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Invertible Networks for the Matrix Element Method

Monday 24 October 2022 17:00 (20 minutes)

For many years, the matrix element method has been considered the perfect approach to LHC inference. We show how conditional invertible neural networks can be used to unfold detector effects and initial-state QCD radiation, to provide the hard-scattering information for this method. We illustrate our approach for the CP-violating phase of the top Yukawa coupling in associated Higgs and single-top production.

Significance

Our work describes a novel analysis method that combines our precise theory predictions of scattering cross sections at colliders with a machine-learning based method to understand parton shower and detector effects that would be otherwise analytically intractable. In contrast to many conventional analysis methods, this allows us to work with high-dimensional data and to extract as much information as possible from it.

References

Experiment context, if any

Primary authors: BUTTER, Anja; PEITZSCH, Sascha (Humboldt-Universität zu Berlin); HEIMEL, Theo (Heidelberg University); MARTINI, Till (HU Berlin); PLEHN, Tilman

Presenter: HEIMEL, Theo (Heidelberg University)

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