

Abstract Submitted
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**A coupled wire model of topological Weyl and Dirac fermion
II: three-dimensional geometric topological phase** ALEXANDER SIROTA,
SYED RAZA, JEFFERY TEO, University of Virginia — We mimic Weyl and Dirac
semimetals in three dimensions by a coupled Dirac wire model, and introduce many-
body gapping interactions that preserve symmetries. The construction relies on ad-
ditional layers of gapped symmetric interacting surfaces of topological insulators,
each carrying fractional charge excitations and containing Ising-like surface topo-
logical order. The three dimensional stack supports mutually non-local fractional
point charges and flux tubes. Moreover the flux tubes, when directed in an ap-
propriate direction, can carry Majorana zero modes and give rise to non-Abelian
"3-loop braiding". Due to the highly anisotropic nature of the coupled wire model,
the topological phase also exhibits geometric properties beyond a topological field
theory description.

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