Contribution ID: **4** Type: **Short talk**

Learning New Physics aware of systematic uncertainties

Wednesday, 11 May 2022 09:30 (15 minutes)

New Physics Learning Machine (NPLM) is a novel machine-learning based strategy to detect multivariate data departures from the Standard Model predictions, with no prior bias on the nature of the new physics responsible for the discrepancy [1, 2]. The main idea behind the method is to build the log-likelihood-ratio hypothesis test by translating the problem of maximizing the log-likelihood-ratio into the minimization of a loss function. NPLM has been recently extended in order to deal with the uncertainties of the Standard Model predictions [3]. The new formulation directly builds on the specific maximum-likelihood-ratio treatment of uncertainties as nuisance parameters, that is routinely employed in high-energy physics for hypothesis testing. In this talk, after outlining the conceptual foundations of the algorithm, we describe the procedure to account for systematic uncertainties and we show how to implement it in a multivariate setup by studying the impact of two typical sources of experimental uncertainties in two-body final states at the LHC.

Primary authors: WULZER, Andrea (CERN and EPFL); GROSSO, Gaia (Universita e INFN, Padova (IT)); ZANETTI, Marco (Universita e INFN, Padova (IT)); PIERINI, Maurizio (CERN); D'AGNOLO, Raffaele

Presenter: GROSSO, Gaia (Universita e INFN, Padova (IT))

Session Classification: Workshop