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Constraints and Bulk Physics in the AdS/MERA Correspondence

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It has been proposed that the Multi-scale Entanglement Renormalization Ansatz (MERA), which is efficient at reproducing CFT ground states, also captures certain aspects of the AdS/CFT correspondence. In particular, MERA reproduces the Ryu-Takayanagi-type formula and the network structure is similar to a discretized AdS space where the renormalization direction gives rise to the additional bulk dimension. Such discovery may enable us to study the important features of gravity/gauge duality in a more controlled setting. We will show that in order for MERA to recover bulk physics consistent with our current knowledge of holography, it has to satisfy certain consistency relations and that it can only capture bulk physics much larger than the AdS radius. A more specific framework to construct bulk-boundary dictionary, bulk states and Hilbert space from a boundary theory using MERA will also be discussed.

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