

Abstract Submitted
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A coupled wire model of topological Weyl and Dirac semimetal I: topological insulating texture and gapping interaction SYED RAZA, ALEXANDER SIROTA, JEFFREY TEO, University of Virginia — Weyl and Dirac semimetals in three dimensions have semi-robust massless electronic structures. We mimic these gapless systems using an array of coupled Dirac wires, and analytically study the gapping effect of many-body interactions. The Dirac wires are arranged in a way so that the charge conserving model exhibits an antiferromagnetic time reversal symmetry as well as a p2mg wallpaper group symmetry, which contains twofold rotations, reflections and glide planes. The gapless electrons can acquire a mass upon symmetry breaking dimerizations, or more interestingly, symmetry preserving many-body interactions. This involves the introduction of a topological insulating texture in the bulk supported by layers of gapped symmetric interacting surfaces of topological insulators. The resulting massive system is a three dimensional *geometric topological state*.

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