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Examples and counterexamples of renormalizability of an EFT in the nonperturbative regime

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An important feature of an effective field theory is its renormalizability, which implies that one can apply a certain power counting to renormalized quantities and perform a systematic expansion of the calculated observables in terms of some small parameter.

When nonperturbative effects become relevant, the requirement of the renormalizability imposes nontrivial constraints on a choice of the effective interaction and the renormalization scheme. We discuss several instructive examples and counterexamples

of renormalizability to illustrate potential issues one has to deal with in the realistic calculations such as nuclear chiral EFT.

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