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Machine learning the likelihoods

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Searches for BSM Physics have produced many theoretical ideas, but only a few can be directly tested at the LHC. Reinterpreting existing results is therefore essential for constraining a wider range of models. Independent of the specific reinterpretation method, the final step always involves statistical analysis and hypothesis testing. Accurate tests require detailed information on correlations between signal regions and detector-related nuisance parameters. Although ATLAS provides this information, using the full statistical model is computationally expensive. In this talk, I will present a project that builds NN-based surrogates of ATLAS statistical models. These surrogates reproduce log-likelihoods with high accuracy while reducing computation time by several orders of magnitude, making large parameter scans much more feasible.

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