

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Weyl metamaterials relativistic fermions in designer curved space ALEX WESTSTRÖM, TEEMU OJANEN, Aalto Univ — In Weyl semimetals, the conduction and valence bands touch in momentum space at an even number of points, around which the bands locally form cones. The position of the nodes, and the tilts and the opening angles of the cones depend on the (inversion or time reversal) symmetry-breaking fields present in the system. We show that for symmetry-breaking fields smoothly varying in space, an effective curved spacetime emerges. We derive expressions for the frame fields describing this spacetime as well as an effective curved-space Weyl equation. We further show that in the semiclassical limit, these equations describe particles moving along geodesics of the metric corresponding to the effective frame fields.

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Date submitted: 07 Nov 2016

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