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Theory of Inversion Symmetric Topological Insulators TAYLOR HUGHES, University of Illinois at Urbana-Champaign, EMIL PRODAN, Yeshiva University, B. ANDREI BERNEVIG, Princeton University — We analyze translationally-invariant insulators with inversion symmetry that fall outside the current established classification of topological insulators. These insulators exhibit no edge or surface modes in the energy spectrum and hence they are not edge metals when the Fermi level is in the bulk gap. However, they do exhibit protected modes in the entanglement spectrum localized on the cut between two entangled regions. There is a direct connection between the inversion eigenvalues of the Hamiltonian band structure and the mid-gap states in the entanglement spectrum. We also analyze the linear response of these insulators and provide examples of when the inversion eigenvalues determine a non-trivial charge polarization, a quantum Hall effect, an anisotropic 3D quantum Hall effect, or a magneto-electric polarization.

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