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Holographic entanglement renormalization of topological insulators XUEDA WEN, Department of Physics, University of Illinois at Urbana-Champaign, 1110 West Green St, Urbana IL 61801, USA, YINGFEI GU, Department of Physics, Stanford University, Stanford, California 94305, USA, PEDRO LOPES, Instituto de Fisica Gleb Wataghin, Universidade Estadual de Campinas, Campinas, SP 13083-970, Brazil, GIL YOUNG CHO, Department of Physics, University of Illinois at Urbana-Champaign, 1110 West Green St, Urbana IL 61801, USA, XIAO-LIANG QI, Department of Physics, Stanford University, Stanford, California 94305, USA, SHINSEI RYU, Department of Physics, University of Illinois at Urbana-Champaign, 1110 West Green St, Urbana IL 61801, USA — In this work we study the real-space entanglement renormalization group (RG) flows and associated emergent holographic geometry of topological band insulators in (2+1) dimensions with continuum multi-scale entanglement renormalization ansatz (cMERA). Given a ground state of a topological insulator at the UV layer, we study how the Berry curvature as well as the quantum metric evolve in the bulk of cMERA. Besides the nontrivial topological properties in the bulk of cMERA, it is found that the UV state flows to a nontrivial IR state which carries a nonzero Berry flux. Our result is in parallel with the picture in lattice MERA that a nontrivial UV state corresponds to a nontrivial IR state. On the other hand, if we try to construct the UV state with a trivial IR state, we find there is a "phase transition" feature in the bulk of cMERA.

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