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(G*) Quantum dots as probes for topological materials

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Topological insulators are an interesting class of materials which host distinct zero/low-energy states at their boundaries. These symmetry-protected states can, for example, arise as Majorana zero-modes in various superconducting systems and have potential applications in quantum error correction. However, experimental study and verification of such zero-modes remains a challenge. Considering a toy-system based on the Su-Schrieffer-Heeger (SSH) model coupled to one end with a semi-infinite conducting lead, we propose a measurement method for gapped topological states through a study of the decoherence dynamics of a quantum dot or qubit. Decoherence rates along the length of the SSH chain vary proportionally to the edge states and allow for both the identification and spatial characterisation of such states.

Authors: DELNOUR, Nicolas (University of Montreal); MACKENZIE, Richard (Université de Montréal); Prof. HILKE, Michael (McGill); Prof. EL EUCH, Hichem (University of Sharjah)

Presenter: DELNOUR, Nicolas (University of Montreal)

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