Experimental subtleties and applications of Majorana modes to topological quantum computation.[1]

JAY SAU, Condensed Matter Theory Center and Joint Quantum Institute, University of Maryland, College Park, Maryland.

Majorana zero modes together topological superconductivity constitute one of the simplest routes to creating topologically protected degeneracy. What's most exciting is that there is already experimental evidence for such modes. In this talk, I will start by discussing subtleties that one must take into account when analyzing experiments promising for Majorana modes with an emphasis on the most recent experiments using STM, which promise Majorana modes [1,2]. I will then look forward into how one could go beyond the limitations of effectively "non-interacting" Majorana modes to create an Ising topological phase that can be used for topological quantum information processing [3]. [1] Dumitrescu et al. Phys. Rev. B 91, 094505 (2015) [2] Sau, Brydon, Phys. Rev. Lett. 115, 127003 (2015) [3] Barkeshli, Sau, arXiv:1509.07135 (2015).