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## Creating and measuring the elusive Majorana fermion

1937, Ettore Majorana predicted the existence of a special class of fermions where the particle and the anti-particle are identical. However, with the possible exception of neutrinos, so far there are no known fundamental particles that belong to this class. Recently, the possible realization of these exotic Majorana fermions as quasiparticle excitations in solids has created much excitement. While most studies have focused on Majorana bound states which can serve as topological qubits, more generally, akin to elementary particles, Majorana fermions can propagate and display linear dispersion. These excitations have not yet been directly observed, and can also be used for quantum information processing. This talk is focused on recent work in realizing Majorana mode in condensed matter systems. I will first describe in detail the conditions under which such states can be realized and what their signatures are. I will then show scanning tunneling microscopy data on 1D domain walls in a superconductor, which might potentially be first realization of dispersing Majorana states in 1D.