

Efficient generation of unweighted events with matrix element surrogates

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Monte Carlo simulations of scattering processes with many particles require enormous computing power. Particularly in view of the HL-LHC, an improvement in efficiency is necessary in order to be able to carry out the desired investigations in an economically sensible way. 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 event generator. The approach reduces the computational cost of unweighted events by factors between 16 and 350 for the considered channels.

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Alternate track

1. Computing, AI and Data Handling

I read the instructions above

Yes

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