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Holographic entanglement entropy for generic quantum many-body systems STEFAN KEHREIN, University Goettingen — The Ryu-Takayanagi conjecture [1] about the holographic derivation of the entanglement entropy provides a remarkable geometric picture by relating minimal surfaces to the entanglement entropy. Underlying this conjecture is the AdS/CFT correspondence, which limits the applicability of this geometric picture in its original formulation to a very specific set of theories. In this talk I will show how the flow equation method [2,3] can be used to construct an emergent geometric picture for eigenstates of generic quantum many-body systems in a weak link limit. Explicit results for the entanglement entropy of fermionic systems in d=1,2,3 dimensions are calculated and compared with known results. The method yields the correct area law with/without logarithmic corrections for ground states of critical/gapped systems. I also discuss the crossover to a volume law for excited states, which comes about very naturally in the flow equation framework.
[1] S. Ryu and T. Takayanagi, Phys. Rev. Lett. 96, 181602 (2006)
[2] F. Wegner, Ann. Phys. (Leipzig) 3, 77 (1994)
[3] S. Kehrein, The Flow Equation Approach to Many-Particle Systems (Springer, 2006)

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