Role of Software Working Group in the Yellow Reports organization

Physics Working Group

Conveners

Detector Working Group

Conveners + **ex-offico**

Simulation team: Software Working Group

Develop

Support

Workflow environment for EIC simulations

- **to use** (tools, documentation, support) **and**
- **to grow with user input** (direction, documentation, tools)

Involvement from EICUG

Possible Role of **Software Working Group** in the tracking group

Develop

Support

Workflow environment for EIC simulations

- **to use** (tools, documentation, support) **and**

- **to grow with user input** (direction, documentation, tools)

Involvement from tracking group

- **Analysis preservation** Please make your software available and integrate it.
- **Coordinate simulations** Please continue to reach out to us.
- **Design of tracking detectors** We rely on your expertise.
- **Developing reconstruction algorithms** We rely on your expertise.

EIC Software

Simulation of physics processes

Monte Carlo Event Generators
Tutorials in preparation

Simulation of detector responses

Fast simulations
Tutorials ✓

Full simulations
Tutorials ✓

Physics analysis

Reconstruction of physics processes
Tutorials in preparation

Questions & Answers

Your question on common MC(EG) and fast simulations

Simulations of physics processes and detector responses

Simulation of physics processes

Monte Carlo Event Generators

Simulation of detector responses

Fast simulations

Full simulations

Physics analysis

Reconstruction of physics processes

Common MC productions

Monte Carlo Event Generators (MCEG)

- started to integrate MCEG collection of BNL taskforce into EICUG software
- ongoing work with MCnet to add modern MCEGs to collection

Benchmark processes

- reach out to Physics Working Group for benchmark processes
- work with Physics Working Group on MC productions for benchmark processes

Online repository of MC productions

- HepSim servers setup
- ongoing work on documentation

Simulations of physics processes and detector responses

Simulation of physics processes

Monte Carlo Event Generators
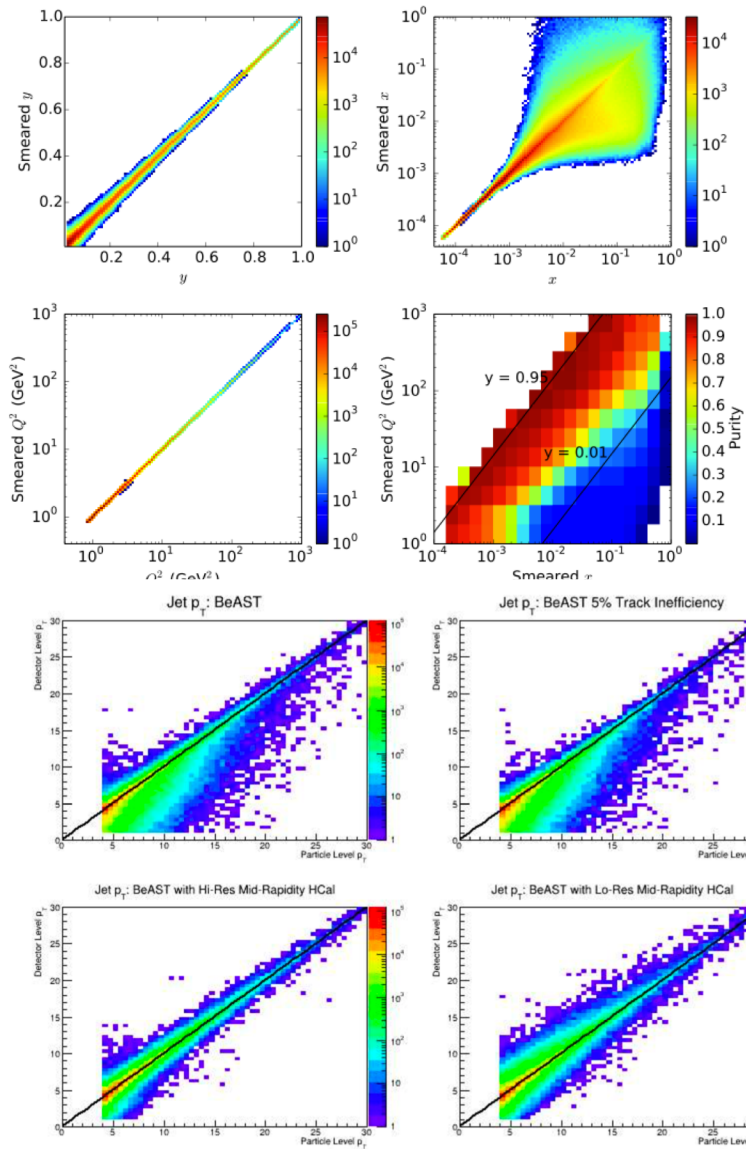
Simulation of detector responses

Fast simulations

Full simulations

Physics analysis

Reconstruction of physics processes

eic-smear

Fast simulations using ROOT, ideal for questions like

- *"Given a (known) detector performance, how well can I measure some physics observable(s)?"*
- *"If I need to measure X to some precision, what detector performance do I need?"*
- Used extensively for **EIC White Paper**

Features

- interface to MCEGs for ep and eA
- smearing of overall detector performance:
  - can be easily modified in user code ([tracking examples])
  - includes acceptance effects
  - parametrizations for eRHIC (BeAST, ePHENIX), JLEIC and others
- ROOT trees for MC Truth and smeared information

Ongoing work on fast simulations

eic_smear

- looking into capturing the effect of magnet field on acceptance and resolution

fun4all

- fast momentum resolution estimate (covered in tutorial, <u>source code</u>)

g4e

- fast: multi-threaded
- fast(er) simulation mode in preparation (same application for fast and full simulations)