



Contribution ID: 109

Type: Parallel Talk

MadFlow: automating Monte Carlo simulation on GPU for particle physics

Saturday, 9 July 2022 11:30 (15 minutes)

We present MadFlow, a python-based software for the evaluation of cross sections utilizing hardware accelerators.

The pipeline includes a first stage where the analytic expressions for matrix elements are generated by the MG5_aMC@NLO framework (taking advantage of its great flexibility) and exported in a vectorized device-agnostic format using the TensorFlow library or a device specific CUDA output.

The simulation of the event is then performed using the VegasFlow and PDFFlow frameworks for the phase space integration and interpolation of PDFs and then deployed automatically to systems with different hardware acceleration capabilities (multi-threading CPU, single-GPU and multi-GPU setups from both Nvidia and AMD). We show results for Leading Order calculations with up to 5 legs in the final state offering an speed-up of orders of magnitude over traditional CPU-based calculations.

In-person participation

Yes

Primary authors: Dr CRUZ MARTINEZ, Juan Manuel (Università degli Studi di Milano); ROSSI, Marco (Università degli Studi di Milano); ZARO, Marco (Istituto Nazionale di Fisica Nucleare); CARRAZZA, Stefano (Istituto Nazionale di Fisica Nucleare)

Presenter: Dr CRUZ MARTINEZ, Juan Manuel (Università degli Studi di Milano)

Session Classification: Computing and Data handling

Track Classification: Computing and Data handling