R_{eA} note comments

Raymond Ehlers[1]

19 November 2021

[1]Oak Ridge National Lab

Adding further systematics

I understand the difficulty in working quickly, but to me, this did not address detector performance because no systematic uncertainties or estimates of what they would be was included. ... Of course a detailed estimate of systematic uncertainties may be prohibitively difficult, but surely we have a reasonable estimate for the uncertainty on the single track reconstruction efficiency and the calorimeter cluster energy resolution? These will be the dominant detector-driven uncertainties and at least these uncertainties should be addressed. ...

Link to full text

Addressing further systematics

- Unclear to me how best to address this point
- To implement systematics as described:
  - charged jets: apply tracking efficiency uncertainty of X%, and re-run analysis
  - calorimeter energy: smear jet energy by cluster energy resolution (?)
- Alternatives:
  - Shift spectra left/right by tracking efficiency uncertainty, width of cluster energy resolution?
  - But doesn't really get to the core of the issue
- Is this too much detail compared to the state of the rest of the simulations?
- Better just to defer to JES + JER note?
- Suggestions?

Estimate final state effects?

. . . Estimate for the size of effects we are expecting for final state effects, ... I haven't been able to follow all of the theoretical developments, but I was under the impression that they were on the order of ~5%. Frankly, this convinces me of the opposite - we can't distinguish initial and final state effects. It looks like the theoretical uncertainties from the PDFs are fairly small, but the statistical uncertainties are close to the size of any final state effects we might reasonably expect and I'd expect systematic uncertainties on the order of 10%. Maybe with charged jets you could get a systematic uncertainty down as low as 5%, but then you'd have an additional theoretical uncertainty from fragmentation functions. I could be wrong on any one of these details or perhaps I couldn't follow the introduction and misunderstood what exactly is being calculated, but unfortunately, I don't think this actually addresses the question of how sensitive ECCE could be to final state effects.

Link to full text

Addressing final state effects

- Fair point: may need to make conclusions weaker.
  - There are non-nuclear final state effects (depends on jet R), so need to be clearer here.
- Not clear how we would implement final state effects:
  - Li. et al modify the splitting kernel, which we can't do here.
- Suggestions?

Backup