Disordered Majorana Wires

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A one dimensional spinless p-wave superconductor may may be in a topological nontrivial state, in which it has a zero energy Majorana bound state at each end. Such a system can be realized in spin-orbit coupled nanowire with proximity-induced pairing from a nearby s-wave superconductor. In this talk, I will discuss how non-idealities, such as potential disorder and deviations from a strict one-dimensional limit, affect the topological phase and its signatures in a current-voltage measurement. In particular, I'll argue that the topological phase can persist at weak disorder and that a multichannel spinless p-wave superconductor goes through an alternation of topologically trivial and nontrivial phases upon increasing the disorder strength, the number of phase transitions being equal to the channel number N.

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