

MARTY: A C++ framework to automate theoretical calculations for BSM phenomenology

Wednesday 17 February 2021 11:00 (1 hour)

MARTY is a C++ computer algebra system specialized for High Energy Physics that can calculate amplitudes, squared amplitudes and Wilson coefficients in a large variety of Beyond the Standard Model (BSM) scenarios up to the one-loop order. It is fully independent of any other framework and its main development guideline is generality, in order to be adapted easily to any type of model. The calculations are fully automated from the Lagrangian up to the generation of the C++ code evaluating the theoretical results (numerically, depending on the model parameters). Once a phenomenological tool chain has been set up - from a Lagrangian to observable analysis - it can be used in a model independent way leaving only model building, with MARTY, as the task to be performed by physicists. In this tutorial we will demonstrate how to get from a BSM Lagrangian up to the automated generation of a C++ library evaluating squared amplitudes, depending on BSM parameters, with MARTY.

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Session Classification: Tutorials and hands-ons