THE UNIVERSITY OF HONG KONG

Department of Physics
THE UNIVERSITY OF HONG KONG

HK Institute of Quantum Science & Technology
香港量子研究院

Complex shaping of light: metamaterial design and topology

Dr. Haiwen WANG

ICFO – The Institute of Photonic Sciences

Abstract:

Shaping and controlling electromagnetic waves have wide-ranging scientific and practical implications. In this talk, I will present a few theoretical proposals to generate novel topological structures in light. In particular, I show that the transmission nodal lines are general topological responses from non-local metasurfaces and can be used to generate spatiotemporal optical vortices. Additionally, I discuss the possible topological structures that can occur in electromagnetic waves. I show that three-dimensional topological structures, known as hopfions and Shankar skyrmions can be created in free-space electromagnetic waves. Such complex shaping of light may be used for optical emulation of new topological physics, or be used in optical trapping and manipulation applications.

Biography:

Dr. Haiwen Wang is currently a Marie Skłodowska-Curie postdoctoral fellow at ICFO – the institute of photonic sciences, in Spain. His research interest include topological phenomena in electromagnetic waves, photonic metamaterial, and the interaction of free-electron with nanophotonic structures. Previously, he obtained his PhD in applied physics at Stanford University and his dissertation was selected as a finalist for the DLS Carl E. Anderson dissertation award.

ANYONE INTERESTED IS WELCOME TO ATTEND!

Wednesday, November 12, 2025, 3:00pm

Room 522, 5/F, Chong Yuet Ming Physics Building, The University of Hong Kong

Department of Physics, Chong Yuet Ming Physics Building, The University of Hong Kong
Phone: 28592360 Fax: 25599152. Anyone interested is welcome to attend.