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Characterization of Intrinsically Fermionic Topological Phases in Majorana-Dimer models[1] BRAYDEN WARE, Univ of California - Santa Barbara , JUN HO SON, Stanford University, MENG CHENG, Yale University, RYAN MISHMASH, JASON ALICEA, California Institute of Technology, BELA BAUER, Microsoft Station Q — In this talk, we explore an exactly solvable model of resonating dimers decorated with Majorana modes. The model realizes an intriguing Ising-like topological order yet possesses a fully gapped edge–a possibility that is unique to fermions and has no analogue in bosonic systems. Based on an analysis of fermion-parity defects and fermion-parity twisted boundary conditions, we argue that this phase can be described as the product of a chiral Ising theory and a topological $p_x - ip_y$ superconductor. We also discuss an eight-fold hierarchy of such phases and show how to unambiguously determine the topological order in numerical calculations using modular transformations of minimally entangled ground states on the torus.

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