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VTX Detector and Cross Section Measurements at CNAO2025

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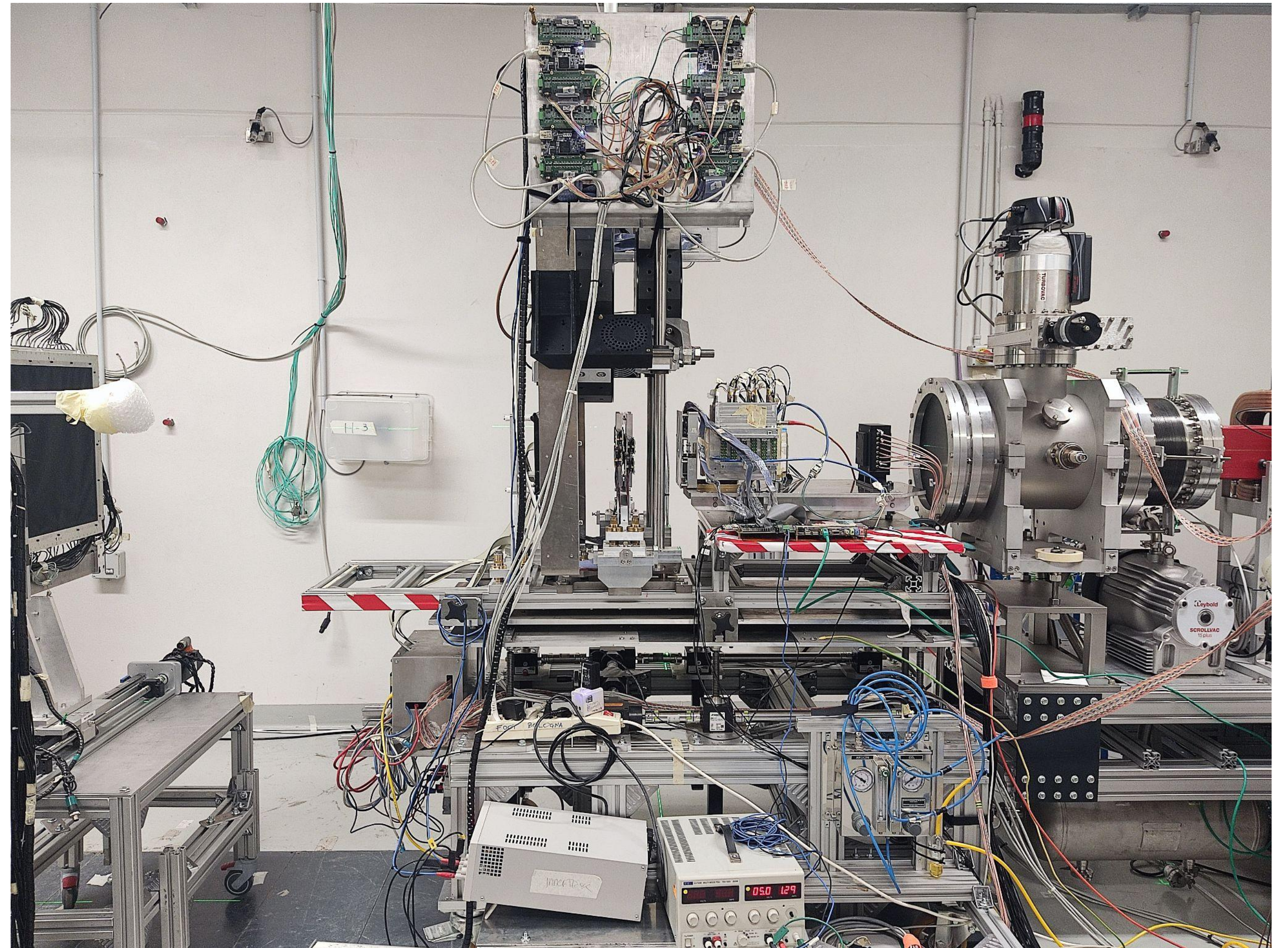


VTX at CNAO2025

- During CNAO2025, the VTX operated with a threshold set at 7σ .
- The achieved efficiencies are remarkably high.
- Pile-up is very low.

Can we extract an experimental cross-section using the ST + BM + VTX + TW setup with CNAO2025?

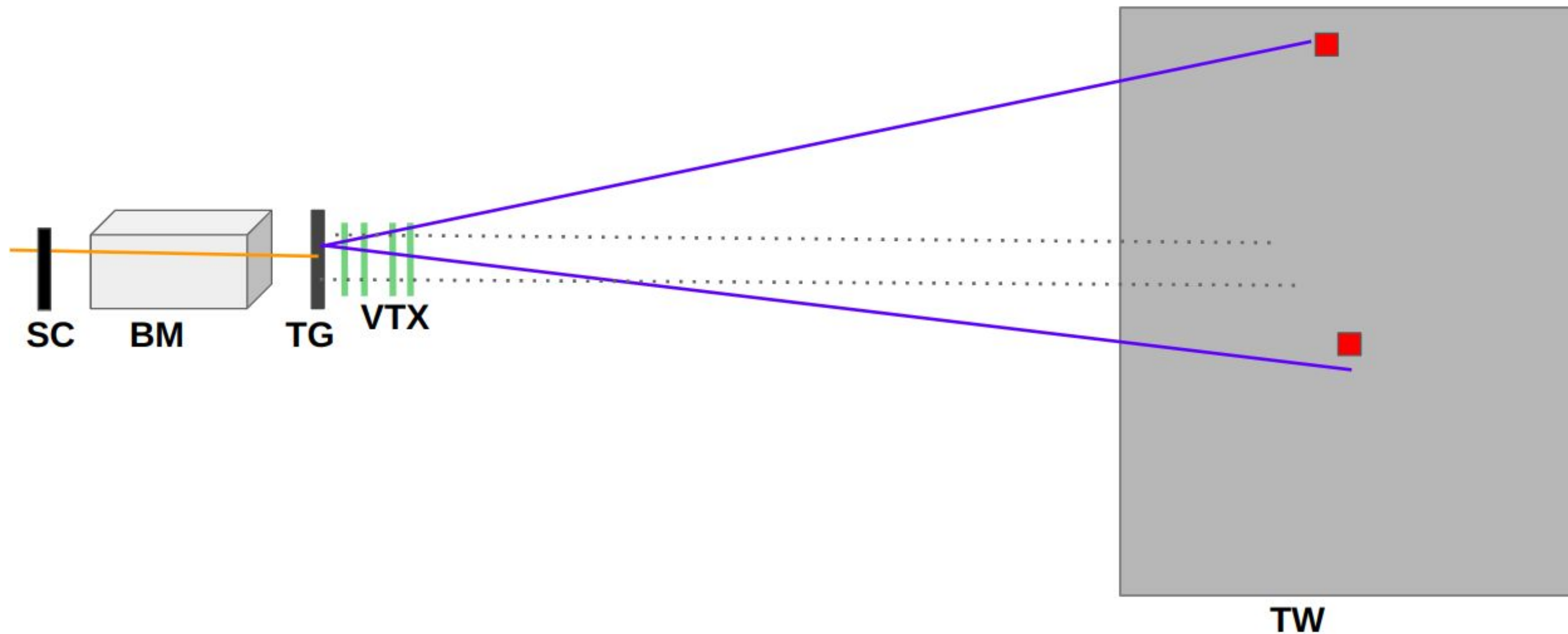
For this analysis, we rely on the MC_CNAO2025 sample (which features a more accurate beam simulation), while several fixes were applied to the decoding of the data.



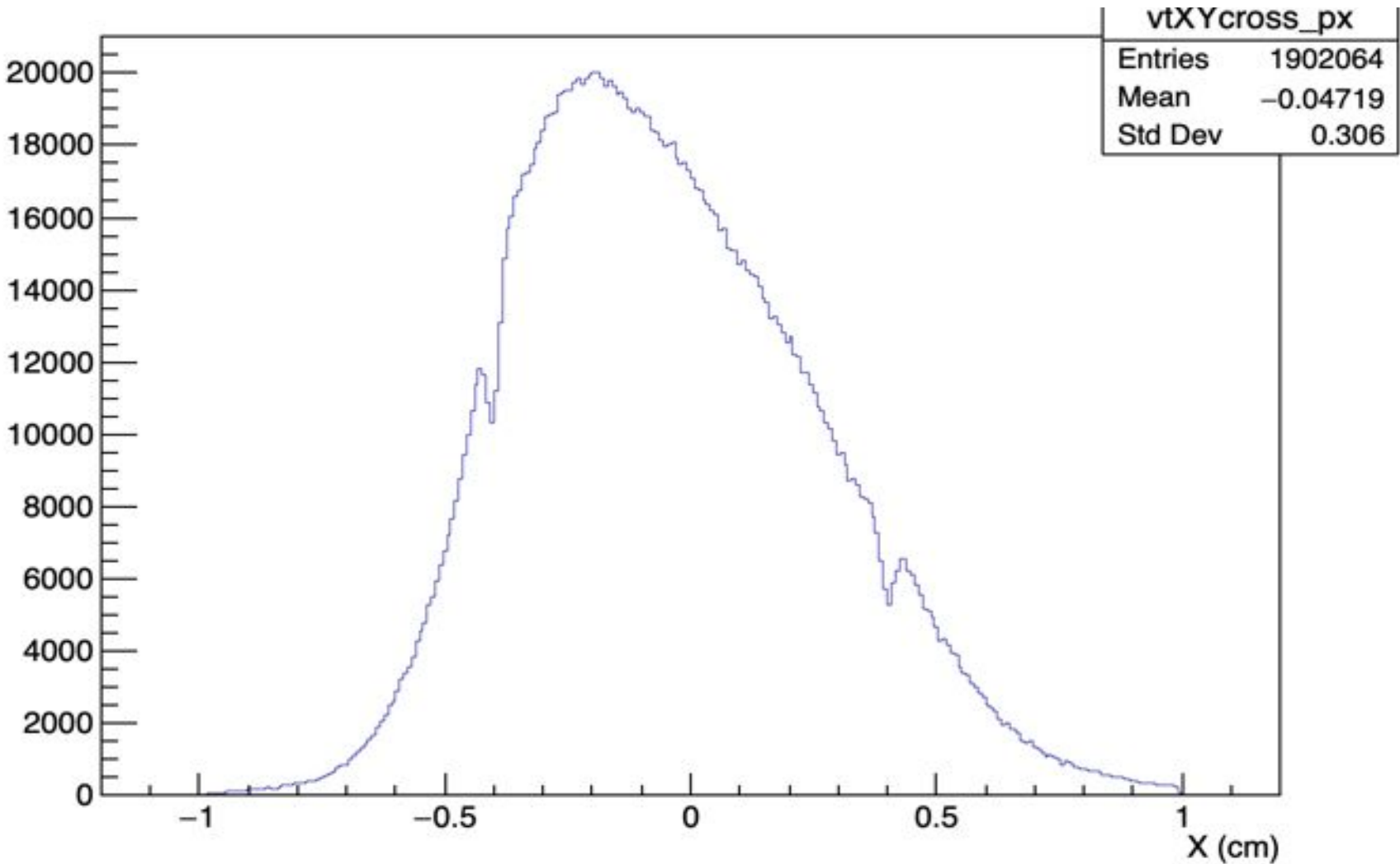
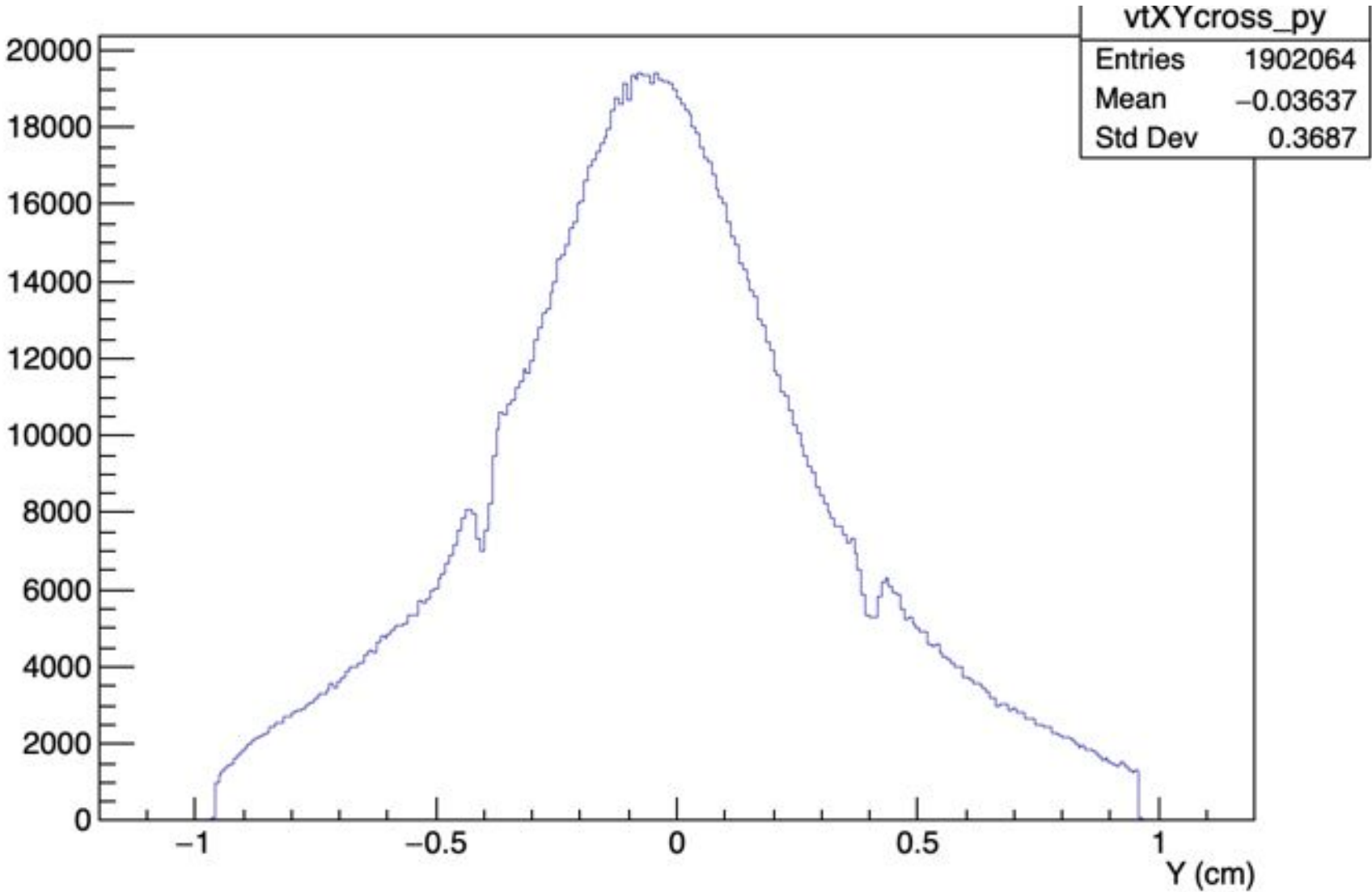
Yield selection

Given an event with only 1BM track in VTX acceptance (a primary):

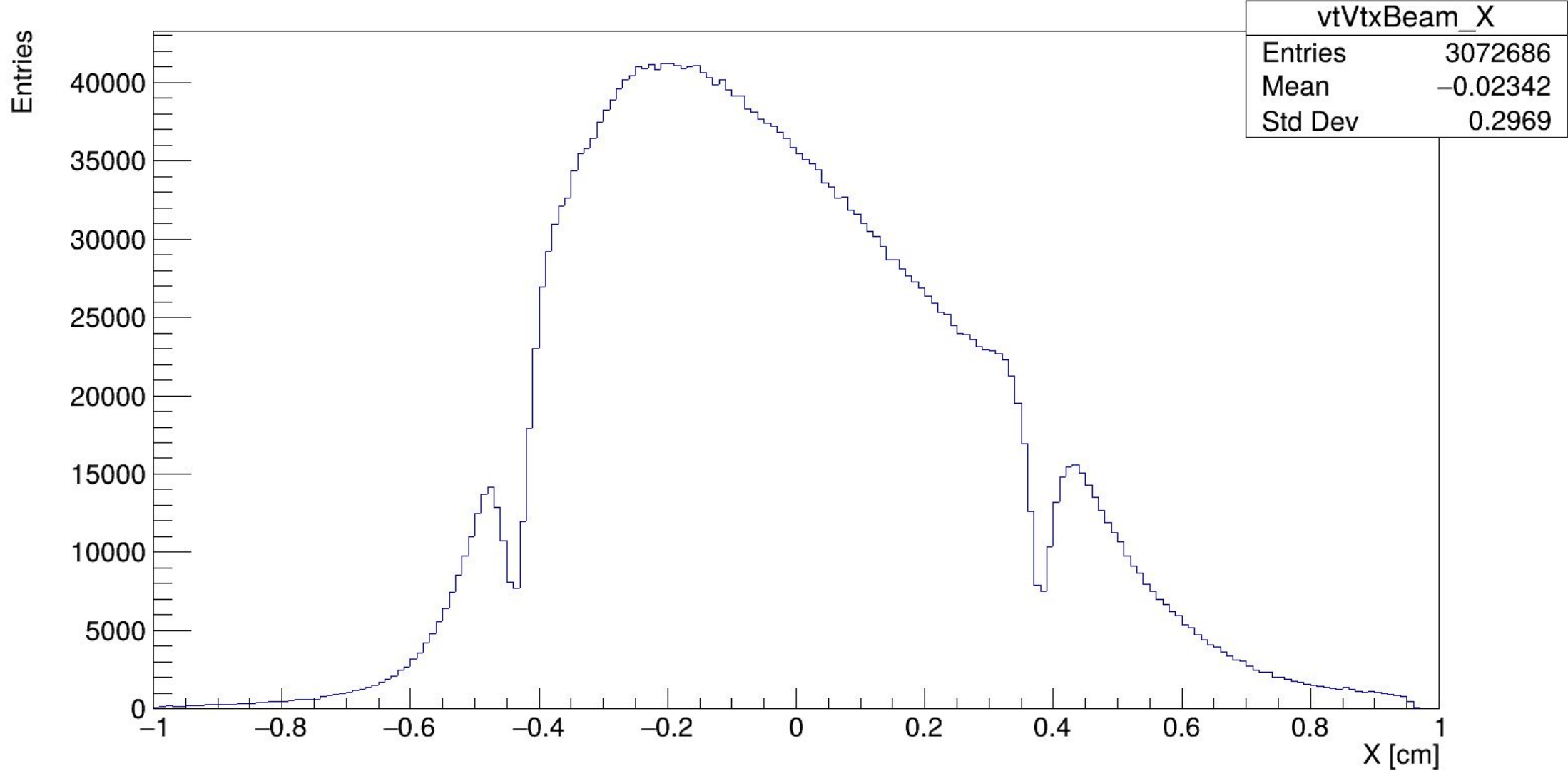
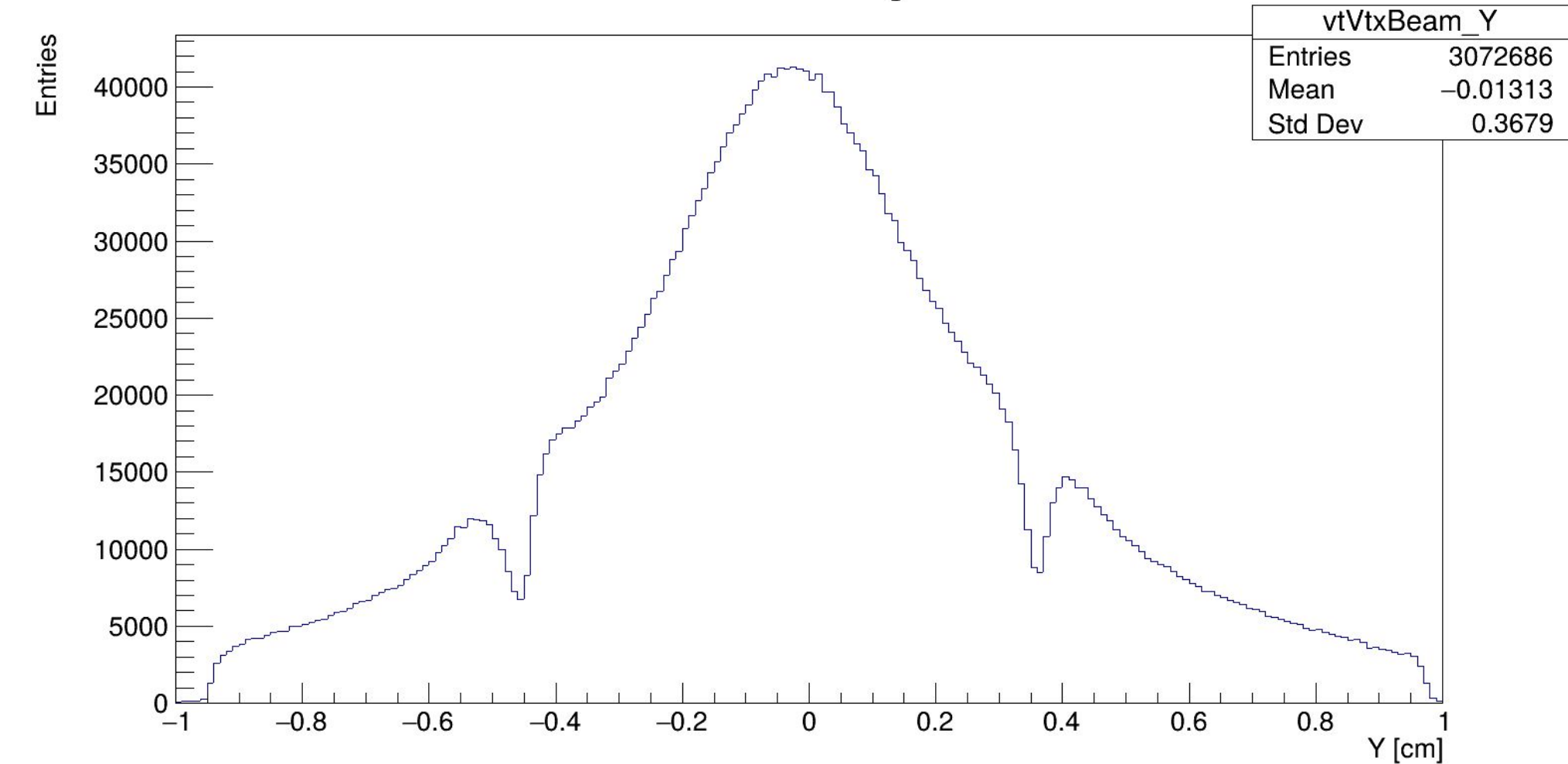
- Discard events with **Z = 6** detected in TW
- Check for the presence of a **fragmentation vertex** in the VTX
- If a vertex is found → **project VTX tracks** onto the TW plane
- Search for a **TW point** near the projected track position



MC

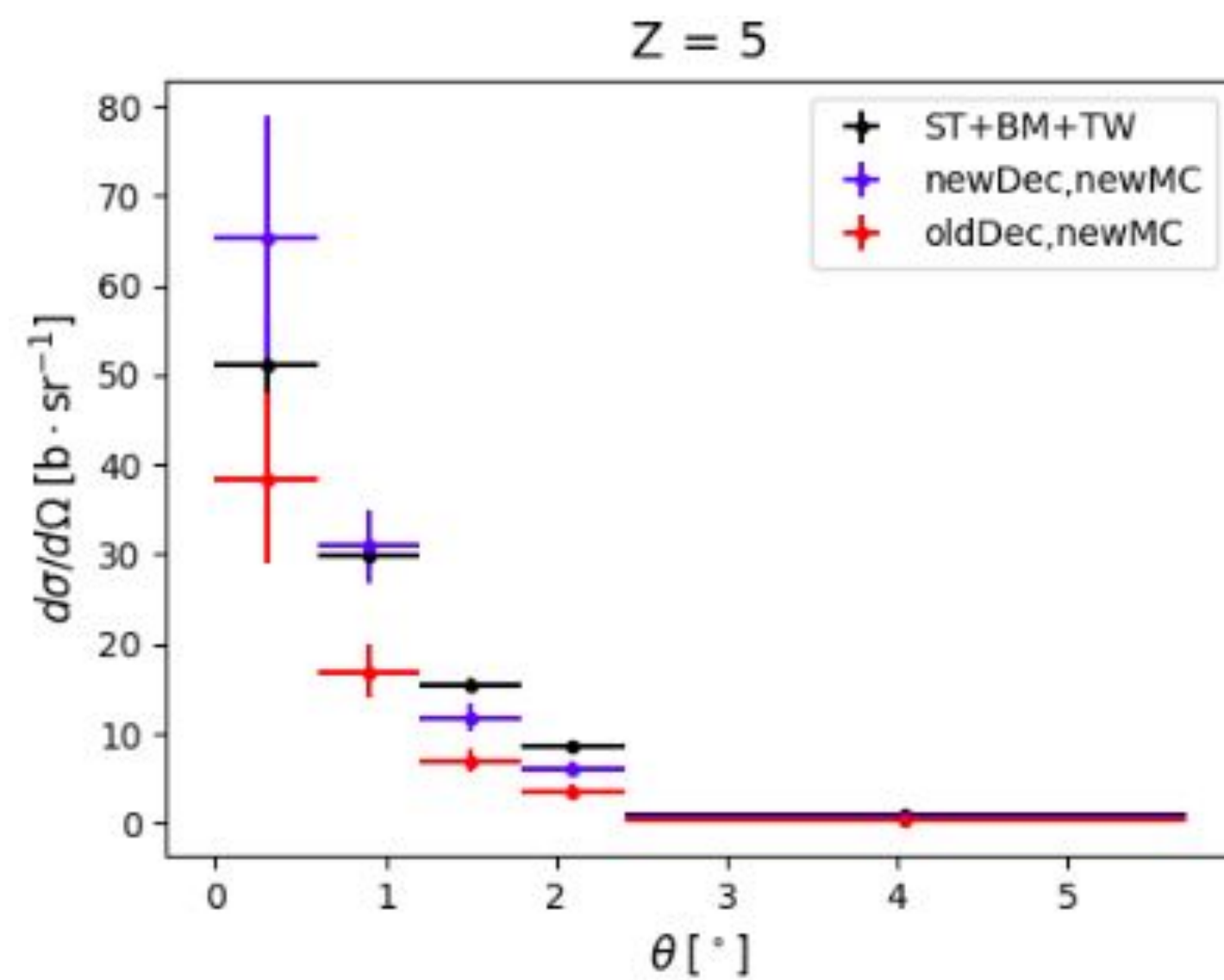
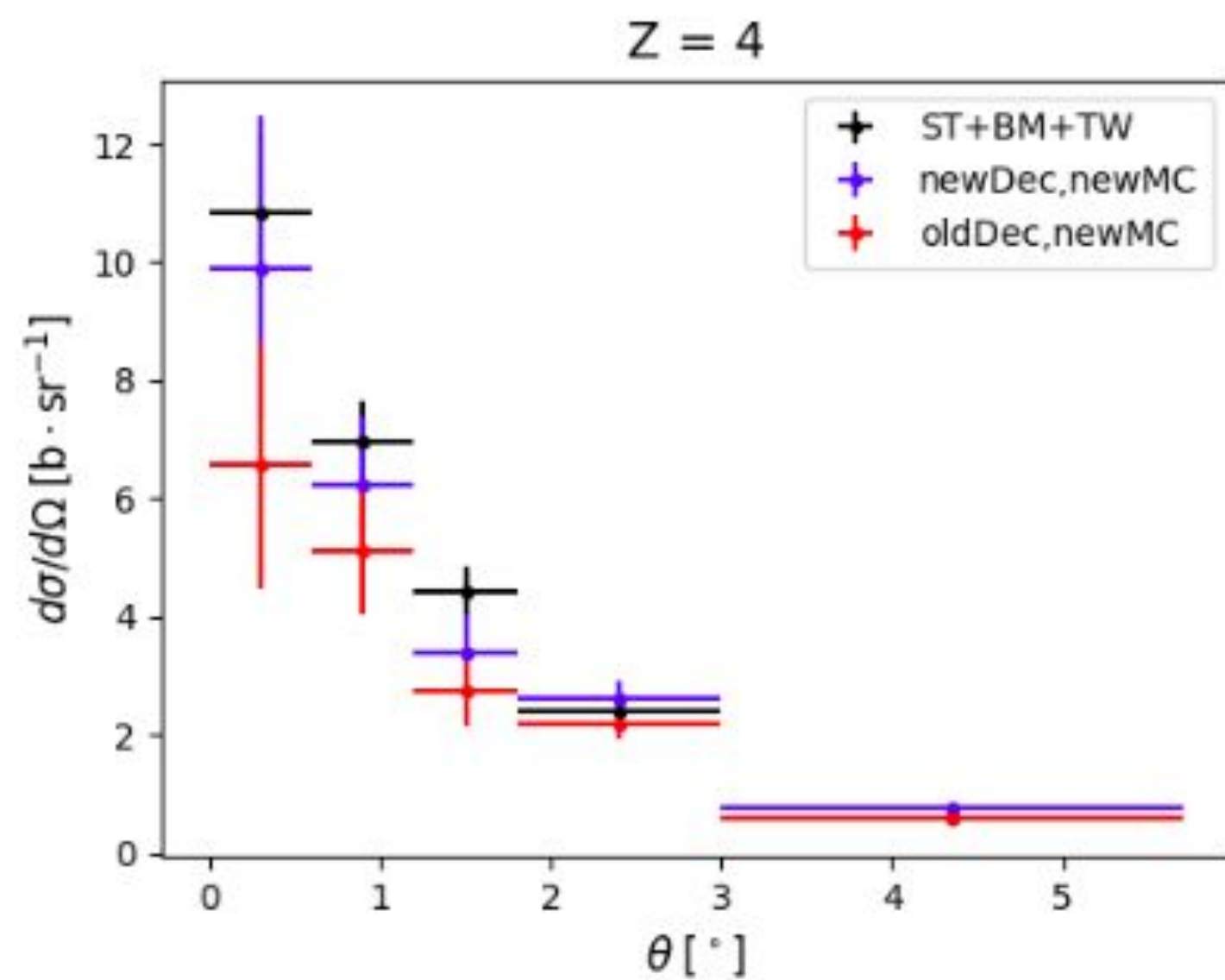
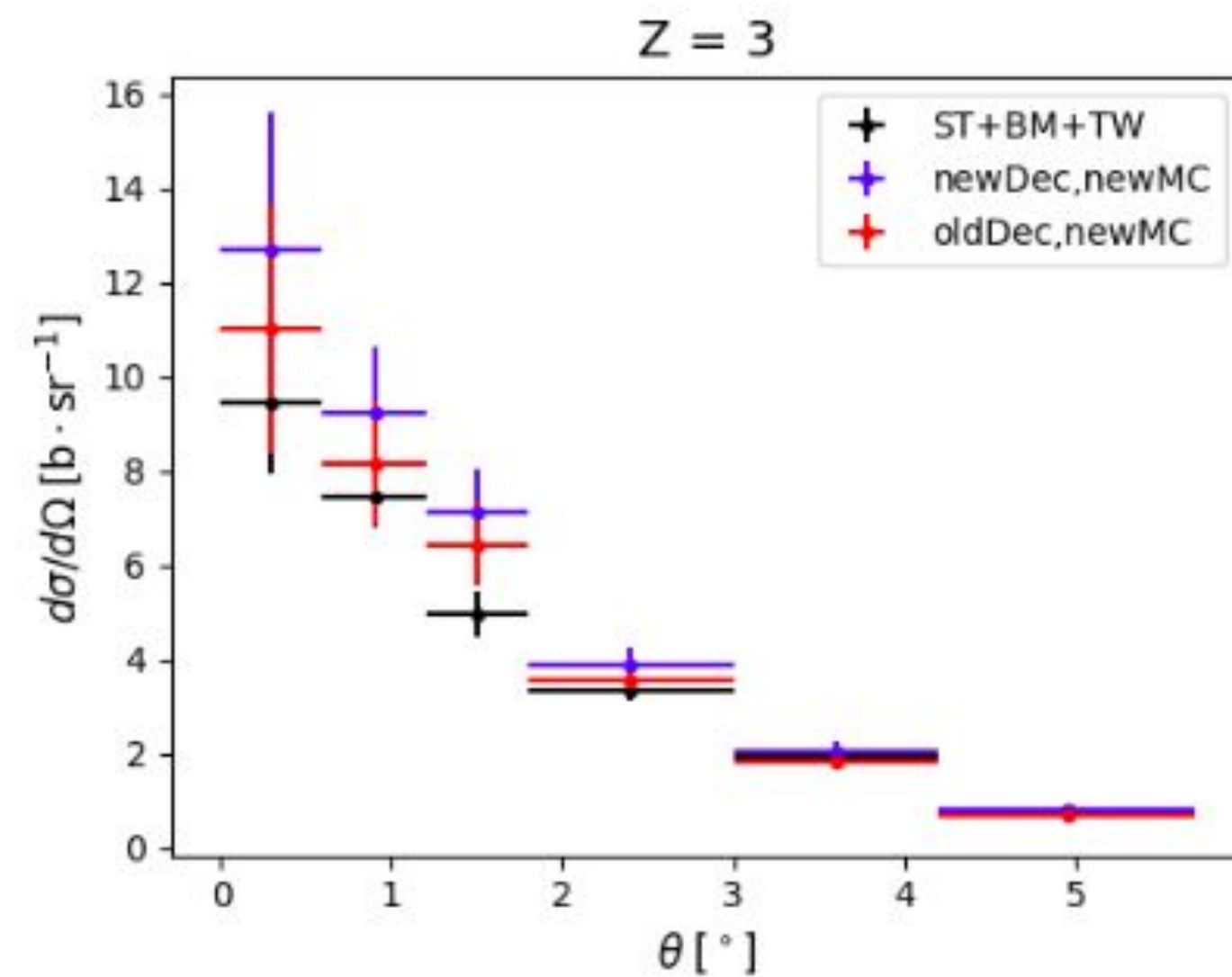
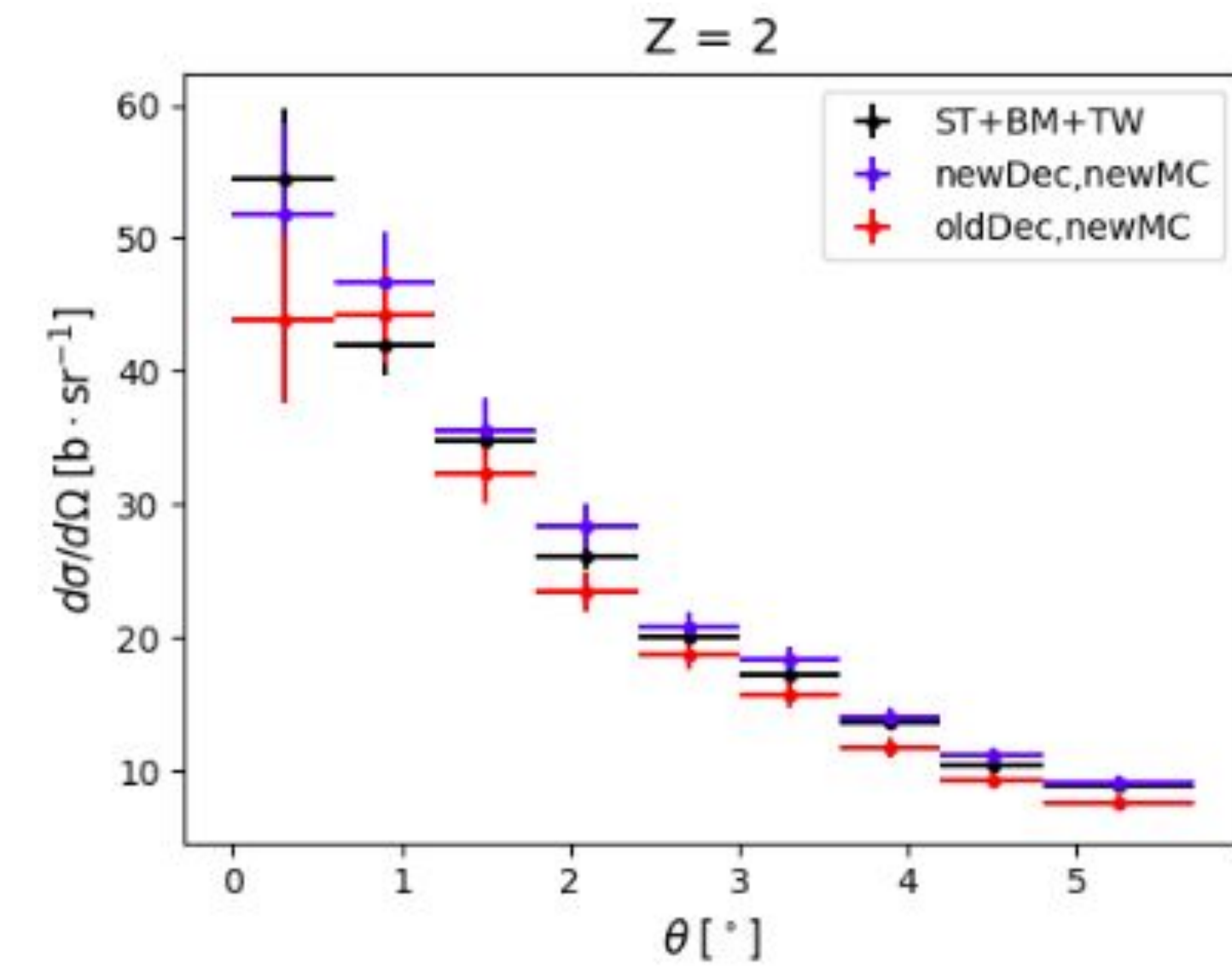


Data



Cross Section

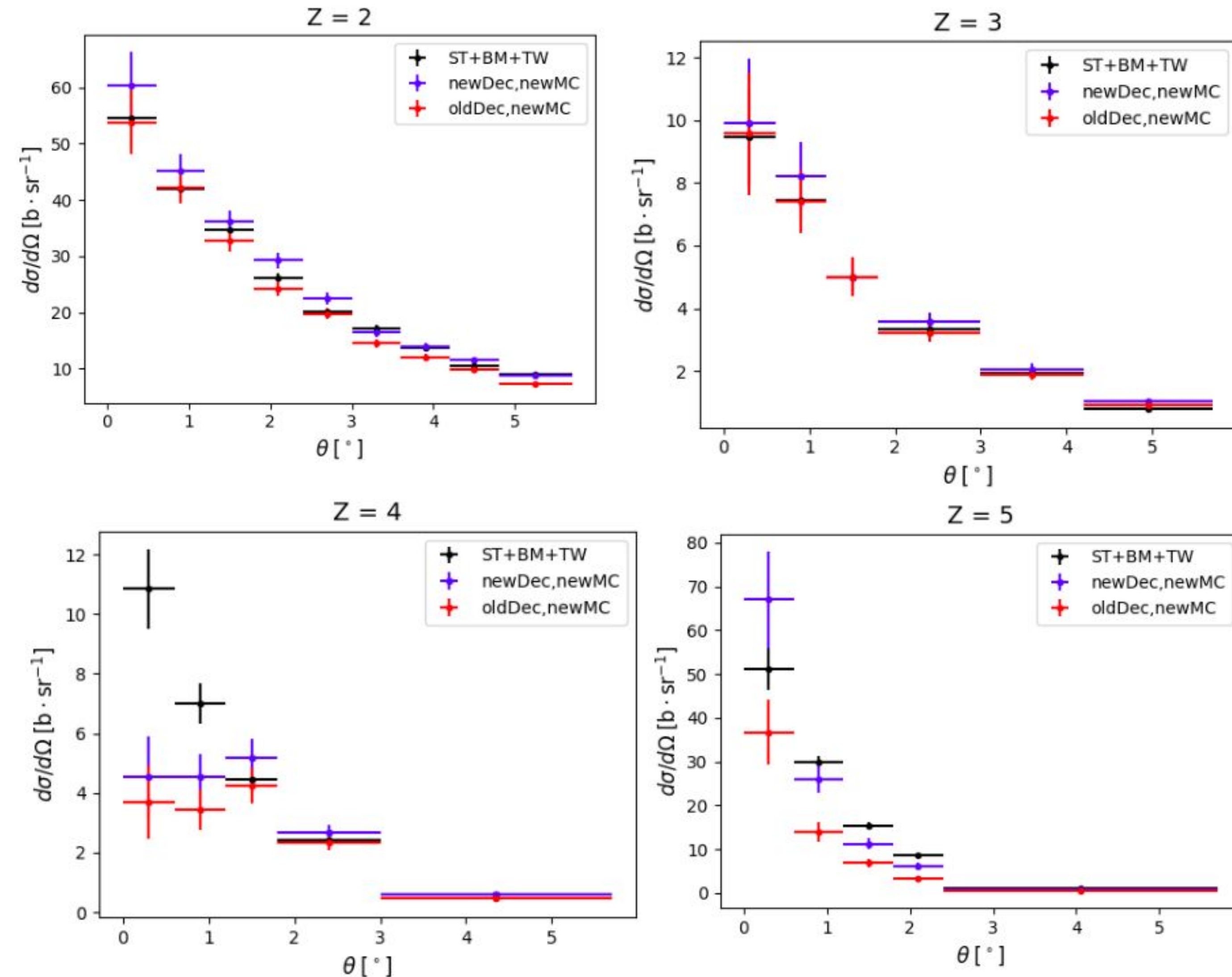
run: 7931



Similar behaviour:
7928

Cross Section

run: 7908



The reconstruction of events with $Z=4$ appears to be the most problematic (for almost all runs).

Could this be due to the absence of an unfolding procedure in the current analysis, or is there something else affecting the reconstruction?

Similar behaviour:

7909, 7910, 7922, 7924, 7927, 7930, 7932, 7933

Other problematic run: 7911, 7942

Conclusion

 **The analysis finally shows reasonable results.**

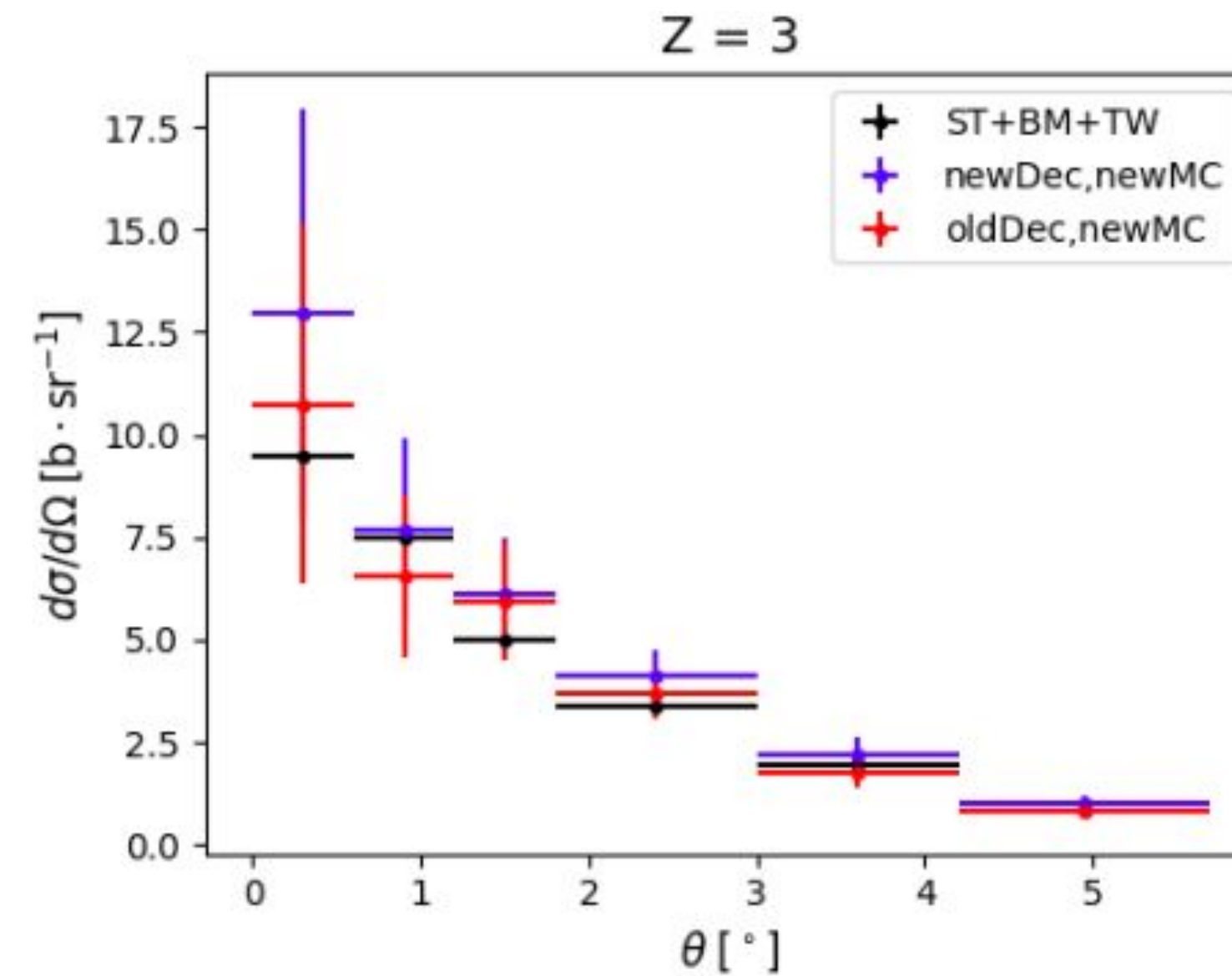
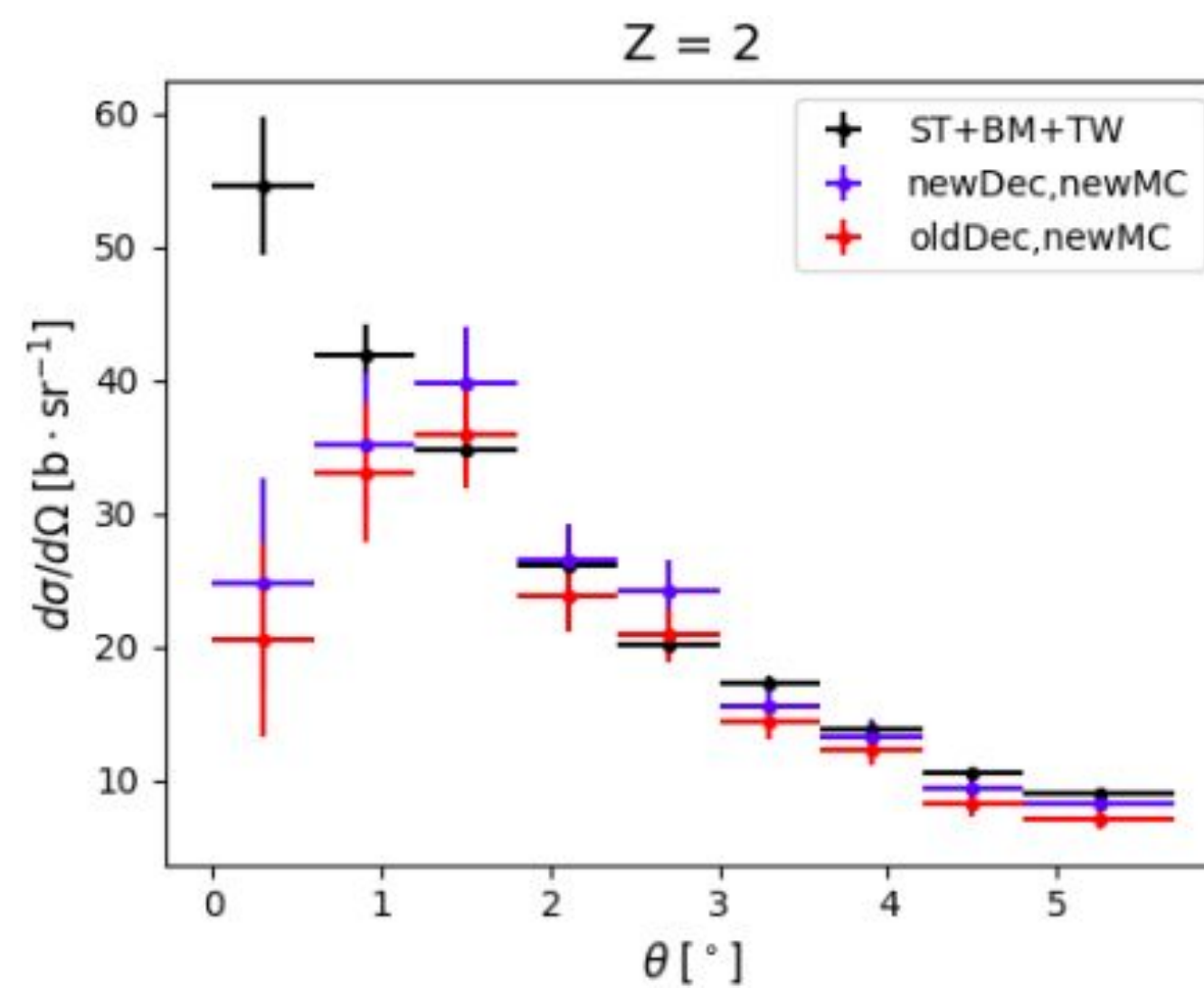
Next points to be understood:

- Is the issue observed for $Z=4$ only related to the absence of the unfolding procedure?
- Why do some runs, such as 7011, still show some issues?



Cross Section

run: 7911



This run also shows issues for $Z=2$; why?

