Probing Higgs properties with high-dimensional fits using Neural Simulation-Based Inference

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Statistical inference is a crucial step in gleaning insights from experimental data to build better physics models of our universe. Measurement of Higgs properties such as its width and self-coupling are some of the most promising paths towards uncovering hints for new physics. Such measurements are complicated by non-linear effects from quantum interference, for which our current statistical inference methodology is suboptimal. However, precise inference demands a careful consideration of all sources of systemic uncertainties for any novel statistical inference method.

This talk covers the motivation and path towards high-dimensional statistical inference of these Higgs properties which provide sensitivity that would have required several years of additional data taking with traditional statistical methods, as well as interpretability tools to ensure that physicists continue to fully understand the reasons certain hypotheses are preferred by the data compared to others.