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Quantifying the computational speedup with MG4GPU for CMS workflows

Thursday 24 October 2024 16:00 (15 minutes)

We will present the first analysis of the computational speedup achieved through the use of the GPU version of Madgraph, known as MG4GPU. Madgraph is the most widely used event generator in CMS. Our work is the first step toward benchmarking the improvement obtained through the use of its GPU implementation. In this presentation, we will show the timing improvement achieved without affecting physics performance, for a wide range of physics processes that are of general interest in CMS, quantified both by gridpack-generation and event-generation. Preliminary results demonstrate a speedup of a factor of three in matrix element calculation and a factor of 2.5 in full gridpack production for one of the most computationally intensive processes: Drell-Yan with four additional emissions. The workflows have been tested with diverse computational resources, including CUDA-enabled NVIDIA GPUs and modern vectorized CPUs from Intel and AMD, accessible via CERN resources and HPCs.

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