

# From renormalization group to emergent gravity : holographic description of quantum many-body systems

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## **Abstract**

Under certain conditions, strongly interacting quantum many-body systems in a  $D$  dimensional spacetime are described by weakly interacting holographic theories defined in a  $(D+1)$ -dimensional spacetime. In this talk, I will discuss about a way to construct holographic duals for general quantum many-body systems based on the ‘quantum renormalization group’ approach. In this approach, the coupling ‘constants’ of a theory become dynamical variables whose dynamics is governed by a quantum Hamiltonian that generates the scale transformation. The gauge freedom to choose different renormalization group schemes leads to the diffeomorphism invariance in the holographic description.