

國立清華大學第 29 屆新進人員研究獎得獎人簡介

物理系 徐有德助理教授



徐有德博士於畢業於清華大學材料科學與工程學系（學士 09 級），於 2018 年取得英國劍橋大學物理學博士學位。畢業後他在荷蘭國家高磁場實驗室（High Field Magnet Laboratory）進行博士後研究。他的學術專長包含高品質晶體材料之合成，以及在高磁場（最高 100 特斯拉）與極低溫（攝氏 -272 度以下）下之高靈敏度實驗測量。徐博士目前已發表 37 篇研究論文，其中包括刊登於《自然》、《自然-物理》、《自然-通訊》、《科學》、《科學進展》及《美國國家科學院院刊》（PNAS）等期刊著作。

徐博士為玉山青年學者（2023 年）與亞太物理學會凝態學部年輕科學家獎（2025 年）獲獎者。

徐博士目前研究主軸為量子材料中之新穎湧現現象。超導體為量子材料的一經典範例：超導體在特定溫度下能展現出零電阻與完美反磁特性，是一具備巨大應用潛力之新穎物質態。然而，在銅與鎳氧化物中相對高溫（大於 40 K）下即可實現的超導機制迄今仍未明朗，攻克該難題為當代凝聚態物理研究的核心課題。利用超過 60 特斯拉的高磁場來抑制超導態，徐博士成功揭示新發現之 $\text{La}_2\text{PrNi}_2\text{O}_7$ 鎳基超導薄膜中「正常態」之電子典型金屬特性，對氧化物高溫超導體的成因提供新的線索。此研究成果發表於《自然-通訊》，並獲選為該期刊「鎳酸鹽超導現象」特刊的封面故事。

徐博士目前在國立清華大學建置前沿量子材料實驗室，目標打造具國際競爭力的量子材料研究團隊，利用多種合成途徑製備塊材晶體，再利用高靈敏度實驗設備分析其研究其電子傳輸與熱力學性質。

Dr. Yu-Te Hsu receives his Bachelor in Materials Science and Engineering from National Tsing Hua University (2009) and his Doctorate in Physics from the University of Cambridge (2018). He conducted postdoctoral research in the High Field Magnet Laboratory in Nijmegen, the Netherlands, investigating the charge transport phenomenology of various quantum materials, including unconventional superconductors and correlated topological semimetals. His expertise includes synthesis of high-quality crystalline materials, and high-sensitivity transport and thermodynamic measurements under extreme conditions of high magnetic fields (up to 100 T) and low temperatures (below 1 K). He has authored 37 research articles including publications in *Nature*, *Nature Physics*, *Nature Communications*, *Science*, *Science Advances*, and *Proceedings of the National Academy of Sciences*.

Dr. Hsu is the recipient of the Yushan Young Fellowship (2023) and the Young Scientist Award from the Division of Condensed Matter Physics, the Association of Asian-Pacific Physical Societies (2025).

His current research focuses on uncovering and understanding novel emergent phenomena in quantum materials, crystalline solids that host macroscopic quantum phenomena. Superconductivity, the phenomenon which a material exhibits zero resistivity and perfect diamagnetism, is an inherently quantum state of matter with immediate practical potentials. The mechanism for superconductivity realized at remarkably high temperatures (> 40 K), such as those found in copper and nickel oxides, remains unclear and is a central theme of current condensed matter research. Dr. Hsu specializes in utilizing high magnetic fields (> 30 T) to suppress superconductivity and revealing the nature of electron interactions in the “normal state” of high-temperature oxide superconductors. His recent research on the nickel-based superconductor $\text{La}_2\text{PrNi}_2\text{O}_7$ thin film is published in *Nature Communications* and featured as the front coverage for its special edition on “*Superconductivity in nickelates*”.

Another theme of Dr. Hsu’s research program is the realization of exotic electronic ground states in correlated insulators. Correlated insulators are materials predicted to be insulators by conventional electronic band theory but are insulators in reality due to strong electron-electron interactions. His research on iridium oxides with strong spin-orbit coupling and electron interaction reveals the existence of novel quantum states and phase transitions, providing new insights on the essential ingredient for high-temperature oxide superconductivity and the nature of quantum phase transitions in doped two-dimensional Mott lattices.

Dr. Hsu is currently building a research lab in NTHU with a focus on the synthesis and characterization of quantum materials. He utilizes different synthetic approaches for bulk

crystalline materials, and studied their transport and thermodynamic properties using state-of-the-art characterization techniques. He is a frequent visitor to international large-scale research facilities such as the European Magnetic Field Laboratories (Dresden and Toulouse), International Mega-Gauss Science Laboratory (Tokyo), Materials Growth and Measurement Laboratory (Prague), and National Synchrotron Radiation Research Center (Hsinchu).