

Machine learning the likelihoods

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Searches for physics beyond the Standard Model are challenged by the large number of viable theoretical scenarios, many of which cannot be directly probed at the Large Hadron Collider. Reinterpretation studies address this limitation by reusing published experimental constraints to test new models. The statistical analysis and limit setting are most accurately performed using the full statistical models released by the experimental collaborations, such as ATLAS HistFactory models. However, their computational cost makes large parameter scans impractical. In this talk, I will present a new project that uses machine learning to construct surrogate models of ATLAS likelihoods. These surrogate networks retain high accuracy while accelerating limit setting by several orders of magnitude, enabling efficient and scalable reinterpretation studies and facilitating systematic phenomenological explorations of new physics scenarios beyond the Standard Model.

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