Realistic simulation of FHCal

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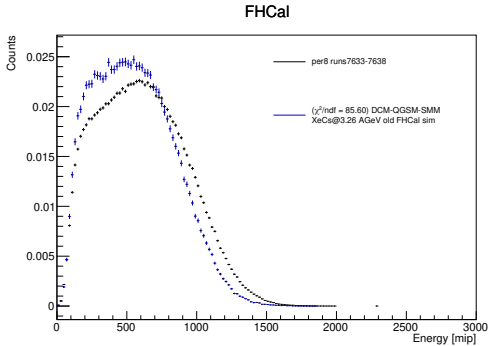
Outline

1. Motivation
2. Event Selection Criteria
3. Aligning Simulation & Experiment
4. Conclusions



Event Selection Criteria

Event selection criteria:

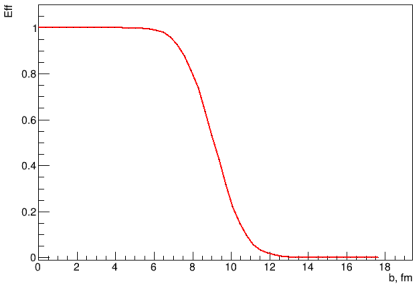
- Vertex
  - At least 2 tracks in primary vertex
  - $\chi^2/NDF < 10$
  - $|Z| < 0.1, (X^2 + Y^2) < 1$

Experiment

- Trigger selection: CCT2
- Single Xe ion in 3.6 μs: 14000 $<$ BC1S integral $<$ 40000

Simulation

- CCT2 efficiency $\rightarrow$ *see talk by D.Idrisov*

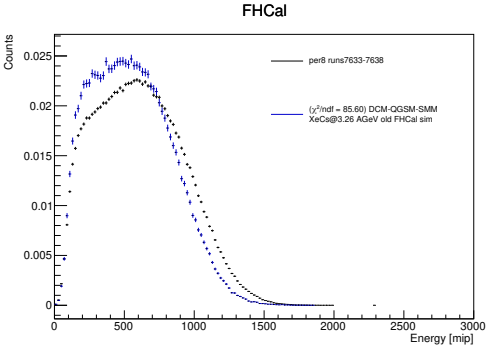


FHCal selection criteria:

- FHCal noise threshold in section 0.5 MIP

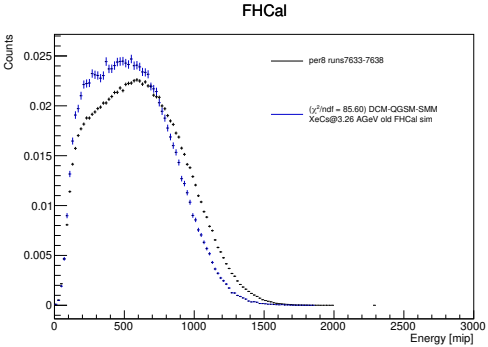
Aligning Simulation & Experiment

What is now



Aligning Simulation & Experiment

What is now

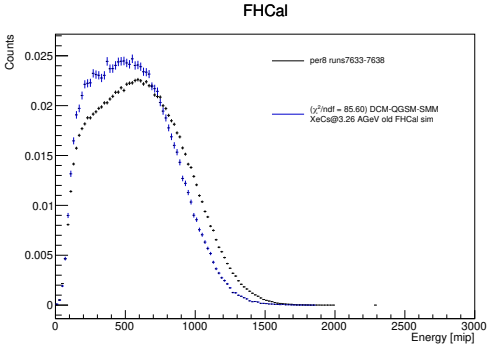


What was done

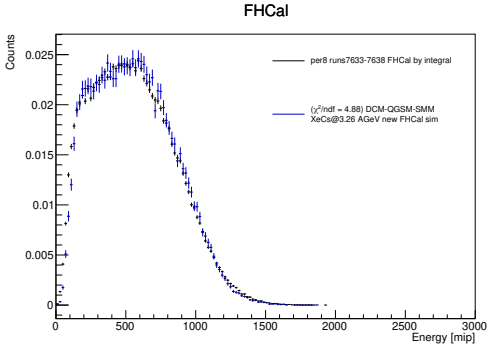
- Refactoring of simulation code
- Refactoring of digitization code
- Calibration check
- Changing scale to MIPs
- **Recalculating with signal integral instead of maximum**

Aligning Simulation & Experiment

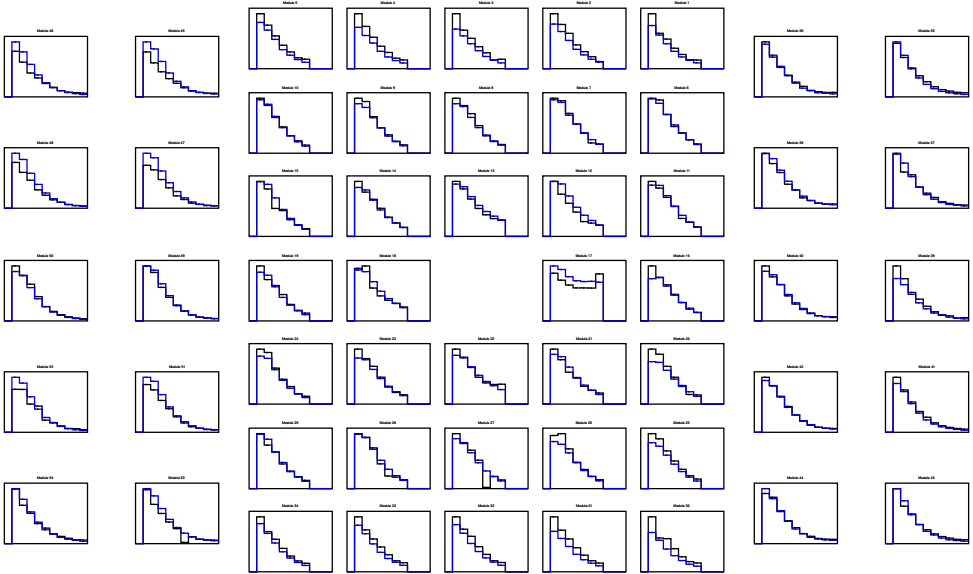
What is now



What was done



Aligning Simulation & Experiment



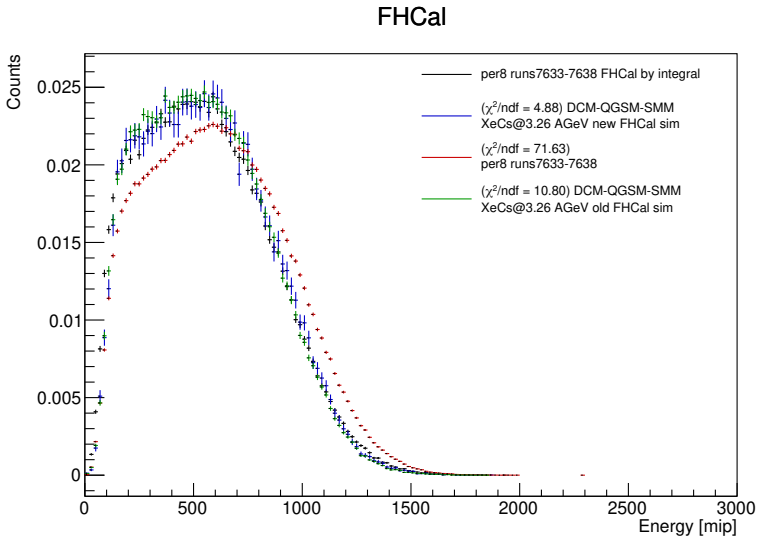
Conclusions

- Alignment of FHCal experimental sata and simulated data (DCM-QGSM-SMM) is significantly improved.
  - FHCal simulation and digitization code was refactored.
  - Changed scale for more reliable alignment of simulated and experimental data.
  - Applied alternative measure of energy reconstruction from experimental data.
- Certain discrepancies in hadron shower profiles to be addressed in future studies.
- Ready to merge to bmnroot.
  - Need small production for quality studies and centrality reconstruction adjustments.

Thank You!

BACKUP

Aligning Simulation & Experiment



Aligning Simulation & Experiment