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Holographic renormalization group à la Wilson

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From the Wilsonian point of view, renormalisable theories are understood as submanifolds in theory space emanating from a particular fixed point under renormalisation group evolution. We show how this picture precisely applies to their gravity duals. We investigate the Hamilton-Jacobi equation satisfied by the Wilson action and find the corresponding fixed points and their eigendeformations, which have a diagonal evolution close to the fixed points. The relevant eigendeformations are used to construct renormalised theories. We explore the relation of this formalism with holographic renormalisation. We also discuss different renormalisation schemes and show that the solutions to the gravity equations of motion can be used as renormalised couplings that parametrise the renormalised theories. This provides a transparent connection between holographic renormalisation group flows in the Wilsonian and non-Wilsonian approaches. The general results are illustrated by explicit calculations in an interacting scalar theory in AdS space.

Primary author(s) : PEREZ-VICTORIA, Manuel (U. Granada)

Presenter(s) : PEREZ-VICTORIA, Manuel (U. Granada)

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