

Referee Report on Jets and Heavy Flavor

Brian Page - for Reviewers
ePIC and EIC Physics Readiness Workshop
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Introduction

Reviewers: Cameron Dean, Olga Evdokimov, Rithya Elayavalli Kunnawalkam, Brian Page, Deepa Thomas

Sections Reviewed: Section 7 and Appendix D

Reviewers met and discussed comments last Friday (3/13)

Full List of Comments:

https://docs.google.com/document/d/1rY3Zk5MpqQQwES1f2Uq5NxyIDzc7QkrKJm_v81ZN8tY/edit?usp=sharing

Section 7 Overall Impression

- ❑ Section presents several interesting and relevant measurements that represent a substantial effort from the working group in a short amount of time and under challenging conditions
- ❑ However, reviewers felt that the descriptions of the measurements are too sparse and the physics message does not come through as strongly as it should
- ❑ Introduction should expand on how jet and HF probes complement and build on what can be done with Inclusive and SIDIS
- ❑ Sections on “Jets in CNM” and “HF in Jets” describe similar physics and systems with essentially the same observable (Need to define ReA in the text) - think about how to organize/rewrite these sections to make things more clear
- ❑ Charm Hadronization subsection - connection to hadron mass should be made more explicit
- ❑ Expand on treatment of spin observables - no projections in main document or appendix

Selected Comments

❑ General Comments

- ❑ Figures should not be repeated between main text and appendix
- ❑ Connecting with Table 1, indicate when in time these measurements may be done - need e+p and e+A. Also, indicate if measurements assume gold or other early physics nuclei
- ❑ Discuss impact of unequal e+p and e+A energies on R_{eA} measurements (good topic for appendix)
- ❑ Be careful when discussing jet and HF access to gluons - this does not arise at DIS LO as is stated several times in the text
- ❑ For all plots/observables, need theory curves or at least discussion of statistical precision to convey impact of ePIC data
- ❑ Citations needed throughout main section and appendix
- ❑ Jet algorithm details should be included in main text - especially if appendices are dropped

Selected Comments

❑ Figure Comments

- ❑ Figure captions need to be more detailed - list collision system for each figure
- ❑ Fig 11 should be separated into two individual plots
- ❑ Statistical uncertainty on Λ_c/D^0 ratio in Fig 11b seem much larger than in <https://arxiv.org/abs/2102.08337> . Why?
- ❑ Text related to Fig 11b mentions hadronization in the medium, but figure only shows projections for e+p
- ❑ Statistical uncertainty in Fig 12 for B's (and possibly D's) are pretty much flat vs z - why?
- ❑ Is the B hadron-in-jet ReA really an early science priority?
- ❑ Caption for Fig 12 mentions projections for two rapidity ranges, but only a combined range is shown

Selected Comments

❑ Comments on Appendix D

- ❑ In general, reviewers felt the level of detail presented in the appendix was more appropriate for such a document - think about what can be added to main body
- ❑ There needs to be a treatment of spin-dependent observables in the appendix
- ❑ Bias toward eA measurements, especially for jets - include treatment of ep (see above)
- ❑ Section D1 discusses jet efficiency, fake rates, JES, and JER - plots of these quantities should be included
- ❑ How to reconcile a JES of nearly 100% with a non-unity track efficiency and a jet efficiency between 93% and 97%?