

Stefan Kallweit – HEP Seminar – October 5, 2021  
Milano

Title: Recent developments within the MATRIX framework

Abstract: The MATRIX framework was originally developed to compute diboson production at next-to-next-to-leading order (NNLO) accuracy in QCD perturbation theory by means of the qT-subtraction method, building upon the MUNICH integrator and the required scattering amplitudes as the only external ingredients.

In its second official release of this summer, this framework was extended in several directions, in particular by including NLO EW corrections and leading N<sup>3</sup>LO effects from NLO QCD corrections to the loop-induced gluon fusion channels.

In this talk I will present the MATRIX framework with a focus on the new features added in this latest public version.

Moreover, I will discuss further recent developments built upon the MATRIX machinery: the application to triphoton production, the first 2->3 scattering process of the class of triboson processes whose 2-loop amplitudes are known; the extension of the qT-subtraction method towards massive coloured final states and its application on heavy-quark pair production; finally, the first complete calculation of mixed NNLO QCD-EW corrections to charged- and neutral-current Drell-Yan processes, using an abelianized version of this heavy-quark extension of the qT-subtraction method.