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

Scattering Theory for Waveguides in Topological Insulator Models

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An edge transport robust to perturbations is guaranteed along interfaces separating distinct two-dimensional topological insulators and is characterized by a topological invariant computed using bulk information via a bulk-edge correspondence. In the setting of such waveguide problems, we present and justify a scattering theory by means of a limiting absorption principle. This offers a quantitative description of the effects of perturbations in the waveguide model and an alternative means to compute the interface topological invariant.

References:

[1] Binglu Chen and Guillaume Bal. Scattering theory of topologically protected edge transport, Pure and Applied Analysis 7(3):701-731, 2025

[2] Guillaume Bal. Topological invariants for interface modes, Communications in Partial Differential Equations, 47(8):1636-1679, 2022