

EICUG Software Working Group

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Markus Diefenthaler (JLab)

Meeting schedule in FY19

02/14	Status of documentation and tutorials, website
03/07	Summary of MCEG workshop, status of Monte Carlo Initiative
04/11	Update on community reference reconstruction
05/20–05/22	In-person meeting in Trieste
06/06	Benchmarks and comparison (Quantitative assessment of measurement capabilities and their physics impact)
07/11	Review of theory tools
07/22–07/26	EICUG Meeting Paris
08/	Summer break
09/05	FY20 planning

MCEG Workshop

The second workshop on “MCEGs for future ep and eA facilities” will take place at DESY Hamburg on February 20 – 22 , 2019.

Organizers

- **EIC Community** E.-C. Aschenauer (BNL), A. Bressan (INFN, Trieste), M. Diefenthaler (JLab)
- **MCnet community** H. Jung (DESY) S. Plätzer (Vienna) and S. Prestel (Lund)

Focus requirements including benchmark measurements and observables,, status of NLO in ep/eA, QCD+QED effects in MCEG, GPDs and TMDs and MCEGs



February 20-22, 2019
DESY Hamburg, Germany

EIC User Group and MCnet present

MCEGs

for future ep and eA facilities

PROGRAM	ORGANIZERS
Updates to general-purpose MCEG for ep/eA	Elis Caroline Aschenauer (BNL)
Status of NLO simulations for ep/eA	Andrea Bressan (INFN/Trieste)
GPDs and TMDs in MCEGs	Markus Diefenthaler (JLAB)
QED+QCD effects in ep/eA simulations	Hannes Jung (DESY)
	Simon Plätzer (University of Vienna)
	Stefan Prestel (Lund University)

www.desy.de/mceg2019

Monte Carlo Initiative

Charge “The EICUG Software Working Group’s **initial focus will be on simulations of physics processes** and detector response to enable quantitative assessment of measurement capabilities and their physics impact. (...) **It will embody simulations of all processes that make up the EIC science case** as articulated in the White-paper.”

Initial focus for simulation of EIC physics processes


- online catalogue of MCEGs
- EICUG documents:
 - MCEG requirements (work in progress)
 - MCEG event model
- MCEG R&D:
 - containers and tutorials for EIC MCEGs

Online catalogue of MCEGs

- Hosted on <https://eic.gitlab.io>, editable for EIC group on GitLab
- **First steps** Agree on fields and then open call for input among EICUG
- **Proposed fields**
 - **Categories** ep, eA, radiative effects
 - Name
 - Contact information
 - **Brief Description** What processes are described? What is unique about the MCEG? Include version number as reference.
 - **References (links)** website, repository, documentation, container, validation plots

MCEG Container for EICUG

Container for Pythia8+DIRE by Nadine Fischer (Pythia)

 **jupyter** README ✓ 8 minutes ago Logout

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```
1 Welcome to the Jupyter notebooks for Pythia 8 and DIRE!
2
3
4 You have the choice to run the following notebooks:
5
6 pythiaPI.ipynb
7 Gives a basic idea of the Pythia 8 event generator, by using the Python
8 interface of Pythia 8. You can adjust a set of parameters and choose
9 from different different histograms to be plotted.
10
11 pythiaRivetPI.ipynb
12 Shows how to use the Pythia 8 event generator, together with Rivet,
13 by using the Python interface of Pythia 8.
14
15 pythiaRivet.ipynb
16 Shows how to use Pythia 8, together with Rivet, by using an already
17 compiled executable called pythiaHepMC. You can adjust a set of parameters
18 and a settings file is created.
19
20 pythiaRivetUS.ipynb
21 As pythiaRivet.ipynb, but uses a prepared settings file, to be provided
22 by the user.
23
24 direRivet.ipynb
25 Shows how to use Pythia 8 with the DIRE parton shower, together with
26 Rivet, by using the default DIRE executable. You can adjust a set of
27 parameters and a settings file is created.
28
29 direRivetUS.ipynb
30 As direRivet.ipynb, but uses a prepared settings file, to be provided
31 by the user.
32
33 direEvent.ipynb
34 Pythia 8 with the DIRE parton shower, graphical output of one event
35 with the default DIRE executable.
36 The process can be chosen as well as a few basic parameters.
37
38 tuning.ipynb
39 Tuning with Professor, Rivet, and Pythia 8 / DIRE.
40
```

Jupyter notebook interface

Pythia 8 standalone

This notebook gives a basic idea of the Pythia 8 event generator, by using the Python interface of Pythia 8. You can adjust a set of parameters and choose from different different histograms to be plotted.

First, lets import all necessary modules.

```
In [1]: import os, sys, pythia8
from plotting import HELPRINT
import pythiaSettings as pyts
```

Now we create a Pythia 8 object and apply the settings to define the incoming beams. More settings can be adjusted later.

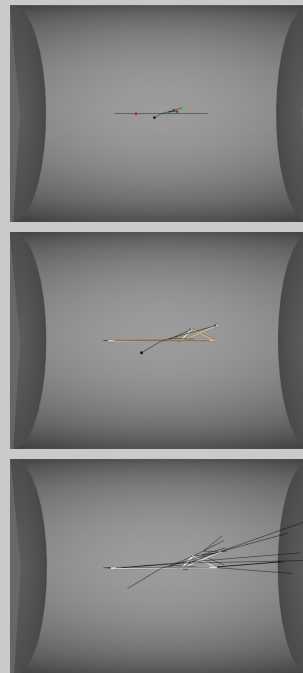
```
In [2]: # Setup pythia, apply beam settings.
pythia = pythia8.Pythia()
pyts.beam_settings(pythia)
```

You can now set the parameters for the incoming beams:

beam A id [beamSid]	=	
beam B id [beamSid]	=	
beam frame type [beamFrameType]	=	2: back-to-back beams with different energies, set beamAid and beamSid
CM5 energy for beam frame type = 1 [beamCM5]		65.7
beam A energy for beam frame type = 2 [beamAid]		10.9
beam B energy for beam frame type = 2 [beamSid]		100

Rivet and Professor support

Visualization of ep collision



Next steps

- Agree on first version of MCEG catalogue and prepare example(s)
- Ask EICUG for input to catalogue
- Agree on MCEG container
- Provide MCEG in catalogue as containers
- Setup MCEG task force