

# MAIA Neutron v6 Updates

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3 October 2025



# MAIA Info – Sample Specs

- ▶ Latest no-BIB and no-BIB **neutron** samples located on OSG at

`/data/DataMuC_MAIA_v0/v6/reco (BIB) /neutronGun*`

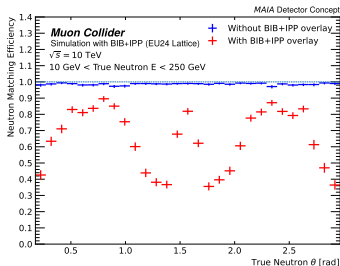
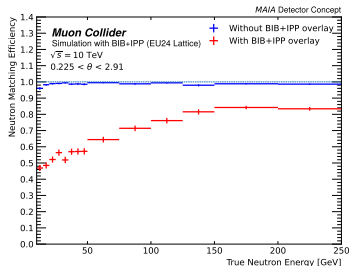
- ▶ Made with:

- ▶ Latest software
- ▶ FTFP\_BERT\_HP (thanks JP!)
- ▶ Larry-style Pandora
- ▶ 300ps timing cuts (thanks Alyna + Kiley!)

# Efficiency

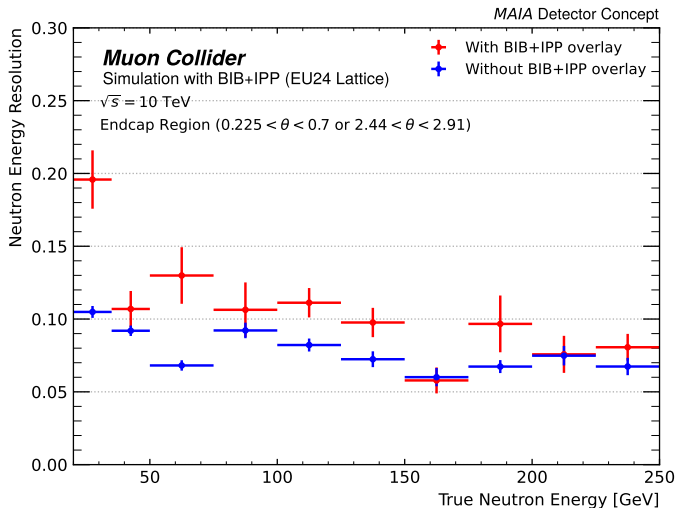
Matching efficiency plotted against energy (left) and theta (right). BIB matching efficiency is very poor (a) at low energies and (b) in the endcaps and the edges of the barrel regions... surprisingly good in the transition regions.

- ▶ Features of this plot still not entirely understood
- ▶ **Possible thought:** We exclude these plots from the paper and just reference them, since neutron matching is not actually a physics priority and we just want to use them as standard candles to study HCAL resolution



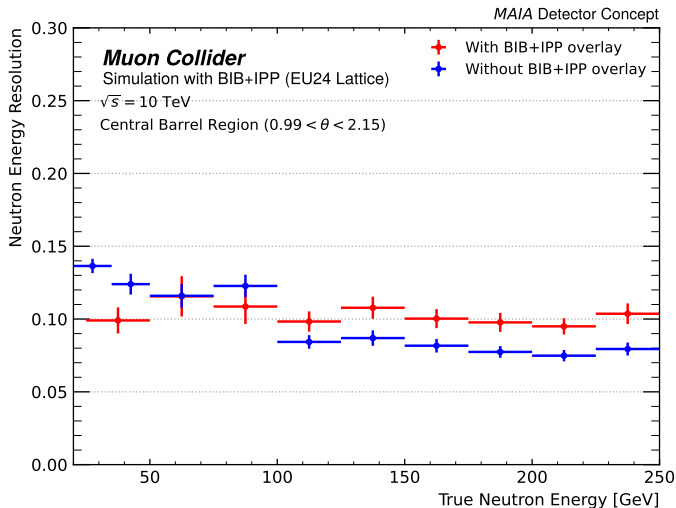
# Resolution (Endcaps)

Energy resolution for neutrons in the endcap region, plotted against true energy.



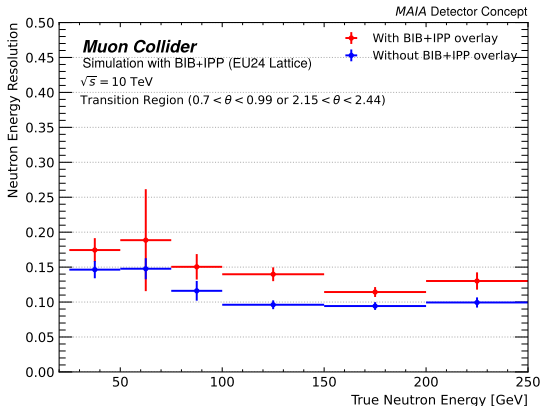
# Resolution (Barrel)

Energy resolution for neutrons in the barrel region, plotted against true energy.



# Resolution (Transition)

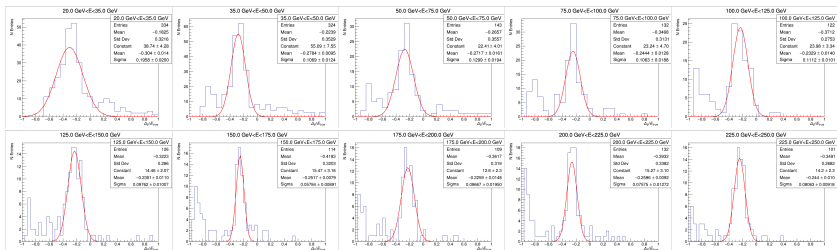
Energy resolution for neutrons in the transition region, plotted against true energy. Initially had a lot of fluctuations, partially due to low stats, but was able to achieve this very reasonable plot after a LOT of creative rebinning (hence wider bin widths than the other plots).



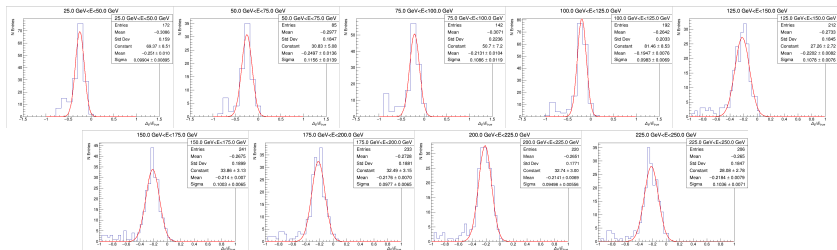
# Summary – Paper Readiness

- ▶ We now have, for **photons**:
  - ▶ Good resolution plots for BIB, no BIB, in barrel and transition regions
  - ▶ Good resolution for no BIB in the endcap regions
  - ▶ Excellent efficiency across energy ranges in transition and barrel
- ▶ And for **neutrons**:
  - ▶ Reasonable resolution plots for all three regions
  - ▶ I will tweak bins even further in endcaps, barrel regions to try to get rid of all remaining fluctuations
- ▶ Depending on what we want to do about neutron efficiency, we pretty much have all deliverables for neutral studies

# Gaussian Slices (Endcaps)



# Gaussian Slices (Barrel)



# Gaussian Slices (Transition)

