

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Spin-Orbit Nodal Semimetals in the Layer Groups** BENJAMIN WIEDER, Department of Physics and Astronomy, University of Pennsylvania, YOUNGKUK KIM, The Makineni Theoretical Laboratories, Department of Chemistry, University of Pennsylvania, CHARLES KANE, Department of Physics and Astronomy, University of Pennsylvania — Recent interest in point and line node semimetals has led to the proposal and discovery of these phenomena in numerous systems. Frequently, though, these nodal systems are described in terms of individual properties reliant on specific space group intricacies or band-tuning conditions. Restricting ourselves to cases with strong spin-orbit interaction, we develop a more general framework which captures existing systems and predicts new examples of nodal materials. In many previously proposed systems, the three-dimensional nature of the space group has obscured key generalities. Therefore, we show how within our framework one can predict and characterize a diverse set of nodal phenomena even in two-dimensional systems constructed of three-dimensional sites, known as the “Layer Groups”. Introducing a set of simple models, we characterize the allowed semimetallic structures in the layer groups and draw connections to analogous three-dimensional systems.

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Date submitted: 05 Nov 2015

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