



ID de la contribución : 928

Tipo : no especificado

## Efficient on-shell matching

*miércoles, 20 de noviembre de 2024 10:45 (15)*

We propose an efficient method to perform on-shell matching calculations in effective field theories. The standard off-shell approach to matching requires the use of a Green's basis that includes redundant and evanescent operators. The reduction of such a basis to a physical one is often highly non-trivial, difficult to automate and error prone. However, on-shell matching allows to perform the matching directly to the physical basis, thus overcoming the necessity to deal with redundancies and evanescent operators.

Our proposal is based on a numerical solution of the corresponding on-shell matching equations, which automatically implements in a trivial way the delicate cancellation of non-local terms between the full theory and the effective one. The use of rational on-shell kinematics ensures an exact analytic solution despite the numerical procedure. In contrast to the traditional off-shell matching, where one has to match only one-light-particle irreducible Green functions, with this approach the full amplitude is needed. In this way we only need a physical basis to perform the matching. We present the algorithm and some further applications in which the on-shell matching approach can be very useful, such as the automation of the Green's basis reduction to a physical one, the obtaining of evanescent contributions or the computation of renormalization group equations.

### Abstract

We propose an efficient method to perform on-shell matching calculations in effective field theories. The standard off-shell approach to matching requires the use of a Green's basis that includes redundant and evanescent operators. The reduction of such a basis to a physical one is often highly non-trivial, difficult to automate and error prone. However, on-shell matching allows to perform the matching directly to the physical basis, thus overcoming the necessity to deal with redundancies and evanescent operators.

Our proposal is based on a numerical solution of the corresponding on-shell matching equations, which automatically implements in a trivial way the delicate cancellation of non-local terms between the full theory and the effective one. The use of rational on-shell kinematics ensures an exact analytic solution despite the numerical procedure. In contrast to the traditional off-shell matching, where one has to match only one-light-particle irreducible Green functions, with this approach the full amplitude is needed. In this way we only need a physical basis to perform the matching. We present the algorithm and some further applications in which the on-shell matching approach can be very useful, such as the automation of the Green's basis reduction to a physical one, the obtaining of evanescent contributions or the computation of renormalization group equations.

**Primary author(s) :** LÓPEZ MIRAS, Javier (Universidad de Granada); Dr. CHALA, Mikael (Universidad de Granada); SANTIAGO, Jose (Universidad de Granada); Srta. VILCHES BRAVO, Fuensanta (Departamento de Física Teórica y del Cosmos, Universidad de Granada)

**Presenter(s) :** LÓPEZ MIRAS, Javier (Universidad de Granada)

**Clasificación de la sesión :** Física Teórica

**Clasificación de temáticas :** Física Teórica