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## Information-theoretical aspects of renormalization group

*Tuesday 24 September 2024 14:30 (1h 40m)*

We demonstrate that quantum error correction is realized by the renormalization group in scalar field theories. We construct  $q$ -level states by using coherent states in the IR region. By acting on them the inverse of the unitary operator  $U$  that describes the renormalization group flow of the ground state, we encode them into states in the UV region. We find that the Knill-Laflamme condition is satisfied for operators that create coherent states. We verify this to the first order in the perturbation theory. This result suggests a general relationship between the renormalization group and quantum error correction and should give insights into understanding a role played by them in the gauge/gravity correspondence. Based on the result, we discuss some prospects for the renormalization group and its information theoretical aspects.

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