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Model-independent search for New Physics at the LHC

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Experimental observations and convincing conceptual arguments indicate that the present understanding of fundamental physics is not complete, motivating the search for physics beyond the Standard Model at collider experiments. The most common searching strategy is to test the data for the presence of one candidate new theory at a time and therefore optimise the data analysis to be sensitive to the specific features predicted by that theory. This model-dependent approach is in general insensitive to sources of discrepancy that differ from those considered. There is therefore a strong effort in developing analysis strategies that are instead agnostic about the nature of potential new physics and thus complementary to the former ones. Signal-model-independent analysis aim at detecting any departures from a given reference hypothesis, like the Standard Model. In practice, this is a challenge given the complexity of the experimental data in modern experiments and the fact that the new physics is expected to be "small"and/or located in a region of the input features which is already populated by standard events. Recently, there has been a strong push towards developing solutions based on machine learning for (partial or full) model-independent searches in high energy physics. In this talk I am going to review some of the newest machine-learning- based techniques pushing the frontiers of model independent searches at collider experiments.

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