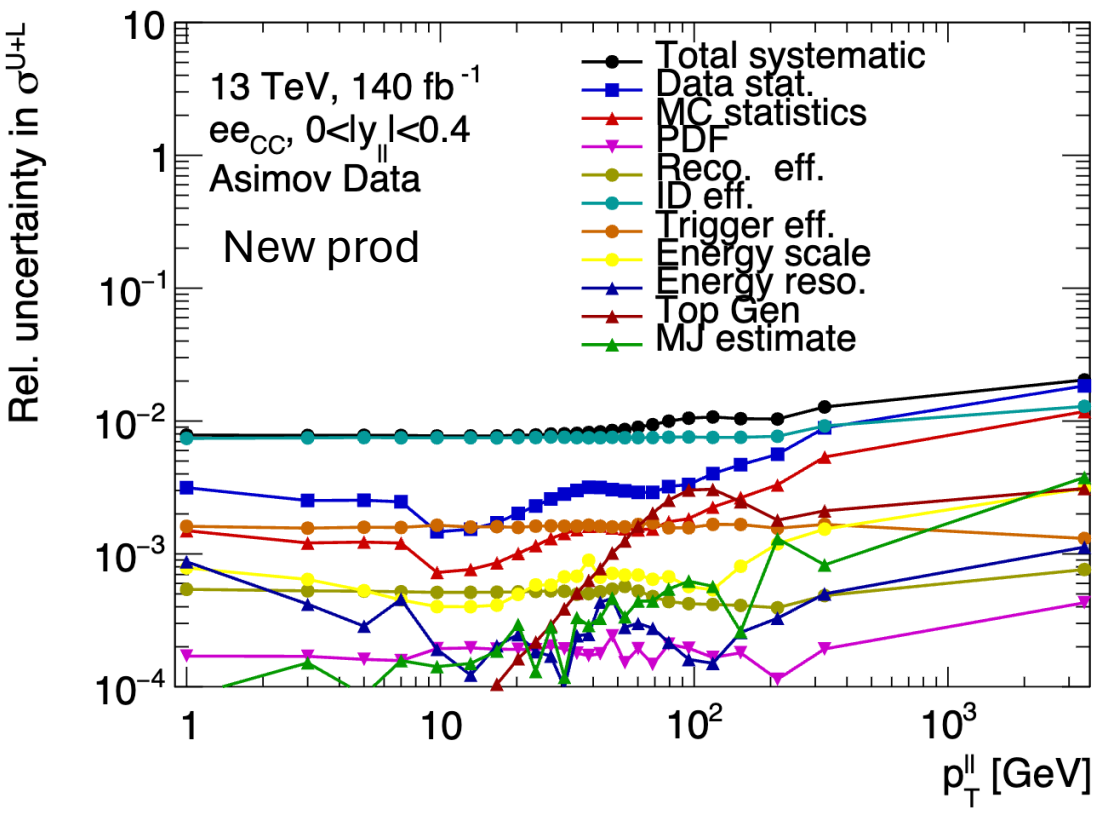
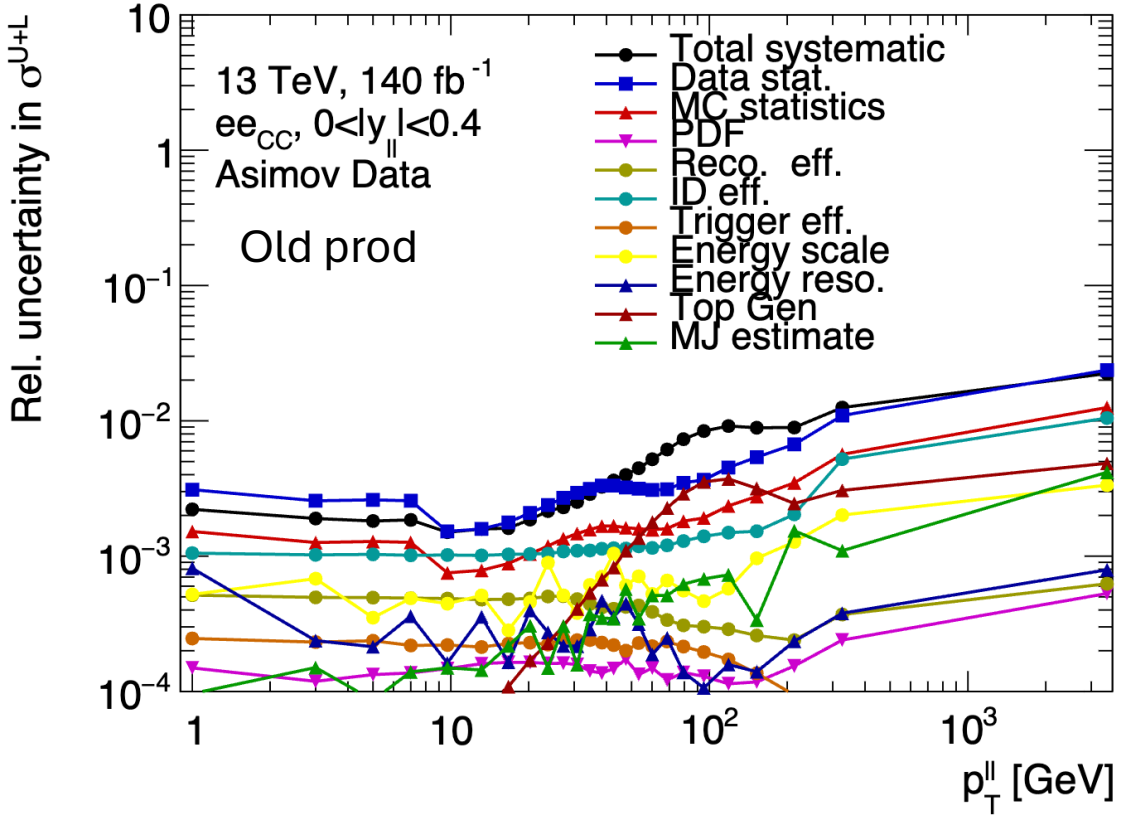
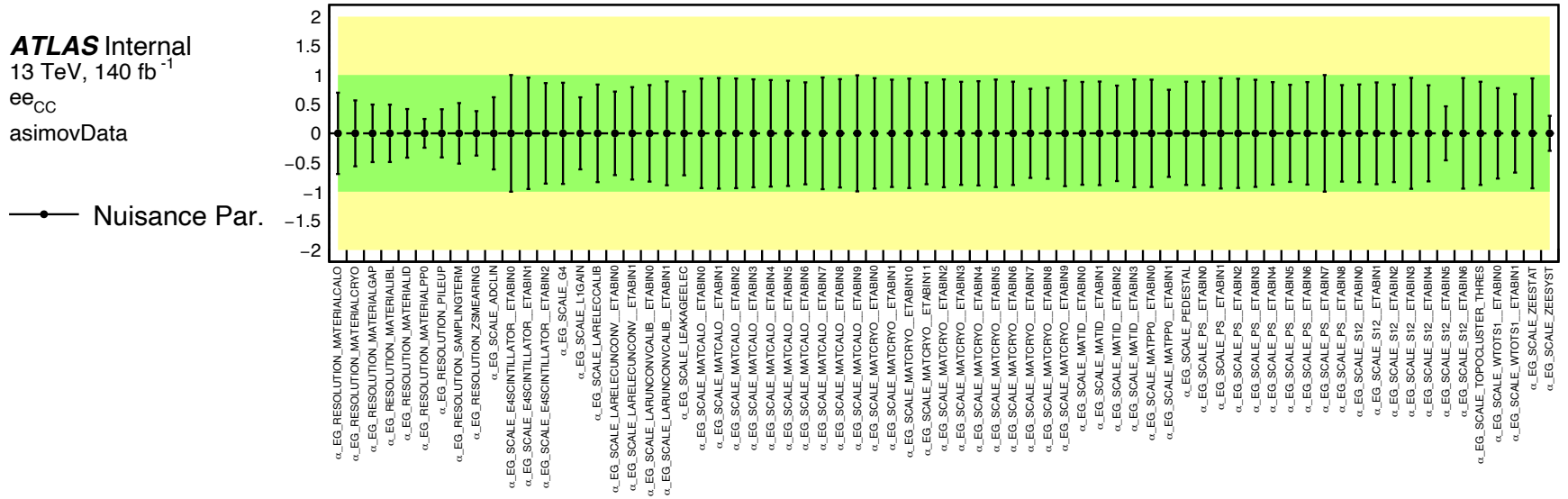
XSec Uncertainty Breakdown

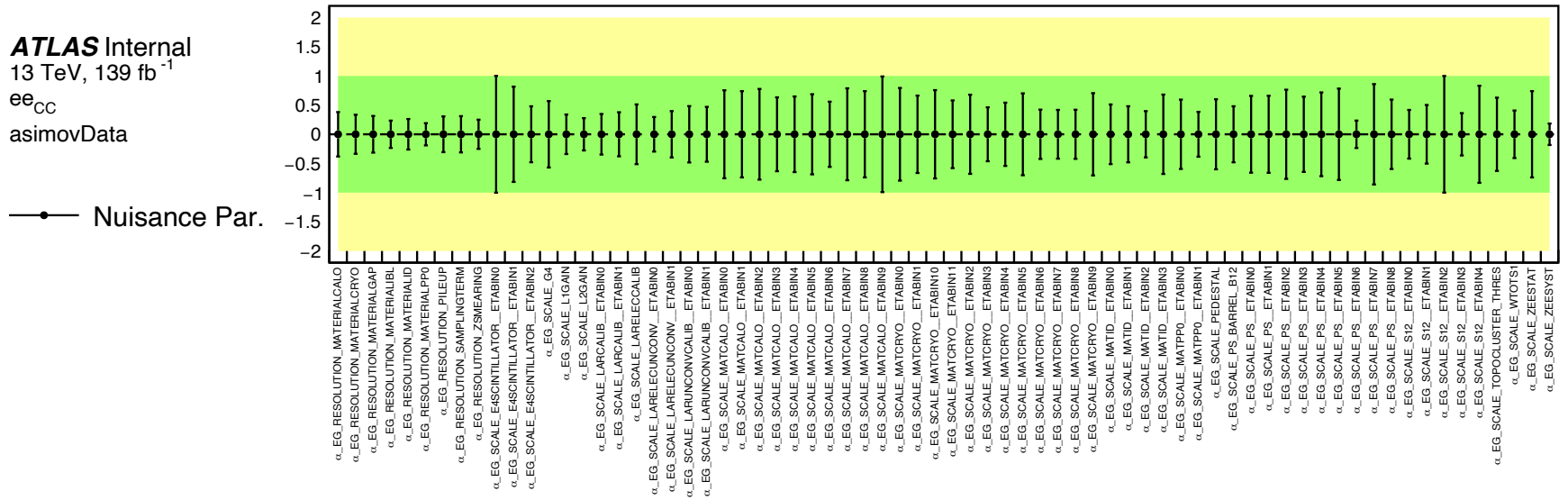
- Clear issues with the ID and trigger variations in the new production.
- Energy scale and resolution does seem to be better though!
- PDF seems similar but not as “smooth” as it was previously
- No obvious issues with other systematic groups to me



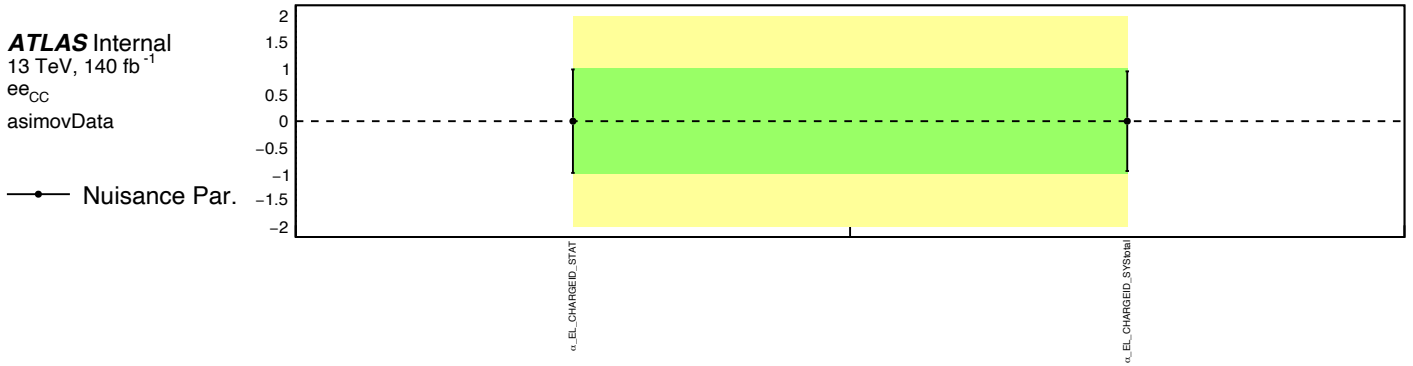




- Calibration systematics all look better in the new production!

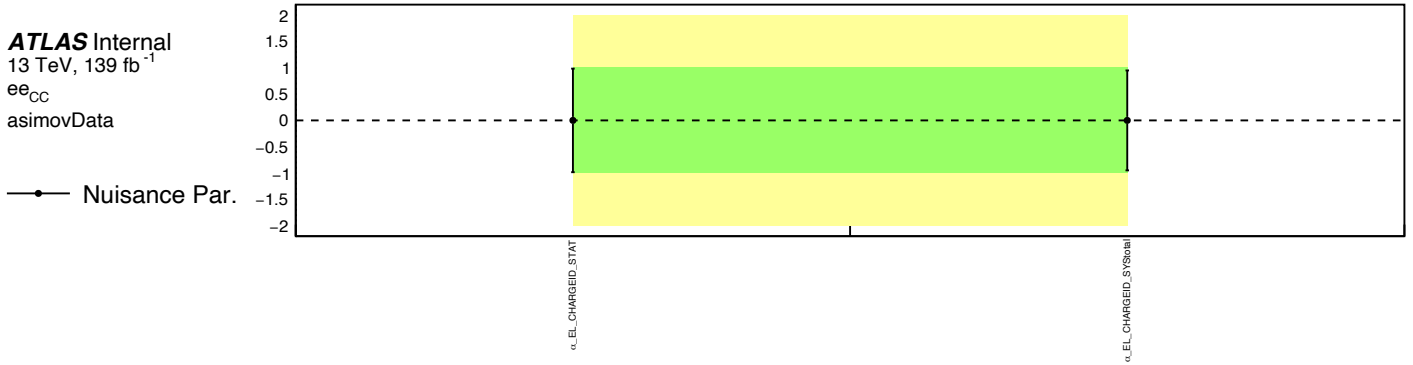


New production

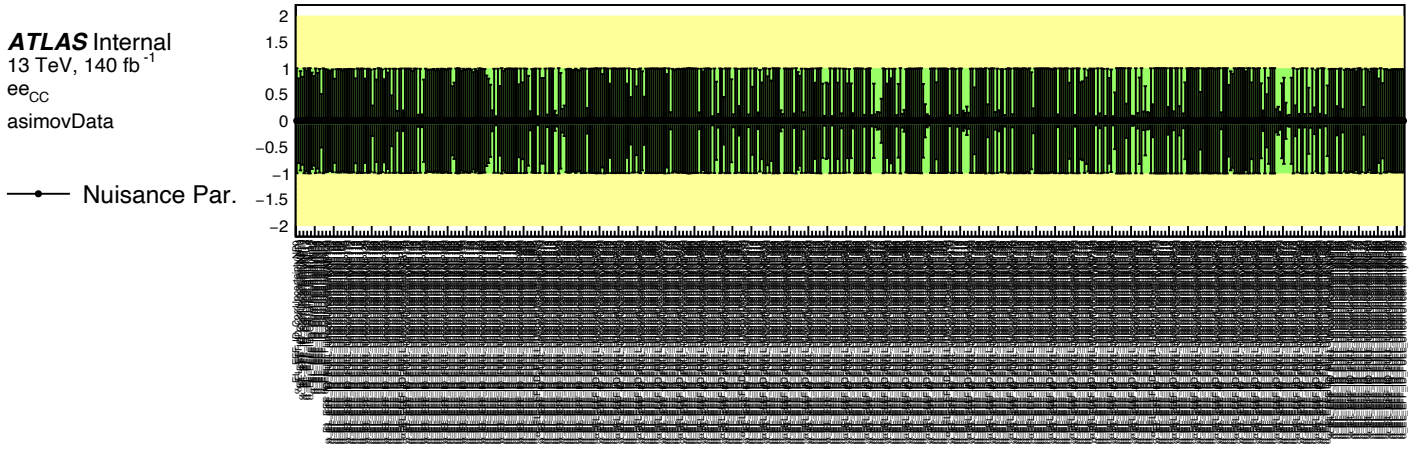


- Charge ID, all good here!

Old production

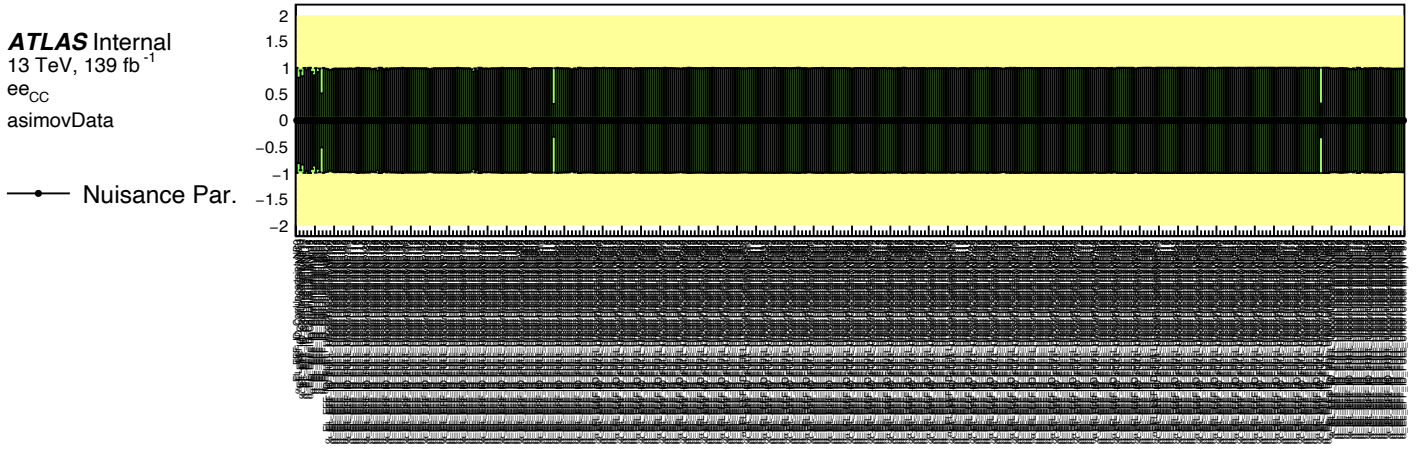


New production

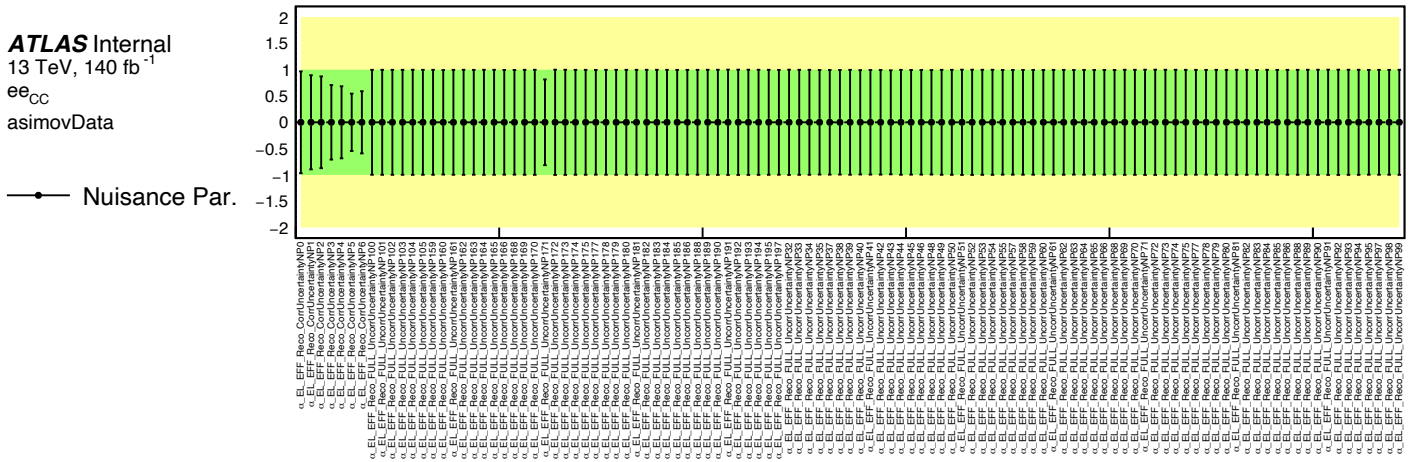


- ID efficiency much more constrained than in the old production, clearly needs more investigation.

Old production

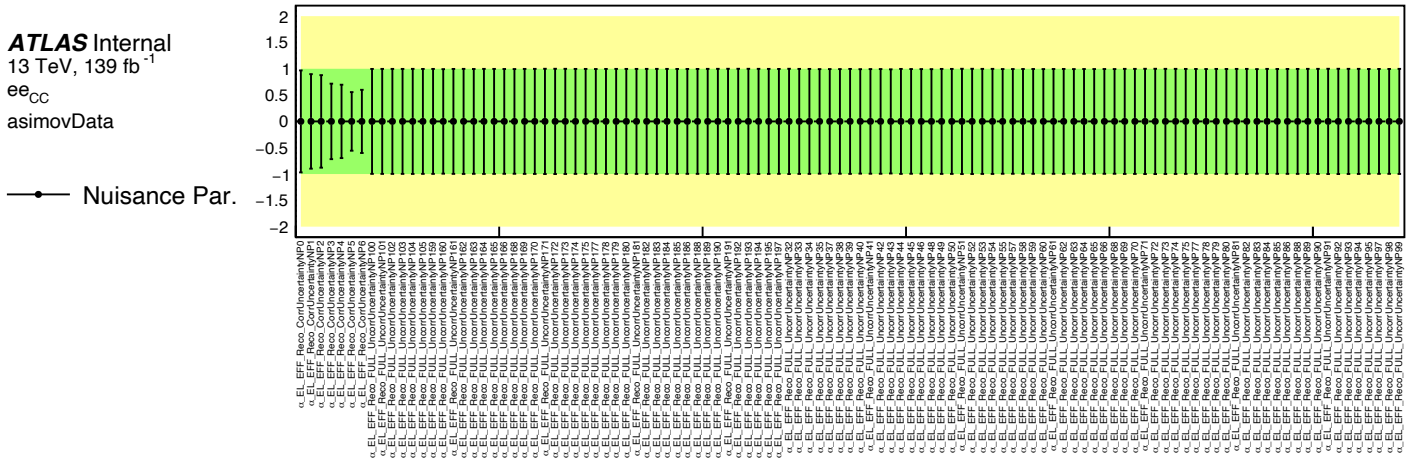


New production

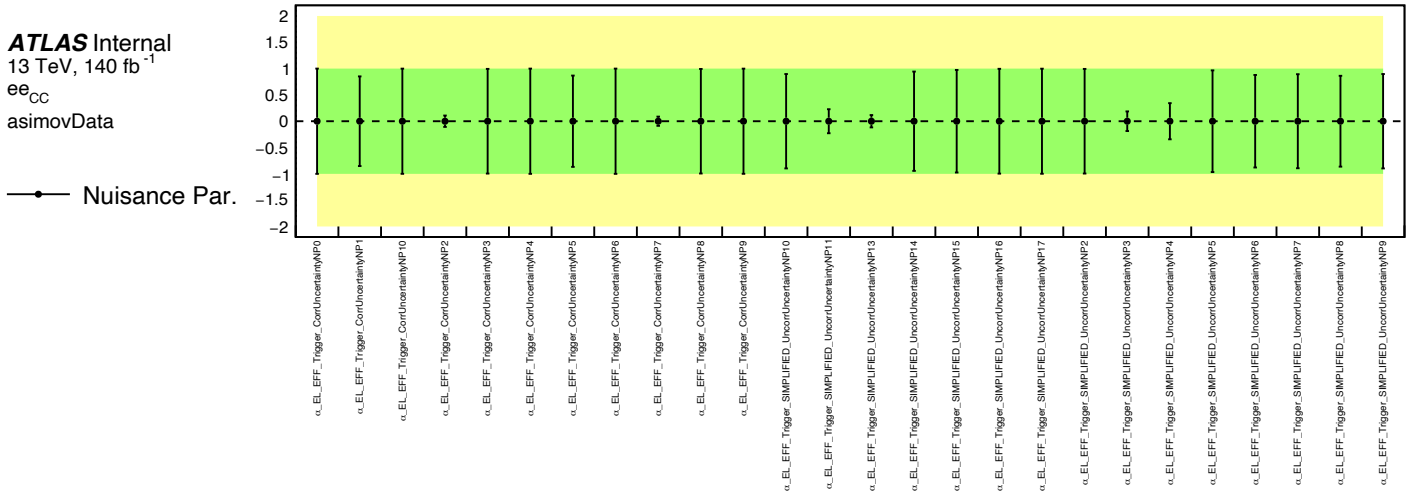


- Reconstruction efficiency looks similar to the old production, good to see!

Old production

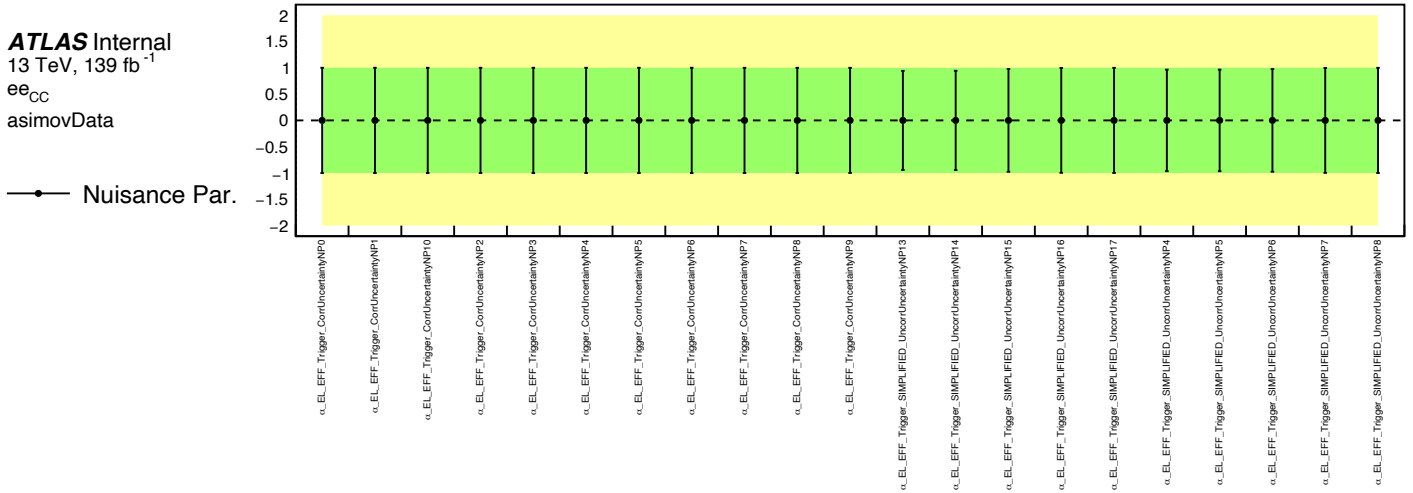


New production



- Several trigger NPs highly constrained as to be expected from uncertainty breakdown plot.

Old production



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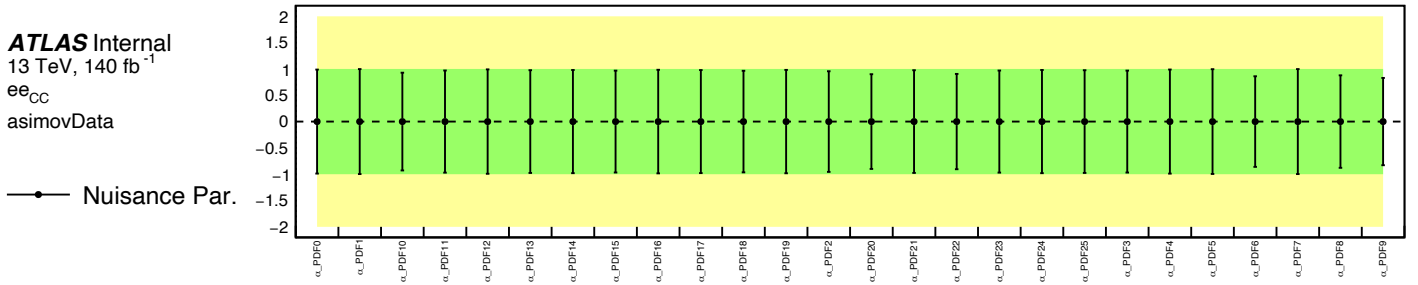
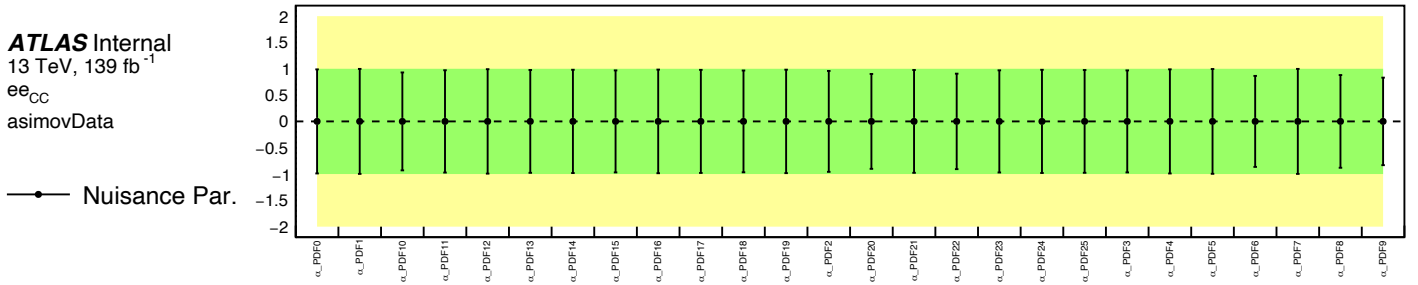
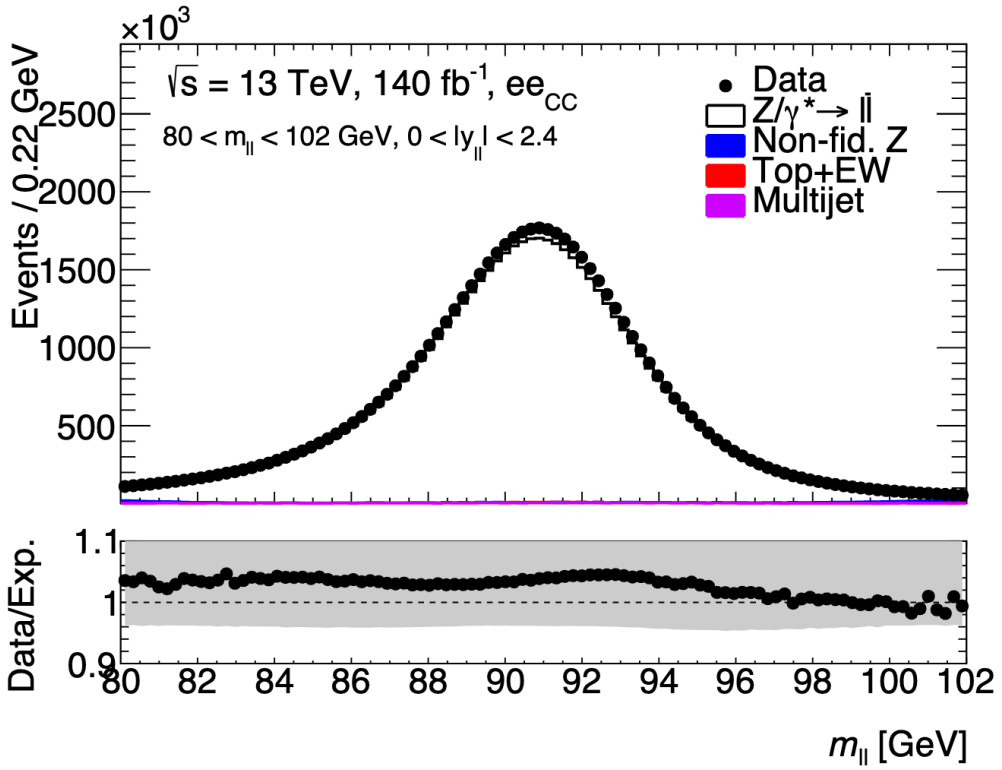


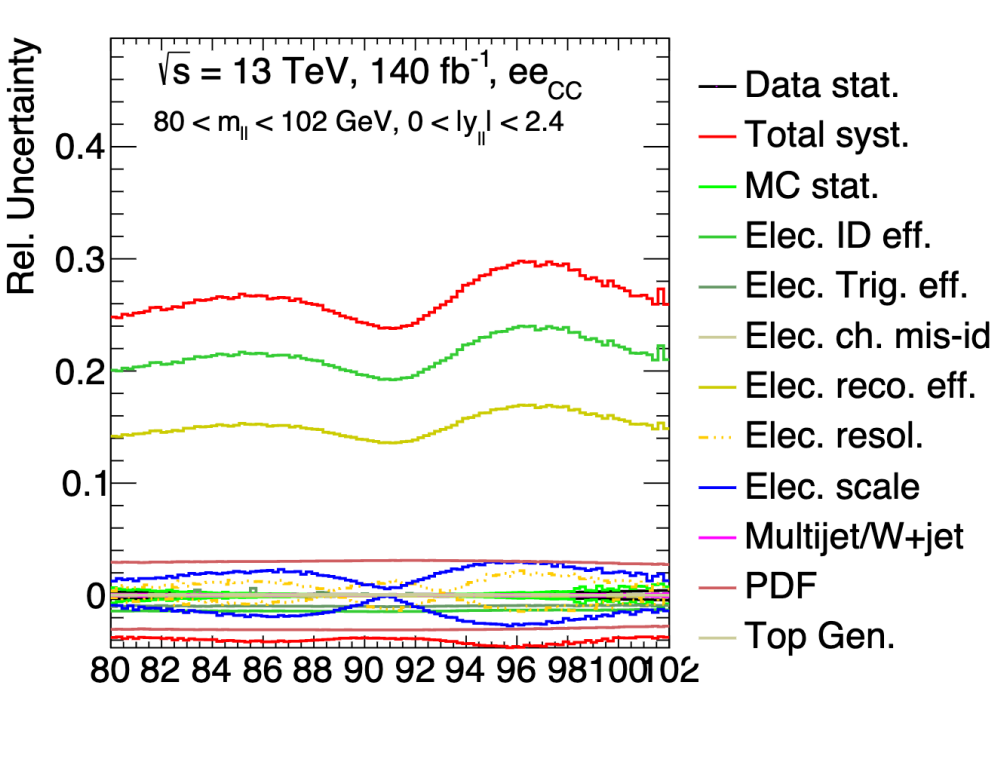
- PDF variations also look very similar to the old.

Old production



Mll Control Plot + sys band





- Normalisation issue remains fixed (one less problem to deal with!)
- Downward systematic band looks reasonable to me, problems seem to stem from upwards variations, again clearly driven by ID efficiency

Path forward

- Highly constrained NPs almost certainly arise from missing files/events, unclear at this point if it comes from the hadding to get full run 2 or from the scan of an individual year, or a combination of both.
  - Similar problems were observed with the ID efficiency last year as well…
- Start with ID efficiency since it's causing the most problems, then look at the other ones
- Good news, if scan resubmissions are necessary aidy can now split the systematic jobs so individual NP resubmission should be much quicker than the initial scans!

Appendix: How results are made

- Derive FFs for full run 2 using the nominal ntuples
- Run scans for individual years for all NPs
  - Check output exists and contains histograms but not the number of events in each NP
  - Resubmit any variation that hasn’t run correctly
- Hadd the years together to get full run 2
- Build workspace (still using meas.SetLumiRelErr(0.037) currently until we have some consensus about whether it should be changed)
- fit Ai in Asimov data (+ pseudo data/ obs data when issues are fixed in Asimov) and make plots!

- Made the pull plots for individual years, 2015/16 seems to be the culprit!

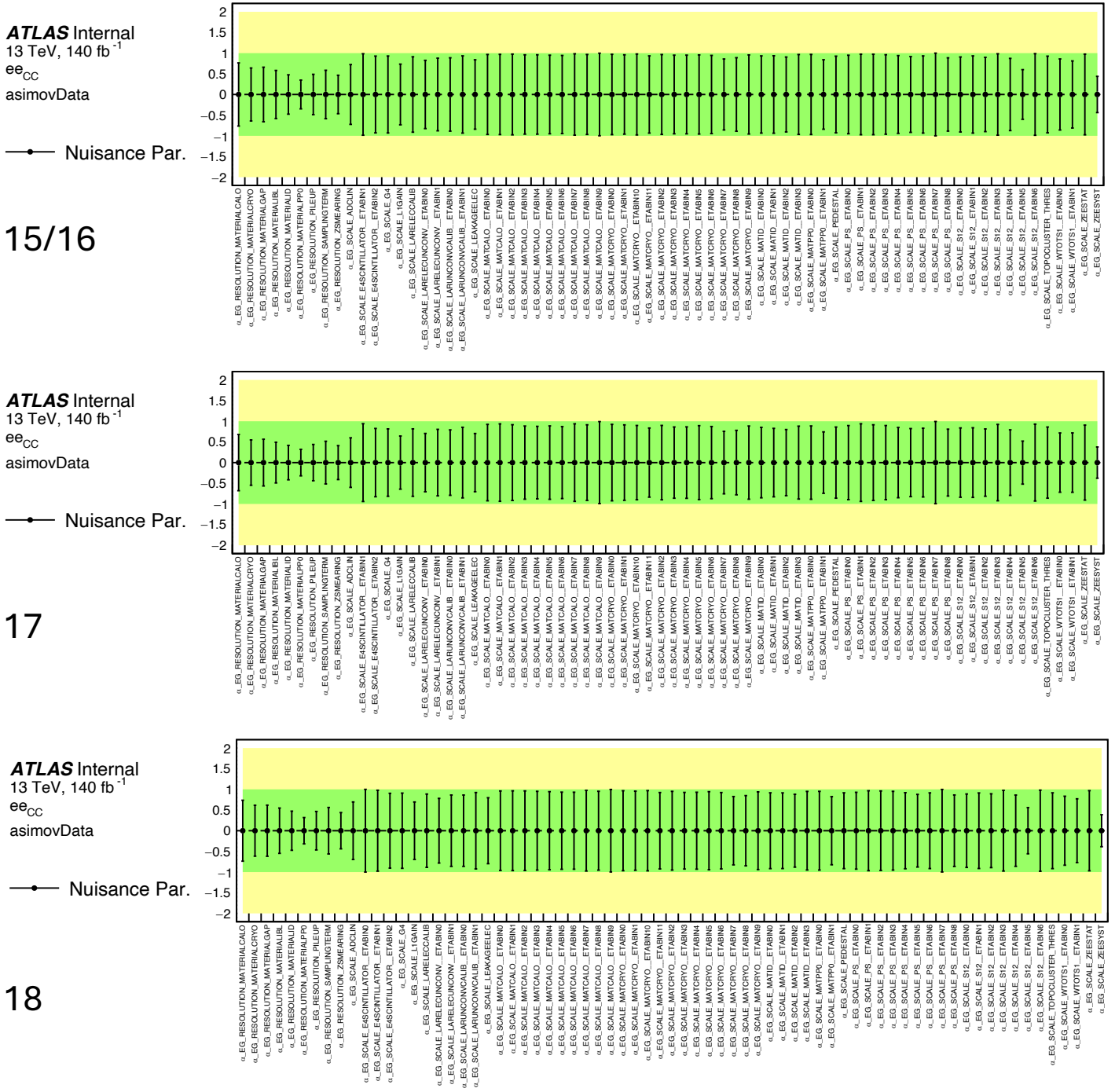
- Kinematic variations
- Charge ID
- ID efficiency variations
- Reco efficiency variations
- Trigger efficiency variations
- PDF variations

- Currently rerunning all 2015/16 ID variations but I'll get a concrete number that are problematic to see if it's feasible to submit split jobs for them all

- Problematic 15/16 trigger systematics will be rerun separately (split submission)

- All else appears reasonable to me?

- Should probably add in pull plots from MJ and background systematics as well (not currently in aidy!



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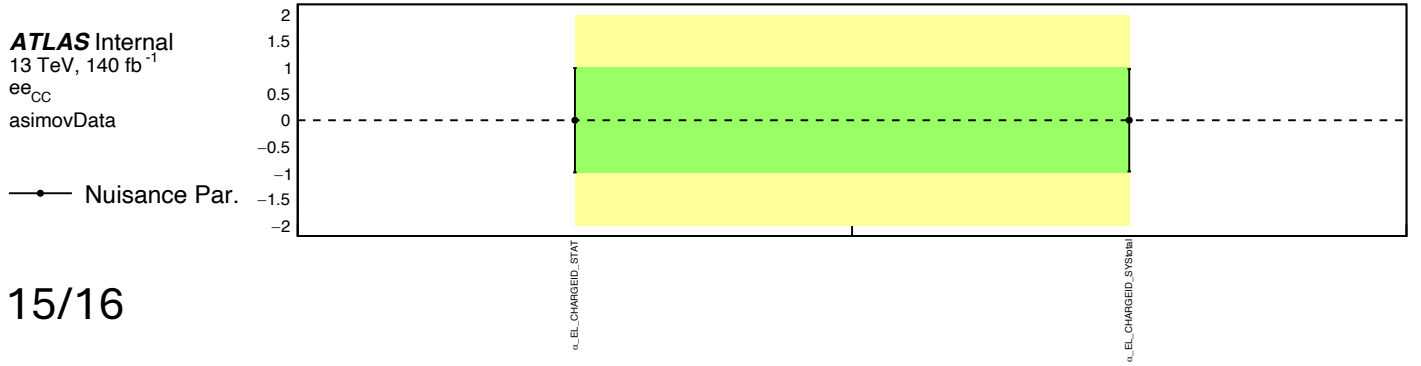
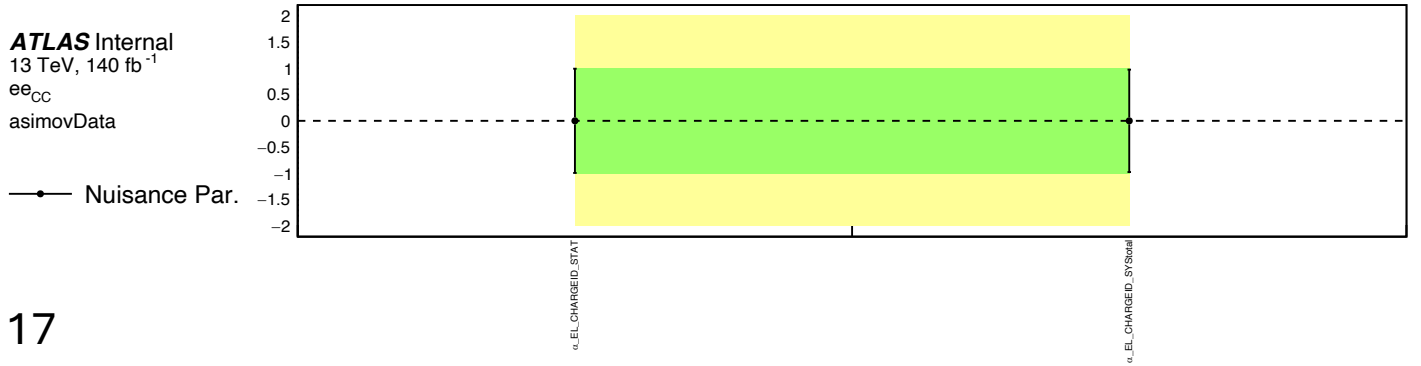


15/16



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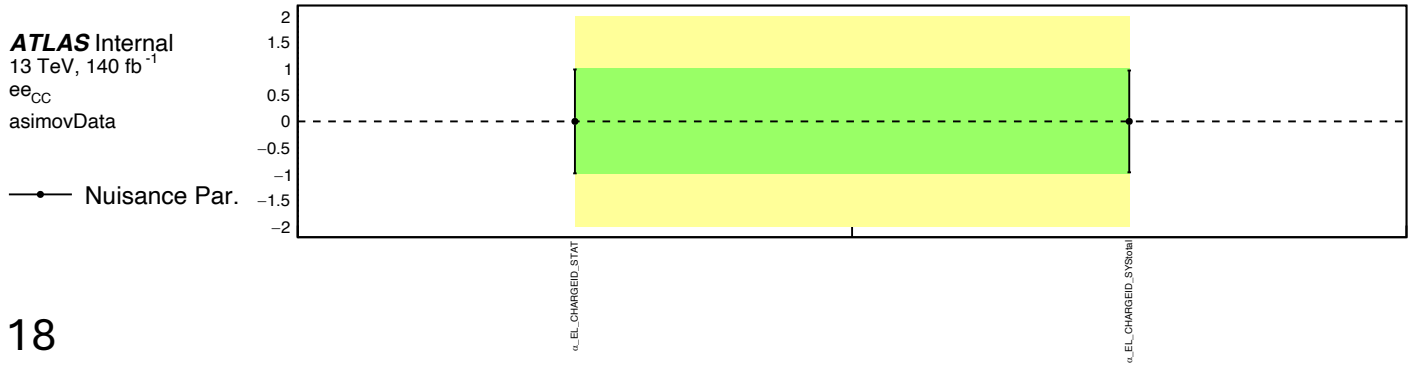

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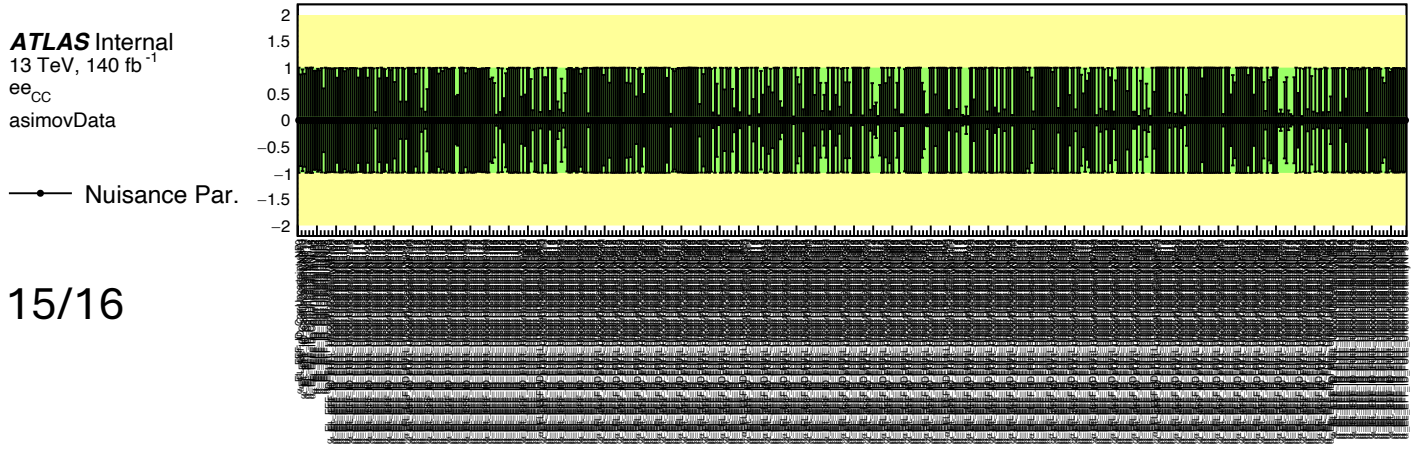

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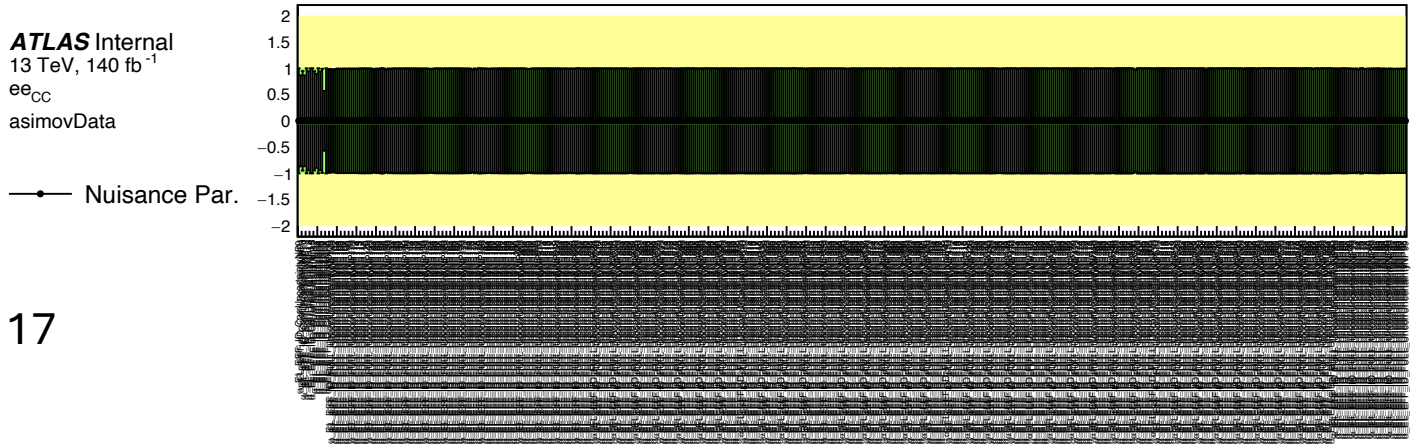

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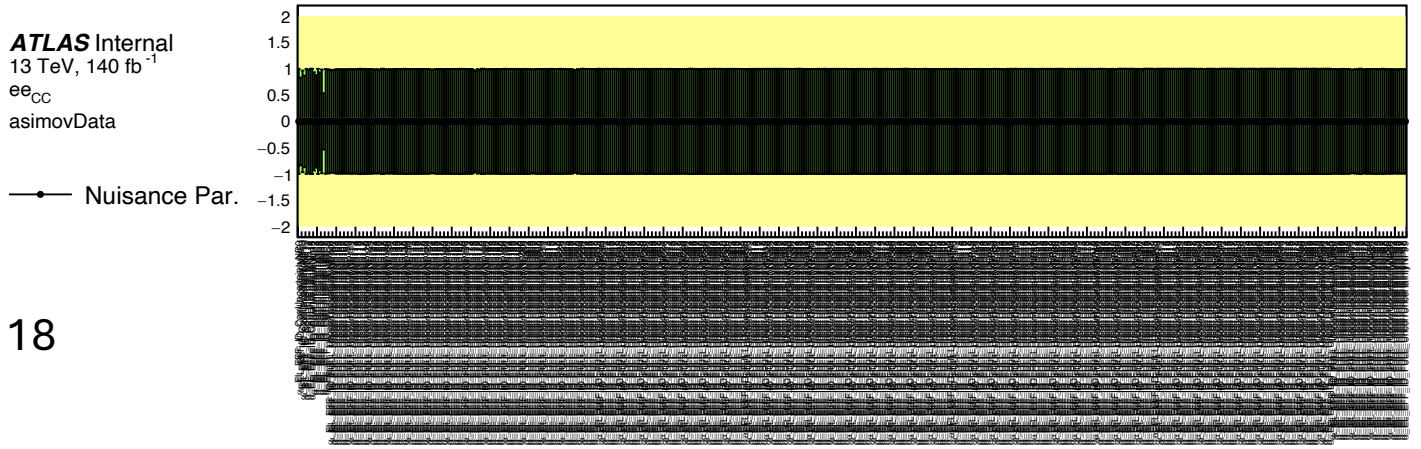

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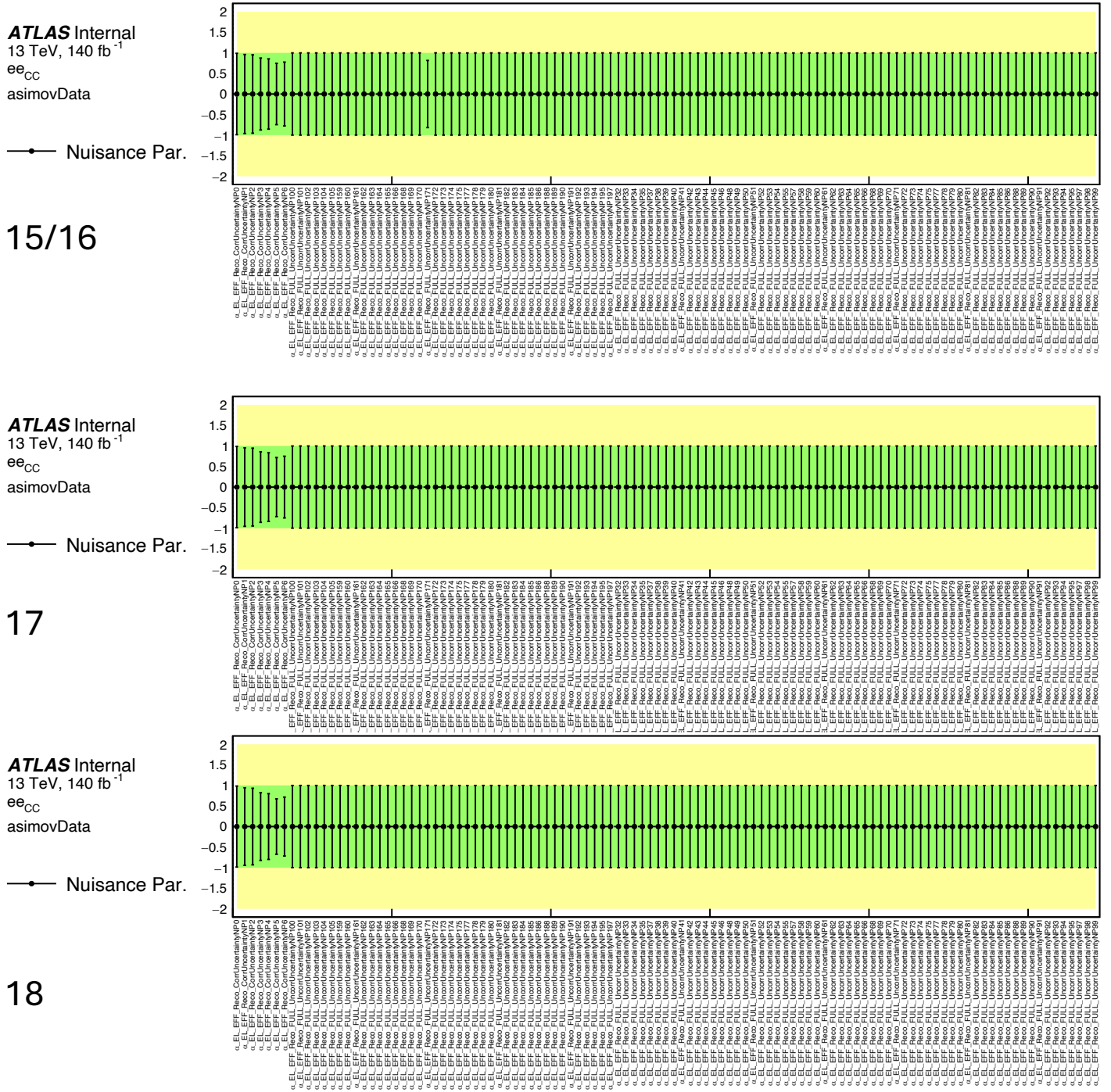

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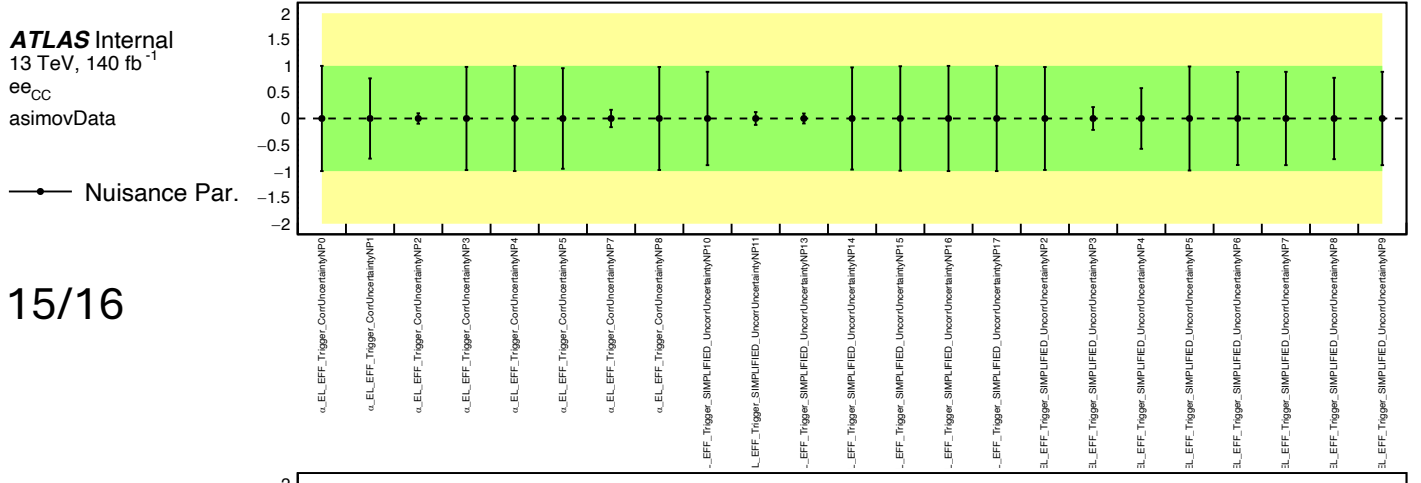

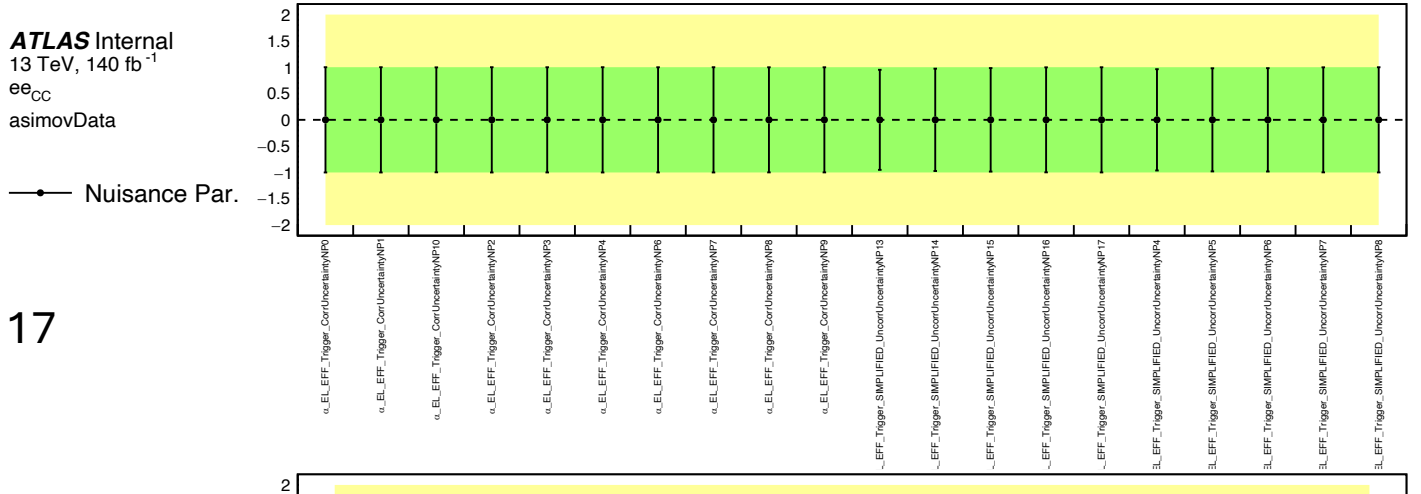

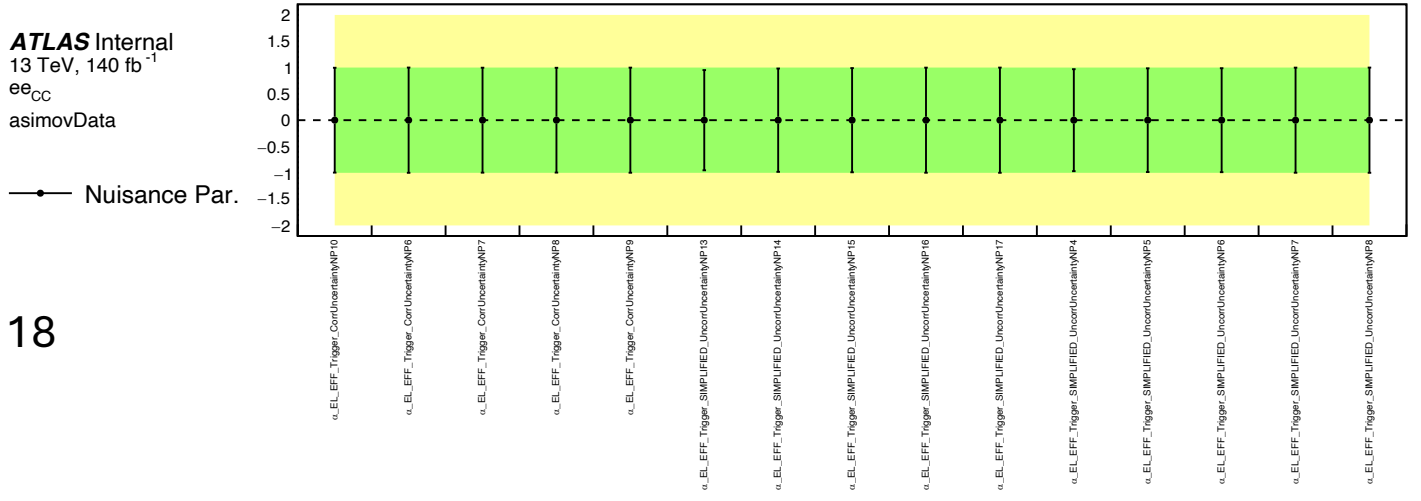

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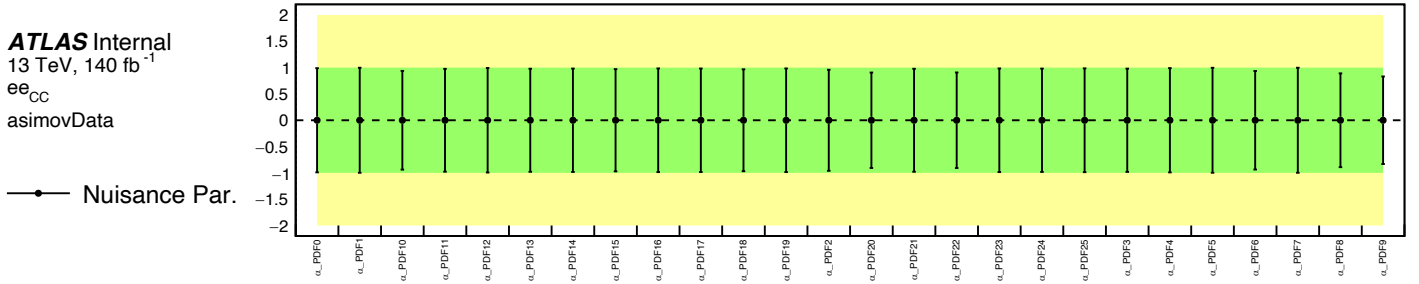

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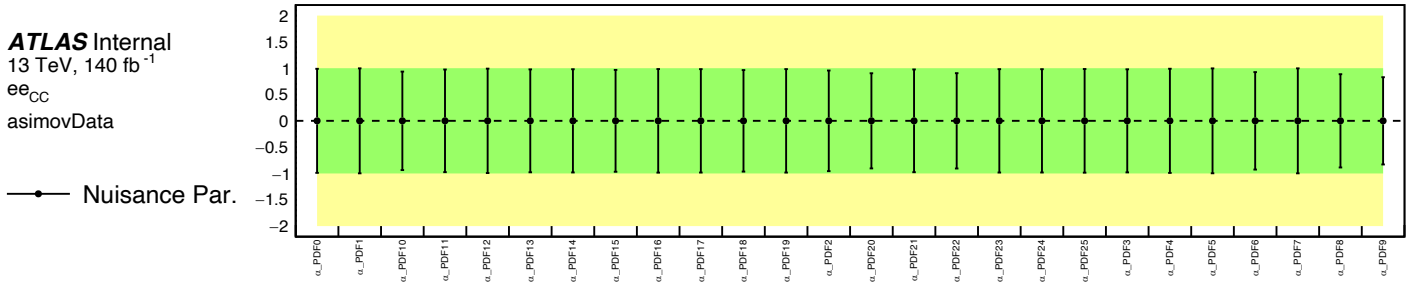

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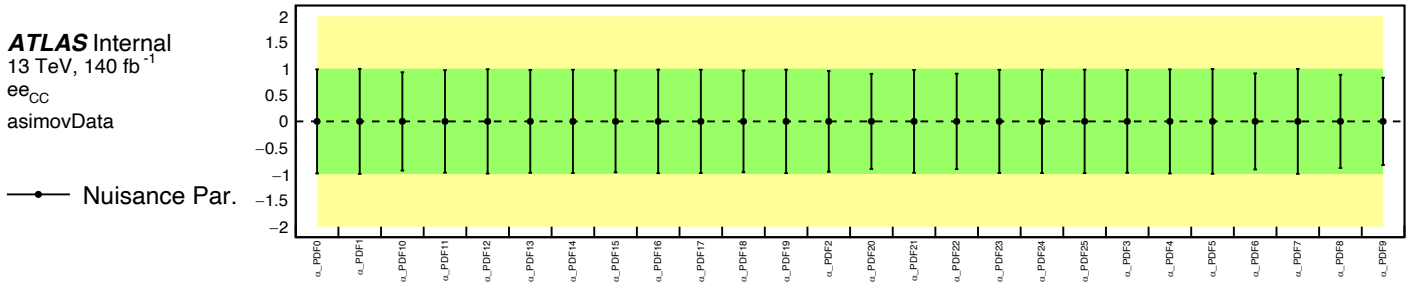

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Updated plans

- CC:
  - Correct problematic NPs
  - Re-hadd full run 2 and fit Asimov/pseudodata/obsData
  - Run compatibility with the muon channel with systematics (get numeric agreement as well as plots)

- CF:
  - Rerun calibration for each year (currently some weird bug is causing the fitting to crash since updating to the new binning)
    - Double check with Filip how to do the systematics on the fit
  - Asimov studies on s2w sensitivity.