Abstract for IAS Focused Program on Mathematical Foundations of Topological Materials (January 6-9, 2026)

Mathematical Analysis of Topological Waves in Super-honeycomb Structured Media

Yi ZHU

Tsinghua University, P. R. China

Email: yizhu@tsinghua.edu.cn

Honeycomb structure is one of the most important structures in topological materials due to its novel symmetries. In this talk, I shall first review recent advances on mathematical aspects on waves in these materials. And then I will focus on our recent works on the topological wave modes in a specific medium with a super-honeycomb structure. More specifically, we prove that the bulk structure admits double Dirac cones in its spectrum, and two branches of topological edge states are bifurcated under perturbations even with a PT symmetry.