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Functional Matching at Two-Loop order

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Effective field theories have been gathering increasing attention in recent years. Within this field, the matching process is a key question for connecting this formalism with precise UV theories beyond the Standard Model. It is precisely here where functional methods have emerged as very efficient tools, especially for automating computations.

So far, this method has been applied up to one loop. I present a systematic procedure for going beyond, considering both fermionic and bosonic degrees of freedom. I will demonstrate how the inclusion of gauge bosons requires a new approach to the problem that was not necessary in the one-loop case. It will rely on the introduction of the Wilson line to obtain a covariant expansion.

Additionally, this method will be exemplifyed with the matching of QED to the Euler-Heisenberg Lagrangian

Abstract

In this talk I will introduce recent functional techniques for the process of renormalization and matching in EFT's. Particularly we will go beyond the one-loop level.

This ideas will require a new approach to the problem by the introduction of the Wilson line in order to obtain explicit gauge covariant expressions.

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