Abstract Submitted
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Decorated defect condensate, a window to topological phase of matter YIZHI YOU, University of Illinois Urbana-Champaign — We investigate the unconventional quantum phases in 3d Weyl metals. The emergent boson fields, coupling with the Weyl fermion bilinears, contain a Wess-Zumino-Witten term or topological Θ term inherited from the momentum space monopoles carried by Weyl points. Three types of unconventional quantum critical points will be studied in order: (1) The transition between two distinct symmetry breaking phases whose criticality is beyond Landau's paradigm. (2) The transition between a symmetry breaking state to a topological ordered state. (3) The transition between $3d$ topological order phase to trivial disordered phase whose criticality could be traced back to a Z_2 symmetry breaking transition on the surface of $4d$. The essence of these unconventional critical points lies in the fact that the topological defect of an order parameter carries either a nontrivial quantum number or a topological term so the condensation of the defects would either break some symmetry or give rise to a topological order phase with nontrivial braiding statistics.

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