、Nature Physics、Nature Photonics、Physical Review X、Physical Review Letters 等期刊發表論文 70 餘篇，總引用數超過 12000。科研成果共獲 8 項美國發明專利授權，9 項中國發明專利授權，部分專利在香港特別行政區成功實現轉化。現擔任 National Science Review 和 Science Bulletin 特邀編委，並獲 Science Bulletin 評選為 2021 年度最佳審稿人、2024 年度最佳編委。

