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3D Weyl Semimetal in a Honeycomb Array of Topological Nano-wires MOHAMMAD VAZIFEH, MARCEL FRANZ, Department of Physics and Astronomy, University of British Columbia — The Weyl semimetal phase has been recently introduced and suggested to exist in strongly correlated pyrochlore iridates as well as in the non-interacting layered Normal/Topological band insulator systems. This unusual phase has a number of interesting properties in the bulk and at the surface arising from the appearance of isolated point-like hedgehog topological defects (known as Weyl-Dirac points) in the Bloch-state manifold. Here we discuss the possible emergence of this phase in a honeycomb arrangement of the parallel topological insulator nano-rods each exposed to a half-integer multiple of magnetic flux quantum. We consider direct hopping between rods as well as the electron-electron interaction between them. We discuss how the initially degenerate Weyl points can be separated in the Brillouin zone by various perturbations breaking either inversion or time-reversal symmetry.

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