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**Entanglement distance between quantum states and its implications for density-matrix-renormalization-group study of degenerate ground-states** SEYYED MOHAMMAD SADEGH VAEZI, Washington University in St.Louis, ABOLHASSAN VAEZI, Stanford University — We study the concept of entanglement distance between two quantum states, which quantifies the amount of information shared between their reduced density matrices. We will show that for gapless systems the entanglement distance exhibits power law dependence on the energy separation and subsystem size and find the corresponding exponents. We also demonstrate that the entanglement distance reaches its maximum for degenerate ground states of two-dimensional topological phases. Various implications of entanglement distance for quantum simulations will be discussed. In particular, we will introduce two modified density-matrix-renormalization-group algorithms that are capable of finding all degenerate ground-states.

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