



Contribution ID: 158

Type: **Oral**

Loop Amplitudes from Precision Networks

Tuesday, 25 October 2022 14:50 (20 minutes)

Evaluating loop amplitudes is a time-consuming part of LHC event generation. For di-photon production with jets we show that simple, Bayesian networks can learn such amplitudes and model their uncertainties reliably. A boosted training of the Bayesian network further improves the uncertainty estimate and the network precision in critical phase space regions. In general, boosted network training of Bayesian networks allows us to move between fit-like and interpolation-like regimes of network training.

Significance

For the first time we integrate uncertainties in the training process of Bayesian neural networks for the prediction of amplitudes. This allows a boosting for performance and reliability of the predicted amplitudes.

References

<https://arxiv.org/abs/2206.14831>

Previous publications:

<https://arxiv.org/abs/2110.13632>

<https://arxiv.org/abs/2106.09474>

Experiment context, if any

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Session Classification: Track 3: Computations in Theoretical Physics: Techniques and Methods

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