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Entanglement under the renormalization-group transformations on quantum states and in quantum phase transitions TZU-CHIEH WEI, Institute for Quantum Computing and Department of Physics and Astronomy, University of Waterloo — We consider the entanglement of states under the renormalization-group (RG) transformations and apply it to the ground states of Hamiltonians that possess quantum phase transitions. We find that near critical points, the ground-state entanglement under RG transformation exhibits singular behavior. The singular behavior under finite steps of RG reveals the correlation length exponent. However, under the infinite steps of RG transformation, the singular behavior is rendered different, and it is not universal unless the critical point can be described by a conformal field theory.

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