Abstract Submitted
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Constructing holographic spacetimes using entanglement renormalization[1] BRIAN SWINGLE, Harvard — We elaborate on our earlier proposal connecting entanglement renormalization and holographic duality in which we argued that a tensor network can be reinterpreted as a kind of skeleton for an emergent holographic space. Here we address the question of the large N limit where on the holographic side the gravity theory becomes classical and a non-fluctuating smooth spacetime description emerges. We show how a number of features of holographic duality in the large N limit emerge naturally from entanglement renormalization, including a classical spacetime generated by entanglement, a sparse spectrum of operator dimensions, and phase transitions in mutual information. We also address questions related to bulk locality below the AdS radius, holographic duals of weakly coupled large N theories, Fermi surfaces in holography, and the holographic interpretation of branching MERA. Some of our considerations are inspired by the idea of quantum expanders which are generalized quantum transformations that add a definite amount of entropy to most states. Since we identify entanglement with geometry, we thus argue that classical spacetime may be built from quantum expanders (or something like them).

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