

Contribution ID: 567 Contribution code: **contribution ID 567**Type: **Oral**

Optimising simulations for diphoton production at hadron colliders using amplitude neural networks

Wednesday 1 December 2021 17:00 (20 minutes)

Phenomenological studies of high-multiplicity scattering processes at collider experiments present a substantial theoretical challenge and are increasingly important ingredients in experimental measurements. We investigate the use of neural networks to approximate matrix elements for these processes, studying the case of loop-induced diphoton production through gluon fusion. We train neural network models on one-loop amplitudes from the NJet library and interface them with the Sherpa Monte Carlo event generator to provide the matrix element within a realistic hadronic collider simulation. Computing some standard observables with the models and comparing to conventional techniques, we find excellent agreement in the distributions and a reduced simulation time by a factor of 30.

Significance

We extend previous work which pioneered the emulation of scattering amplitudes with neural networks, studying these techniques for the first time within a full hadronic collider simulation.

References

<https://arxiv.org/abs/2106.09474>
[https://doi.org/10.1007/JHEP06\(2020\)114](https://doi.org/10.1007/JHEP06(2020)114)

Speaker time zone

Compatible with Europe

Authors: BULLOCK, Joseph (IPPP, Durham University); MOODIE, Ryan (IPPP, Durham University); BADGER, Simon (Università degli Studi di Torino)

Presenter: MOODIE, Ryan (IPPP, Durham University)

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

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