Weekly Seminar

New insights and applications of non-Hermitian systems with real-energy spectra

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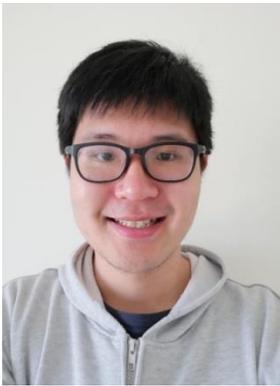
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Abstract

Generally speaking, the energy spectra of non-Hermitian Hamiltonians are complex. However, for some specific systems, say those with parity-time symmetry, real-energy spectra could emerge and are separated to the domain of complex-energy spectra by exceptional points. The appearance of real-energy spectra (or exceptional points) may lead to distinguished quantum phenomena. This talk will discuss some new insights on non-Hermitian systems with real-energy spectra. Firstly, we give a general outline of how to construct Hermitian chiral boundary states out of topological insulators of non-Hermitian bulk states, even without parity-time symmetry. The transport of such Hermitian chiral boundary states significantly deviates from the paradigm of chiral boundary transport in Hermitian systems. Secondly, the level-repulsion problem near exceptional points is also considered.

References:
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About the speaker

Dr. Chen WANG received his Ph.D. degree from Hong Kong University of Science and Technology in 2016 and joined the department of science of Tianjin University in 2019. His research interests include quantum phase transitions induced by disorders, topological phases, spintronics, and quantum chaos. Recently, he has focused on exploring novel phenomena in non-Hermitian systems.