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Chiral Luttinger liquids and a generalized Luttinger's theorem in fractional quantum Hall edges via finite-entanglement scaling DANIEL VARJAS, MICHAEL ZALETEL, University of California, Berkeley, JOEL MOORE, University of California, Berkeley, Lawrence Berkeley National Laboratory — We use bosonic field theories and the infinite system density matrix renormalization group (iDMRG) method to study infinite strips of fractional quantum Hall (FQH) states starting from microscopic Hamiltonians. Finite-entanglement scaling allows us to accurately measure chiral central charge, edge mode exponents and momenta without finite-size errors. We analyze states in the first and second level of the standard hierarchy and compare our results to predictions of the chiral Luttinger liquid (χLL) theory. The results confirm the universality of scaling exponents in chiral edges and demonstrate that renormalization is subject to universal relations in the non-chiral case. We prove a generalized Luttinger's theorem involving all singularities in the momentum-resolved density, which naturally arises when mapping Landau levels on a cylinder to a fermion chain and deepens our understanding of non-Fermi liquids in 1D.

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