

Canadian Association of Physicists

Association canadienne des physiciens et physiciennes

Contribution ID: 2858

Type: Invited Speaker / Conférencier(ère) invité(e)

## Qubits as edge state detectors: illustration using the SSH model

Monday 3 June 2019 11:15 (30 minutes)

As is well-known, qubits are the fundamental building blocks of quantum computers, and more generally, of quantum information. A major challenge in the development of quantum devices arises because the information content in any quantum state is rather fragile, as no system is completely isolated from its environment; generally, such interactions degrade the quantum state, resulting in a loss of information.

Topological states are promising in this regard because they are in ways more robust against noise and decoherence. But creating and detecting edge states can be challenging. We describe a composite system consisting of a two-state system (the qubit) interacting with an SSH chain (a hopping model with alternating hopping parameters). In this model, the dynamics of the qubit changes dramatically depending on whether or not an edge state exists. Thus, the qubit can be used to determine whether or not an edge state exists in this model.

Authors: MACKENZIE, Richard (U. Montréal); ZAIMI, Meri (U. Montréal); BOUDREAULT, Christian (Collège militaire royal de Saint-Jean); ELEUCH, Hichem (Abu Dhabi University); HILKE, Michael (U. McGill)

Presenter: MACKENZIE, Richard (U. Montréal)

Session Classification: M1-4 Mathematical Physics (DTP) | Physique mathématique (DPT)

Track Classification: Theoretical Physics / Physique théorique (DTP-DPT)