Chez Pierre

Presents ...

Tuesday, February 3, 2026
10:00 am - 11:00 am
Duboc room – 4-331

Special Chez Pierre Seminar

Ruben Verresen, University of Chicago

"What Holds Topological Quantum Matter Together?"

Topological matter is often associated with gapped Hamiltonians, thought to underpin exotic low-energy features such as edge modes and anyonic excitations. In this talk, we challenge this conventional wisdom. First, we show that topological features can persist in gapless systems, sometimes even leading to experimentally accessible signatures that would be impossible in a gapped phase. Conversely, using tensor-network simulations, we revisit the assumption that an energy gap guarantees stability. Going further, we move beyond the Hamiltonian-based framework itself by showing how non-unitary dynamics can evade no-go constraints on the preparation of topological matter. The latter is illustrated by an experimental realization of an emergent non-Abelian S3 lattice gauge theory, where braiding and fusing anyons is shown to give a universal set of topological operations, further motivating the study of stability in open quantum systems.