

Abstract Submitted
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Spinon Majorana fermion RUI WANG, HONG-YAN LU, Texas Center for Superconductivity and Department of Physics, University of Houston, Houston, Texas 77204, USA, BAIGENG WANG, National Laboratory of Solid State Microstructures and Department of Physics, Nanjing University, Nanjing 210093, China, CHIN-SEN TING, Texas Center for Superconductivity and Department of Physics, University of Houston, Houston, Texas 77204, USA — A new realization of Majorana fermions is proposed in the frustrated magnets via the topological proximity effect. Specifically, we consider the interface between a topological insulator and a frustrated magnetic material. Using the renormalization group-based mean-field theory, and calculating the self-energy correction due to the topological insulator, we find that the spin texture and the spin-momentum locking of the Dirac cone will be inherited by the spinons in the nearby frustrated magnets. This leads to a particular topological state of matter that supports the Majorana excitation. Unlike the conventional ones, these Majorana fermions are the composite states of spinons and anti-spinons, rather than electrons and holes. They can also participate in the transport of spinons, resulting in nontrivial spin current, while the charge current is completely frozen.

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