



ePIC Jet Reconstruction Task Force Meeting

February 7th, 2022

Derek Anderson (ISU)



Meeting Time

- Today worked for 8/11 people
 - ☞ Continue w/ this time?
 - ☞ Alternate times?
- Mattermost channel

Take-Aways from Jet/HF meeting

- Default EICrecon output:
 - › 2 collections: truth & reconstructed jets
 - › Anti-kT algorithm
 - › Single R
- Build in flexibility to specify other algorithms/R values/etc.
- Minimum benchmark: JER

To-Do

- JANA Material:
 - › Jet definition file [👋]
 - › Configuration file [👋]
 - › Jet factory [👋]
 - › Jet-finding algorithm (next point)
- Standalone jet-finding plugin [☞]
- Example macros:
 - › Calculate JER w/ EICrecon output [☞]
 - › Other ideas?

Key

- [👋] = I'll work on
- [☞] = volunteers?

Feb. 7th Jet/HF Slides



Next Simulation Campaign and Related Task Forces

- **Next simulation campaign:**

- **Target date:** End of March. **tbd**
- **Goal:** Improved software stack for the reconstruction, including benchmarks.

- **Task forces** to reach our goal:

- **Calorimeter Clustering**
- **Jet Reconstruction**
- **PID**
- **Tracking**
- **EICrecon** for urgent fixes to the reconstruction software stack
- **Modular Reconstruction** for substantial improvements of the reconstruction software stack
- **Simulation Production**

Important note: Task forces != subgroups

- Task forces solve specific issues.
- Subgroups based around interest in a general area, e.g., reconstruction, will form later.

- Each task force will be responsible for leading the effort for a particular topic with the following goals:

- The development is accessible to the whole collaboration in our main repository.
- We can evaluate the reconstruction quality using a set of well-defined plots that we can easily reproduce.
- Kickoff meeting with task force leaders on January 27.

Task Force Intro | General

Reconstruction Task Forces

Calorimeter Clustering	Chao Peng cpeng@anl.gov	Dmitry Kalinkin dmitry.kalinkin@gmail.com
Jet Reconstruction	Derek Anderson dmawxc@iastate.edu	
PID	Christopher Dilks dilks@jlab.org	
Tracking	Shujie Li shujieli@lbl.gov	
EICrecon	Dmitry Romanov romanov@jlab.org	
Modular Reconstruction	David Lawrence davidl@jlab.org	Sylvester Joosten sjoosten@anl.gov
Simulation Production	Wouter Deconinck wouter.deconinck@umanitoba.ca	

EPIC Computing & Software Weekly Meeting, February 1, 2023.

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Markus Diefenthaler, Feb 1st Comp/Soft Meeting

Task Force Intro | Jet Reconstruction

Task Force Lead: Derek Anderson (ISU)

- dmawxc@iastate.edu
- derek.murphy.anderson@protonmail.com
- Mattermost

Meetings: planning on weekly meetings

- Poll for initial time:
 - › <https://www.when2meet.com/?18588885-DkOuM>
- Poll is also to help determine available workforce

Task Force Charge: incorporate jet reconstruction into EICRecon

⇒ 2 main thrusts:

- 1) Developing a “**jet factory**” for EICRecon (+ any additional code)
- 2) Determining **key jet benchmarks** and implementing them

Key Tasks:

- Developing EICRecon jet factory
- Writing example macros/standalone code to work with jet output
- Developing jet benchmark code

Jet Reco in EICRecon | the jet factory

User specifies following at runtime:

- Input collection (e.g. tracks)
- Kinematic cuts on constituents
- Jet parameters

Jet_Factory.cc

For each member in input_collection, do
if member is in kinematic_cuts, then
add member to constituent_list

Create fastjet objects & do clustering
Write fastjet output to PODIO collection

User then interacts with jet PODIO collection

Jet Reco in EICRecon | jet parameters

Possible jet parameters to specify:

- Input collection
- Jet algorithm
 - › Generalized kT parameters?
 - › Inclusive/exclusive options?
- Recombination scheme
- Rjet
- Jet eta/pT ranges
- Area definition
 - › Max ghost eta
 - › Num. repeat

Jet Reco in EICRecon | PODIO jet strawman

Members

uint64_t	nCst	// no. of constituents
float	aJet	// jet area
edm4eic::Vector4f	pJet	// jet 4-momentum

Vector Members

edm4eic::Vector4f	pCst	// constituent 4-momentum
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General Discussion

Some questions to discuss:

- What do we need/want in our jets?
- What benchmarks should we consider?
 - › Inclusive spectra (e.g. jet p_T)?
 - › More specific observables?
- How do we accommodate multiple jet definitions?
 - › Multiple collections?
 - › Multifactories?
- How do we incorporate backgrounds?
- In addition to the jet factory, what additional infrastructure do we need?
 - › An example “jet reader” macro?
 - › A standalone way of reconstructing jets?