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Gravitational responses and entanglement for 2-dimensional chiral topological states ROGER MONG, California Institute of Technology, MICHAEL ZALETEL, University of California, Berkeley, XIAO-LIANG QI, Stanford University — Chiral topological phases in 2+1D, which have a gapped bulk and gapless chiral edges, can be characterized by their response to deformations of spacetime. The leading order 'gravitational response' is encoded in the gravitational and torsional Chern-Simons terms, which result in a chiral central charge and Hall viscosity respectively; however, it is not clear which aspects of these responses remain universal for a model without microscopic Lorentz invariance. We demonstrate how the chiral central charge and Hall viscosity may be extracted via an entanglement measure in the bulk, giving evidence for the correctness of a subset of the predicted responses. We also discuss some physical interpretations of the thermal responses. As a concrete example, we explicitly calculate the relevant bulk thermal responses and entanglement properties of a p+ip superconductor.

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