

Jet and Heavy Flavor WG Summary

Olga and Brian

August 25, 2023

Group Information and Contacts

❑ Mailing List: eic-projdet-jethf-l@lists.bnl.gov

❑ <https://lists.bnl.gov/mailman/listinfo/eic-projdet-jethf-l>

❑ Meeting Indico Pages: <https://indico.bnl.gov/category/420/>

❑ Wiki Page: <https://wiki.bnl.gov/eic-project-detector/index.php/JetsHF>

❑ Mattermost Chat: (sign-up link)

https://eic.cloud.mattermost.com/signup_user_complete/?id=i8gnmob4stdrpjfrezhegxs3ew

❑ Conveners

❑ Olga Evdokimov – evdolga@uic.edu

❑ Brian Page – bpage@bnl.gov

❑ Meetings

❑ Keep the Wednesday 12 pm time slot? Biweekly?

Warsaw Summary: Jet Benchmarks

- ❑ Initial set of jet benchmarks

- Kinematic Distributions (Jet pT, Eta, Phi, E, correlations)
- Reconstructed / Generator Jet Delta R
- Duplicate Track Plots
- Jet Energy Resolution / Scale (Vs Eta and E)

- ❑ Root macro(s) for generating these quantities and plots using RDataFrames exists

- ❑ Based on ReconstructedJets and GeneratedJets branches of ElCrecon output

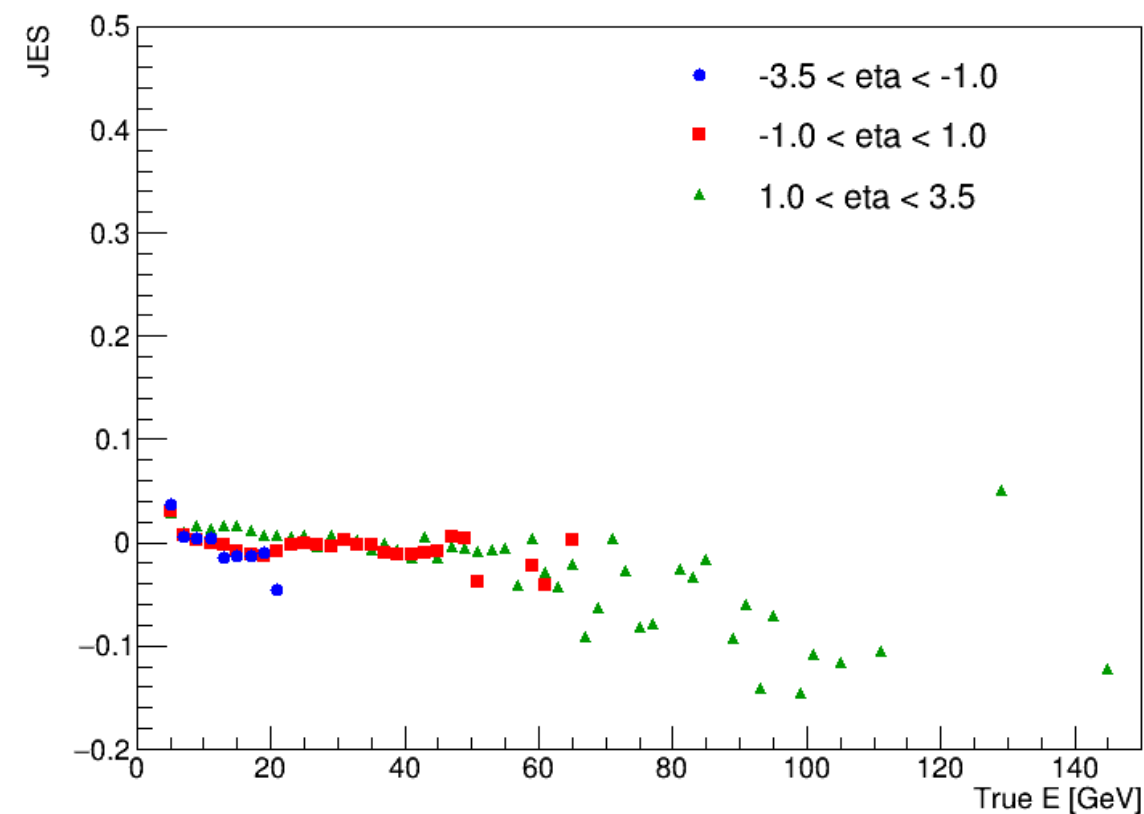
- Currently track-only
- Should change GeneratedJets factory to only include charged truth particles

- ❑ Results shown derive from:

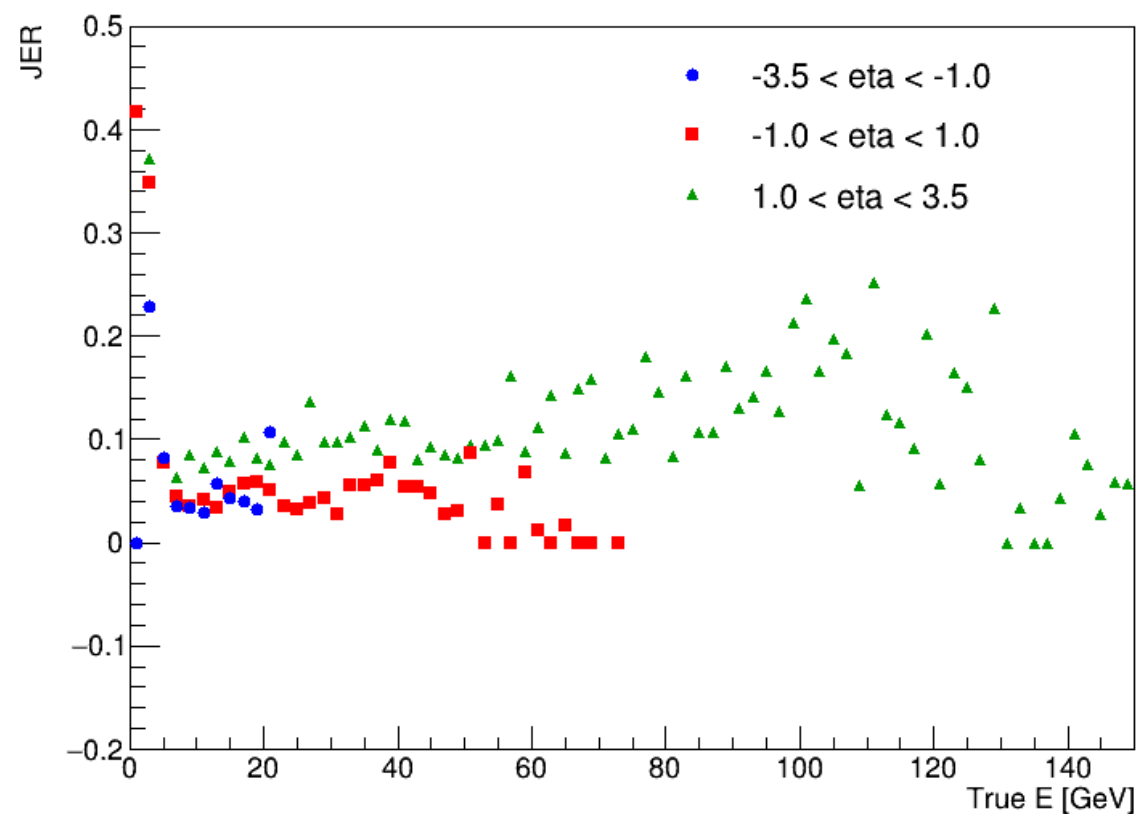
- NC DIS (Pythia8) 18x275 with $Q^2 > 100 \text{ GeV}^2$
- 125000 events

Warsaw Summary: Jet Benchmarks

Jet Energy Scale Vs True Energy



Jet Energy Resolution Vs True Energy



Current Status – Future Directions

- ❑ Initial jet reconstruction benchmarks are ~done
 - Will need updates as jet factory is modified
 - Evolve as calorimeter information is added to jet finding
- ❑ Beginning to look at track performance
 - Efficiency and resolution for tracks and also Lambdas and D0s
 - Explore quantities needed for track QA
- ❑ Updates to Jet Factory – see next slide

Jet Software | Status and Plans (from Derek)



- **Status:** Jet factory were originally written as **JFactory** (which produce exactly 1 output)
 - Now upgrading to **JMultiFactory** (which can produce multiple outputs)
 - Work being done in [PR #767](#)
 - ☞ All comments have been addressed and PR will be merged by September campaign
- This upgrade will:
 - Make it easier to address EDM issues with jets (see [issue #724](#))
 - ☞ **One approach:** jet multi-factory produces collection of jets and parallel collection of “jet parameters” which stores things like jet area
 - › Prepare for unification factory interfaces
 - ☞ S&C team would like to have a single interface for **all factories** (see Nathan’s recent [update](#)).
 - ☞ This upgrade will make the transition to such an “EpicFactory” a matter of changing names
- **Plans:** there are two key upgrades to take care of in near future
 - a) **Enable jet-constituent podio relations:** jet constituents currently stored in same collection as jets
 - ☞ These associations can (and should) be handled via PODIO relations
 - ☞ Also referenced in [issue #724](#)
 - b) **Enable user-configurability:** reconstruction parameters currently hard-coded
 - ☞ This should be changed to make it easier for users
 - ☞ And will allow for consistent handling of parameters via steering files across EICrecon
- Both can be addressed in a single PR
 - Good topic for September S&C workshop!
 - **Getting these in by the October campaign is reasonable**