(Re)interpreting the results of new physics searches at the LHC

Contribution ID: 5

A shortcut to new physics: using the archive of LHC measurements to constrain BSM models

Monday 15 February 2021 14:35 (20 minutes)

A huge amount of effort and person-power goes into searching for evidence of beyond-the-SM (BSM) theories at the LHC. A search may take a large team over a year to produce, and even then may only focus on the model' s most spectacular signature. But many BSM theories could probably already be ruled out because they would have caused measurable distortions to well-understood spectra of "standard" processes. If one could quickly check how a signal would have manifested itself in the myriad of LHC measurements to date, a huge amount of person-power could be liberated to focus instead on the remaining models which are not already ruled out. CONTUR is a tool which compares inclusive-process event generation from MC BSM models to a bank of >150 LHC measurements preserved in Rivet+HEPdata, giving a rapid prior indication of which parts of a model's parameter space are already ruled out, and providing a powerful complement to direct-search results in post-hoc BSM reinterpretations.

In this talk, I will give an overview of this powerful new approach. I will then highlight the results from our most recent papers (https://arxiv.org/abs/2006.07172 and https://arxiv.org/abs/2009.02220), where we use this method to tackle a whole class of "Vector-like Quark" models and the 2HDM+a, and show complementary results to the direct search program.

Author: HABEDANK, Martin (Humboldt University of Berlin (DE))

Co-authors: BUCKLEY, Andy (University of Glasgow (GB)); BUTTERWORTH, Jonathan (UCL); Dr CORPE, Louie Dartmoor (UCL (GB)); HUANG, Danping (University of London (GB)); YALLUP, David (University College London)

Presenter: HABEDANK, Martin (Humboldt University of Berlin (DE))

Session Classification: Workshop talks