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SModelS: A Tool for Making Systematic Use of Simplified Models

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We present an automated software tool "SModelS" to systematically confront theories Beyond the Standard Model (BSM) with experimental data. The tool consists of a general procedure to decompose such BSM theories into their Simplified Model Spectra (SMS). In addition, SModelS features a database containing the majority of the published SMS results of CMS and ATLAS. These SMS results contain the 95% confidence level upper limits on signal production cross sections. These two components together allow us to quickly confront any BSM model with LHC results.

Recently, support for signal efficiency maps has been added to our software framework, hence also efficiency maps published by the experimental collaborations can be used. Using recasting tools like MadAnalysis5 or CheckMATE, such efficiency maps can also be created outside the experimental collaborations, allowing us to further enrich our database and improve the constraining power of our approach. It is our aim to extend our effort beyond collider searches for new physics, exploiting also information about BSM physics contained in precision measurements, or dark matter searches.

As show-case examples we will discuss an application of our procedure to specific supersymmetric models, show how the limits constrain these models, and point out regions in parameter space still unchallenged by the current SMS results. While the current implementation can handle null results only, it is our ultimate goal to build the next standard model in a bottom-up fashion from both negative and positive results of several experiments. The implementation is open source, written in python, and available from http://smodels.hephy.at.

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