# 14th MCnet Meeting

Wednesday 23 November 2016 - Friday 25 November 2016

CERN


# Book of Abstracts

# Contents

**Student and Postdoc Talks** / **2**

# A framework for second-order parton showers

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A framework is presented for including second-order perturbative corrections to the radiation patterns of parton showers. The formalism allows to combine $O(\alpha_s^2)$-corrected iterated 2→3 kernels for "ordered" gluon emissions with tree-level 2→4 kernels for "unordered" ones. The combined Sudakov evolution kernel is thus accurate to $O(\alpha_s^2)$. As a first step towards a full-fledged implementation of these ideas, we develop an explicit implementation of 2→4 shower branchings in this letter.

**Student and Postdoc Talks** / **11**

# A new model for soft interactions in Herwig

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**Special Session** / **25**

# Anosov-Kolmogorov C-K systems and MIXMAX pseudorandom number generator for MC simulations

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**Overview Talks** / **21**

# Ariadne/Dipsy Overview

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**Special Session** / **23**

# Blue Yonder

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**Overview Talks** / **22**

## HEJ Overview

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**Overview Talks** / **16**

## Herwig Overview

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**Special Session** / **24**

## IBA

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**Student and Postdoc Talks** / **8**

## Introduction

Karl Nordstrom[1]

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I will briefly introduce myself and talk about my studentship project.

**Student and Postdoc Talks** / **4**

## Introduction

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David Yallup introduction.

**Student and Postdoc Talks** / **5**

## Introduction

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Introduction

**Student and Postdoc Talks** / **6**

## Introduction

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Introduction again.

**Student and Postdoc Talks** / **13**

## Living Resource: Warm-Up Discussion

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**Student and Postdoc Talks** / **15**

## MCplots

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**Overview Talks** / **19**

## MadGraph Overview

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**Student and Postdoc Talks** / **7**

## NLO QCD and EW calculations with Recola and Sherpa

Jennifer Thompson[1]

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Precision in Monte Carlo predictions is becoming increasingly important as experiments continually improve. One key way this is achieved in Monte Carlo event simulations is to include the higher-order effects from perturbation theory in the matrix element calculation. This has been completed at NLO QCD, and progress is already being made into NNLO QCD automation. At this level of precision, NLO EW effects also become significant, and I will talk about the inclusion of NLO EW effects to the matrix element with the SHERPA event generator.

**Student and Postdoc Talks** / **10**

## Photon-photon interactions in e+e- collisions with Pythia 8

Ilkka Helenius[1]

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Photon-photon interactions arising from the photons emitted by high-energy leptons will generate inevitable background processes for future electron-positron colliders. Therefore means to accurately simulate these interactions are required in order to study the realistic physics potential of these future experiments. We have been working on an implementation of these interactions into Pythia 8 Monte-Carlo generator. We will first discuss what are the relevant processes in these interactions and how these can be generated using equivalent photon approximation and parton distribution functions for resolved photons. Then we will present our recent developments including options to simulate also soft QCD processes and multiple partonic interactions in resolved photon-photon collisions. Combining these with unresolved processes enables full simulations of particle production in photon-photon interactions from lepton beams. The results for charged particle and jet production are compared to data from LEP experiments. The comparisons indicate that multipartonic interactions do play a role also in photon-photon collisions but further studies are still required to obtain accurate description of the data.

**Overview Talks** / **18**

## Pythia Overview

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**Overview Talks** / **20**

## Rivet Overview

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**Overview Talks** / **17**

## Sherpa Overview

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**Student and Postdoc Talks** / **3**

## The Contur method

Jonathan Butterworth[1]

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A short overview of the Contur method, constraining new physics with standard model signatures.

**Student and Postdoc Talks** / **1**

## Thermodynamical String Fragmentation

Nadine Fischer[1]

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We study a few possible modifications to the Pythia string fragmentation: a new model for generating the transverse momentum of hadrons, inspired by thermodynamics, the effect of close-packing of strings, and a simple model for hadron rescattering. We present the modified predictions and compare to data as well as to default Pythia.

**Student and Postdoc Talks** / **9**

## Top EFT at NLO in QCD Progress within MG5_aMC

Eleni Vryonidou[1]

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**Student and Postdoc Talks** / **12**

## Top tagging with deep neural networks

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The identification of so-called ‘boosted’ objects; heavy particles whose decay products are highly collimated in the detector, is now a standard part of the event reconstruction toolbox at the LHC. Several QCD-inspired methods that exploit the different signatures between heavy particle decays and soft QCD backgrounds are now well-established. An intriguing new paradigm; ‘Jet Images’, has recently been proposed, which makes use of training deep neural network algorithms designed

for image/facial recognition software, but applies them in the context of classifying boosted event topologies at the LHC. I will discuss an application of these methods to identifying hadronically decaying tops. I show how these methods can offer comparable or even superior performance to currently-used taggers, and speculate on what physics features the network may be learning.

**14**

# Welcome