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SModelS: A tool for interpreting simplified-model results from the LHC

A software toolkit “SModelS” is presented that systematically confronts theories Beyond the Standard Model (BSM) against experimental LHC data. The toolkit consists of a procedure to decompose a given full BSM model in terms of a Simplified Model Spectrum (SMS). In addition, SModelS ships with a database of SMS results produced by the CMS and ATLAS collaborations. The results are given for specific topologies either as upper limits on production cross sections or as signal efficiency maps. While the current SModelS version 1.0 can only handle the former, SModelS 1.1 will also be able to cope with the latter. Using recasting tools such as MadAnalysis5 or CheckMATE, it is possible to enrich the database with efficiency maps created by groups outside the experimental collaborations, including ourselves. The database together with the decomposition code allow us to quickly confront an arbitrary BSM theory with the SMS results.

We discuss the application of the framework to two different supersymmetric scenarios, and demonstrate how feedback to the experimental communities
about missed SMS topologies can be given.

While SModelS currently requires the probed model to respect a discrete Z₂ symmetry, it is our aim to also extend the framework to non-MET signatures, including signatures with heavy stable charged particles.

It is our long term vision to build up a Next Standard Model from experimental SMS null and positive results in a bottom-up fashion.

The toolkit is open source, written in python, and available under http://smodels.hephy.at.

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