

Abstract Submitted
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Quantum critical point preempted by nematicity SHI-XIN ZHANG, SHAO-KAI JIAN, HONG YAO, Institute for Advanced Study, Tsinghua University — We explore the nature of the topological phase transitions from double-Weyl semimetals to trivial insulators or 3D Chern insulators, describing the annihilation of two double-Weyl nodes with opposite chiralities. With only short-range interactions, the transition can be a continuous one of Lifshitz type, as expected. However, from renormalization group analysis, we find that this quantum critical point is unstable against (even infinitesimal) long-range Coulomb interactions by emerging intermediate phases with nematic ordering. In other words, with finite (even infinitesimal) long-range Coulomb interactions, the topological quantum critical points are preempted by nematic phases.

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