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IAPME Seminar

Topological Ideas Implemented with Metamaterials

14 April 2025

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Venue: N23-4018
Time: 16:00 - 17:00
Hosted by: Prof. Hongchao LIU

Abstract

Topology is a mathematical term to describe the shape of objects, such as the sphere, torus, and even coffee mug. The key idea is to count the number of ‘holes’ in the geometrical objects, which remains unchanged with smooth deformation. It becomes more interesting when this idea is adopted to characterize materials, i.e., the number of holes becomes the so-called topological invariant, and importantly, the property of being robust against deformation is inherited. In this talk, I will firstly show how the geometrical concept is connected to materials. I will then give a few examples on how topological invariants can be implemented with metamaterials. I will further show that the topological invariants can take the form of matrix and lead to non-Abelian characteristics.

Biography

Dr. Dongyang WANG received his PhD in 2018 from Tianjin University, China, and did his postdoctoral research at the Hong Kong University of Science and Technology from 2019 to 2023. He joined the University of Southampton in United Kingdom as an Anniversary Fellow in October of 2023 and is currently a permanent academic in the Optoelectronics Research Centre. Dr. Wang’s research focuses on topological photonics, metamaterials, and terahertz science. His research has led to the discovery of several new topological phases, such as the first photonic magnetic Weyl point, the super-imaging effect with topological metamaterials, and the non-Abelian band topology in general optics.