

25th MCnet meeting 2023 @ CERN

Report of Contributions

Contribution ID: 2

Type: **not specified**

Introduction

Thursday, 27 April 2023 14:00 (10 minutes)

Presenter: LÖNNBLAD, Leif (Lund University (SE))

Session Classification: MCnet open meeting

Contribution ID: 3

Type: **not specified**

Experiment view on generators

Thursday, 27 April 2023 14:10 (30 minutes)

Presenters: HIRSCHBUEHL, Dominic (Bergische Universitaet Wuppertal (DE)); BHATTACHARYA, Saptarna (Northwestern University (US))

Session Classification: MCnet open meeting

Contribution ID: 4

Type: **not specified**

Response from Generator authors

Thursday, 27 April 2023 14:40 (20 minutes)

Session Classification: MCnet open meeting

Contribution ID: 5

Type: **not specified**

Discussions

Thursday, 27 April 2023 15:00 (30 minutes)

Session Classification: MCnet open meeting

Contribution ID: 6

Type: **not specified**

More discussions?

Thursday, 27 April 2023 16:30 (30 minutes)

Session Classification: MCnet open meeting

Contribution ID: 7

Type: **not specified**

Rivet, YODA and Contur: recent updates and ongoing developments

Wednesday, 26 April 2023 09:00 (20 minutes)

Presenter: YEH, Yoran (University College London (UK))

Session Classification: Student and Postdoc talks

Contribution ID: 8

Type: **not specified**

Development of novel, portable Matrix Element + Phase Space methods

Wednesday, 26 April 2023 09:20 (20 minutes)

For more than a decade the current generation of fully automated, matrix element generators has provided hard scattering events with excellent flexibility and good efficiency. However, as recent studies have shown, they are a major bottleneck in the established Monte Carlo event generator toolchains. With the advent of the HL-LHC and ever rising precision requirements, future developments will need to focus on computational performance, especially at intermediate to large jet multiplicities. We present a novel family of fast matrix element algorithms that are amenable for GPU acceleration, making use of modern, minimal color decompositions. Moreover, we discuss the performance achieved for standard candle processes such as V +jets and $t\bar{t}$ +jets production.

Presenter: KNOBBE, Max (University of Göttingen)

Session Classification: Student and Postdoc talks

Contribution ID: 9

Type: **not specified**

Jets and multiparton interactions in photon and proton collisions

Wednesday, 26 April 2023 09:40 (20 minutes)

We present a study using a Rivet - including a new routine for low p_T jet data - of the pythia 8 modelling of photoproduction (HERA), photon-photon (LEP) and proton-(antiproton) (LHC, Tevatron) jet measurements. We look the influence of the underlying event model, and its energy dependence.

Presenter: CASTELLA, Juan Jose

Session Classification: Student and Postdoc talks

Contribution ID: **10**Type: **not specified**

Lepton-hadron collisions in MadGraph5_aMC@NLO

Tuesday, 25 April 2023 09:50 (20 minutes)

In the coming years, the Electron-Ion-Collider (EIC) in the United States will enable researchers to study lepton-hadron collisions with unprecedented precision. To consolidate figures of merit of a variety of measurements at the EIC, it is essential to include radiative corrections in simulations of electron-proton and electron-nucleus collisions. For the time being, there do not exist any automated simulation tools for such reactions, including even only next-to-leading order (NLO) radiative corrections.

In this talk, I will present our recent progress in the implementation of photoproduction, where the photon is either coming from an electron or from a proton in an ultra-peripheral collision at the LHC. We perform the calculations at NLO in the fixed-order mode within MadGraph5_aMC@NLO, a framework for (N)LO computation, intensively used at the LHC.

Presenter: LABONI, Manna

Session Classification: Student and Postdoc talks

Contribution ID: 11

Type: **not specified**

Photon splitting corrections to soft-photon resummation

Tuesday, 25 April 2023 10:30 (20 minutes)

In this talk I present an algorithm to add photon-splitting corrections to the Yennie-Frautschi-Suura-style soft-photon resummation available in the Sherpa Monte-Carlo event generator.

Then, I introduce different lepton dressing strategies which incorporate further leptons and hadrons in addition to the customary photons, and discuss their sensitivity to dressing parameters such as the cone size. Results are presented for the academic case of on-shell Z decay as well as Drell-Yan lepton production at a proton-proton collider.

Presenter: FLOWER, Lois

Session Classification: Student and Postdoc talks

Contribution ID: 12

Type: **not specified**

Novel approach to measure quark/gluon jets at the LHC

Tuesday, 25 April 2023 09:30 (20 minutes)

In this talk, we present a new proposal on how to measure quark/gluon jet properties at the Large Hadron Collider (LHC). Our measurement strategy takes advantage of the fact that the LHC has collected data at different energies and focuses on measuring jet angularities. By studying these angularities, we aim to enrich statistically the given data sample by quark or gluon jets based on derived quark and gluon angularities.

The measurement of quark/gluon jet properties is important in understanding the underlying physics of high-energy collisions. The proposed measurement strategy has the potential to improve the separation ability of the background of these measurements and provide a deeper understanding of the properties of quark/gluon jets.

We will discuss the details of the measurement strategy, including the theoretical basis for jet angularities and the experimental techniques for measuring them. We will also present preliminary results from our phenomenological analysis of samples generated by Herwing and Pythia event generators using this approach.

Overall, our proposed measurement strategy provides a promising new avenue for studying quark/gluon jet properties at the LHC, and has the potential to deepen our understanding of the fundamental building blocks of matter.

Presenter: BARON, Petr (Palacky University (CZ))

Session Classification: Student and Postdoc talks

Contribution ID: 13

Type: **not specified**

Unweighting multijet event generation using factorisation-aware neural networks

Wednesday, 26 April 2023 10:00 (20 minutes)

The generation of unit-weight events for complex scattering processes presents a severe challenge to modern Monte Carlo event generators. Even when using sophisticated phase-space sampling techniques adapted to the underlying transition matrix elements, the efficiency for generating unit-weight events from weighted samples can become a limiting factor in practical applications. Here we present the combination of a two-staged unweighting procedure with a factorisation-aware matrix element emulator using neural networks which we make accessible in the Sherpa event generation framework. The algorithm can significantly accelerate the unweighting process, while it still guarantees unbiased sampling from the correct target distribution. We apply, validate and benchmark the approach for partonic channels contributing at the tree-level to the high-multiplicity LHC production processes $Z + 4, 5$ jets and $t\bar{t} + 3, 4$ jets, where we find speed-up factors between 16 and 350.

Presenter: JANSSEN, Timo**Session Classification:** Student and Postdoc talks

Contribution ID: 14

Type: **not specified**

The new Alaric Parton Shower in Sherpa

Tuesday, 25 April 2023 10:10 (20 minutes)

I will present the logarithmically accurate parton shower Alaric. The algorithm is implemented in the Sherpa framework, and I show its NLL accuracy in final state evolution both numerically as well as by analytical arguments. I will also present phenomenological results compared to observables measured at LEP.

Presenter: REICHELT, Daniel (Durham University, IPPP)

Session Classification: Student and Postdoc talks

Contribution ID: 15

Type: **not specified**

Introduction

Tuesday, 25 April 2023 09:00 (30 minutes)

Session Classification: Student and Postdoc talks

Contribution ID: 16

Type: **not specified**

Discussion on MCnet in relation to LPCC

Thursday, 27 April 2023 09:00 (30 minutes)

Session Classification: Collaboration meeting

Contribution ID: 17

Type: **not specified**

Discussion on future MCnet activities

Thursday, 27 April 2023 09:30 (30 minutes)

Session Classification: Collaboration meeting

Contribution ID: 18

Type: **not specified**

Student and Postdoc committee

Session Classification: Collaboration meeting

Contribution ID: **19**

Type: **not specified**

AOB

Session Classification: Collaboration meeting

Contribution ID: **20**

Type: **not specified**

Dinner

Wednesday, 26 April 2023 19:00 (2 hours)

Contribution ID: 21

Type: **not specified**

Presentation of the MCnet (new) collaboration

Thursday, 27 April 2023 16:00 (30 minutes)

Presenter: LÖNNBLAD, Leif (Lund University (SE))

Session Classification: MCnet open meeting

Contribution ID: 22

Type: **not specified**

Students and Postdoc Talks

Session Classification: Collaboration meeting

Contribution ID: 23

Type: **not specified**

KrkNLO Matching

Thursday, 27 April 2023 10:15 (20 minutes)

Presenter: WHITEHEAD, James

Session Classification: Student and Postdoc talks

Contribution ID: 24

Type: **not specified**

Students and Postdoc Committee

Thursday, 27 April 2023 10:35 (25 minutes)

Session Classification: Student and Postdoc talks