

Time-dependent noise spectroscopy of Majorana bound states

Michael Ridley¹

¹Bar-Ilan University, Ramat Gan, Israel

The clock speed of topological quantum computers based on Majorana zero mode (MZM)-supporting nanoscale devices is limited by the time taken for electrons to traverse the device. We employ the time-dependent Landauer-Büttiker transport theory for current cross-lead correlations in a superconducting nanowire junction hosting MZMs. From the time-dependent quantum noise, we are able to extract traversal times for electrons crossing the system. After demonstrating a linear scaling of traversal times with nanowire length, we present a heuristic formula for the traversal times which accurately captures their behavior. We then connect our framework to a proposed experimental verification of this discriminant between spurious and genuine MZMs utilizing time-resolved transport measurements.