

Abstract Submitted
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Dilute magnetic topological semiconductors KYOUNG-MIN KIM, YONG-SOO JHO, KI-SEOK KIM, POSTECH — Replacing semiconductors with topological insulators, we propose the problem of dilute magnetic topological semiconductors. Performing the renormalization group analysis for an effective field theory, where doped magnetic impurities give rise to a spatially modulated random axion term, we find a novel insulator-metal transition from either a topological or band insulating phase to an inhomogeneously distributed Weyl metallic state with such insulating islands, where extremely broad distributions of ferromagnetic clusters combined with strong spin-orbit interactions are responsible for the emergence of randomly distributed Weyl metallic islands. Since electromagnetic properties in a Weyl metal are described by axion electrodynamics, the role of random axion electrodynamics in transport phenomena casts an interesting problem beyond the physics of percolation in conventional disorder-driven metal-insulator transitions.

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