

Unweighted event generation with matrix element surrogates

Friday 2 February 2024 10:00 (20 minutes)

We show that employing a sophisticated neural network emulation of QCD multijet matrix elements based on dipole factorisation can lead to a drastic acceleration of unweighted event generation in high-multiplicity LHC production processes. We incorporate these emulations as fast and accurate surrogates in a two-stage rejection sampling algorithm within the SHERPA Monte Carlo that yields unbiased unweighted events suitable for phenomenological analyses and post-processing in experimental workflows, e.g. as input to a time-consuming detector simulation. For the computational cost of unweighted events we achieve a reduction by factors between 16 and 350 for the considered channels. We also show how this technique can be used for NLO calculations with emulated loop amplitudes.

SciPost Phys. 15, 107 (2023), arXiv:2301.13562

Authors: MAÎTRE, Daniel; SIEGERT, Frank; TRUONG, Henry; SCHUMANN, Steffen; JANSSEN, Timo

Presenter: JANSSEN, Timo

Session Classification: Contributed Talks

Track Classification: 8 ML for phenomenology and theory