

STATUS OF THE LHCF-ARM2 CALIBRATION



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CALIBRATION OF GSO LAYERS WITH ELECTRONS

- 2022 Calibration works on GSO layers are now in an advanced stage!
- The software has been completed and thanks to the improvements on the Library made by Eugenio and Alessio we can now get the **final results**.
- To date, only a few minor problems are known:
 1. The execution of the code is (almost) **inevitably slow**, especially with high MC statistics and in the silicon case (**too slow smearing procedure!**).
 2. The sum-dE distributions of data and MC have **slightly different widths**.
 3. **Multi-hit cut is not applied**, we have to perform silicon calibration before.



METHODOLOGY

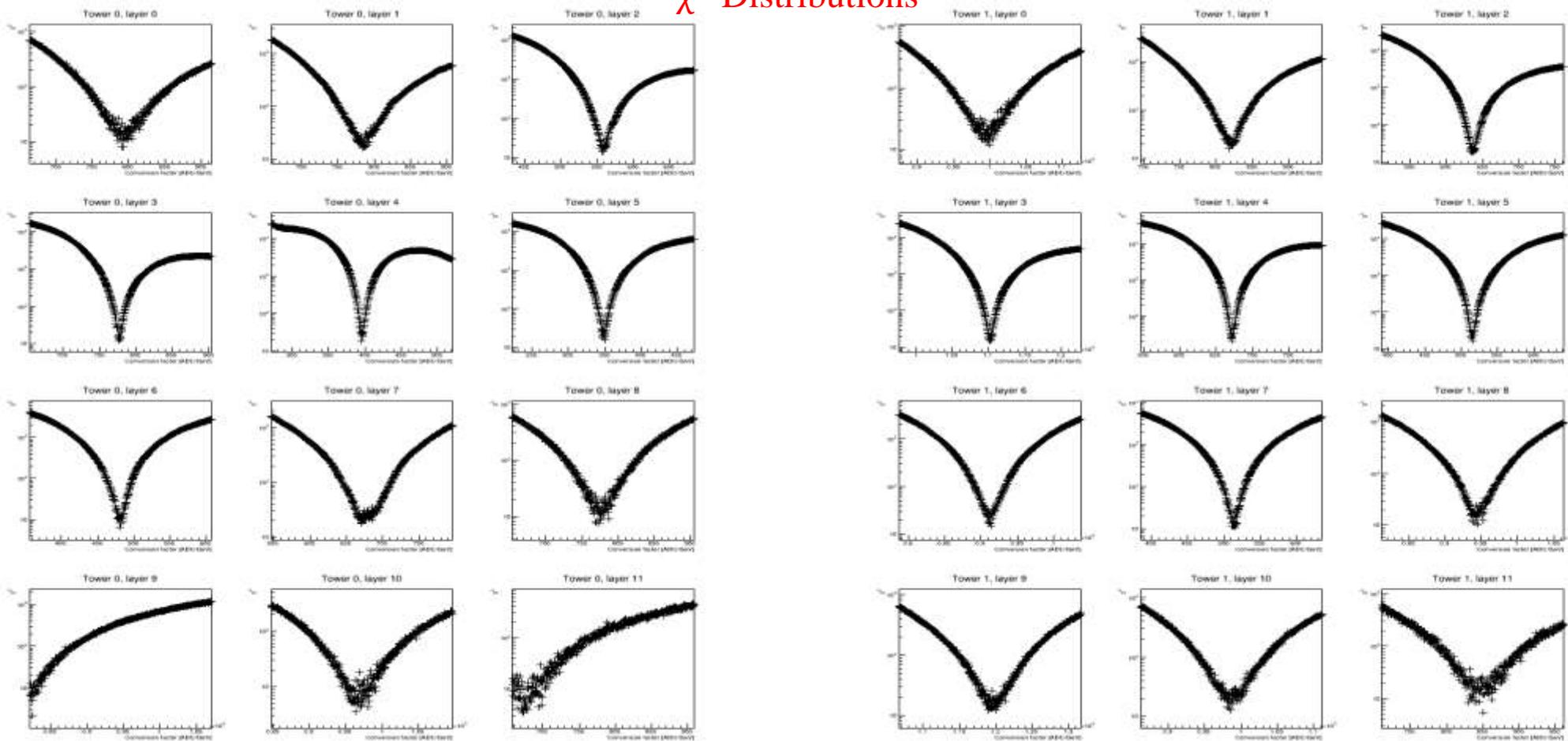
Both the GSO and silicon layers are reconstructed using a similar methodology:

1. Calibration and reconstruction of data and MCs (for the moment without smearing).
2. **Apply selection criteria to data and MC:**
 - position within the 5x5 mm centre square for ST and 10x10 mm for LT.
 - $L_{90} < 20 X_0$.
 - sumdE within 3σ .
 - multihit cut (not yet applied).
3. Applying smearing to MCs using real pedestals (**Gaussian and artificial for silicon at the moment**).
4. Calculate ADC/GeV factors **by minimizing the χ^2** between data and mc energy deposit distributions. MC ones are re-weighted to take into account the beam profile.
5. Calculate and compare total energy deposit of data and MC.
6. **Make the tables of GeV/ADC conversion factors** (not in this presentation).

SMALL TOWER

χ^2 Distributions

LARGE TOWER



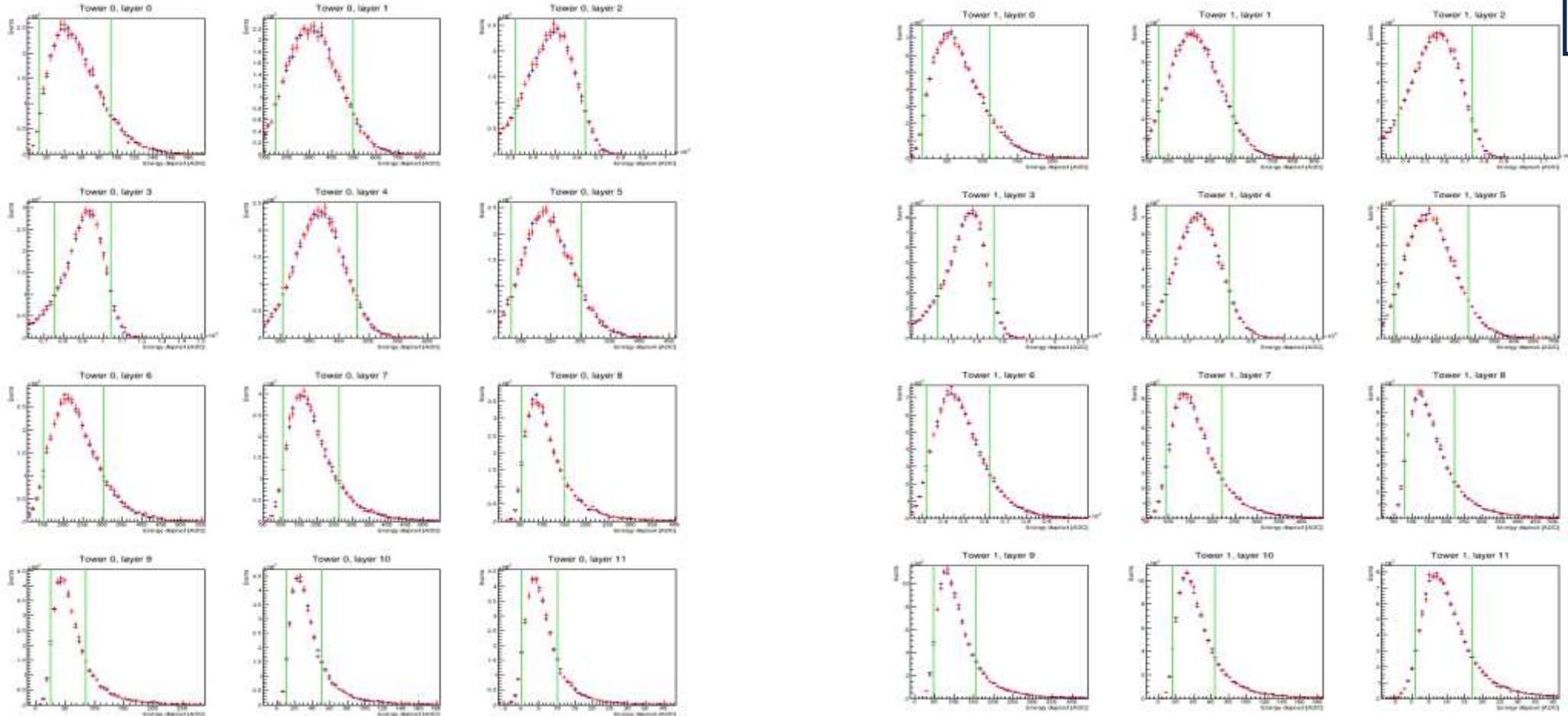


150 GEV

SMALL TOWER

ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



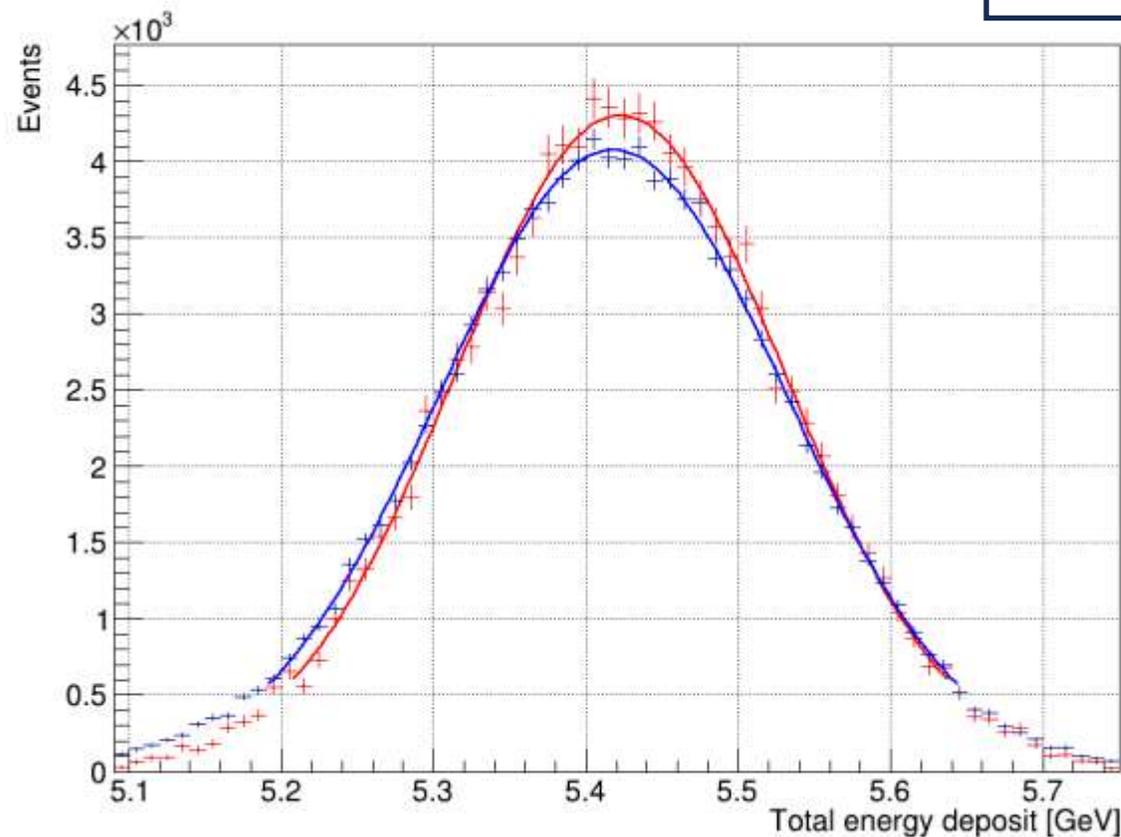
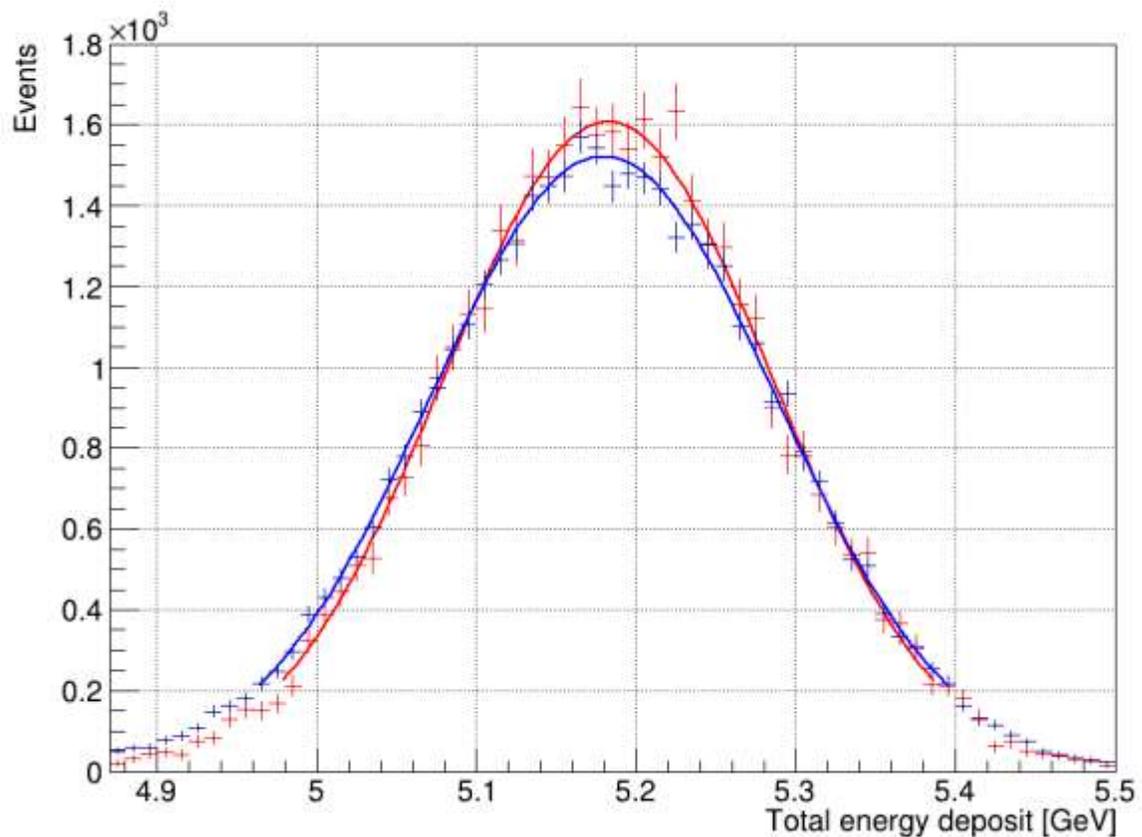


150 GEV

TOTAL ENERGY DEPOSIT DISTRIBUTIONS

SMALL TOWER

LARGE TOWER



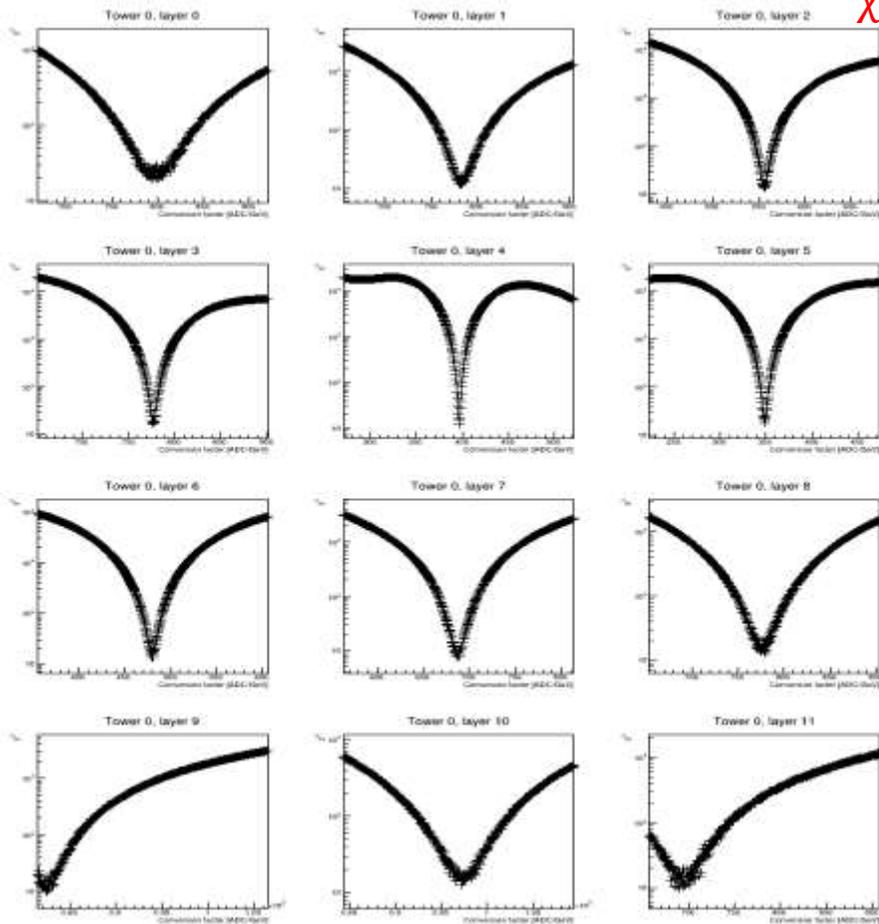


200 GEV FRONT

SMALL TOWER

χ^2 Distributions

LARGE TOWER



TO BE PREPARED

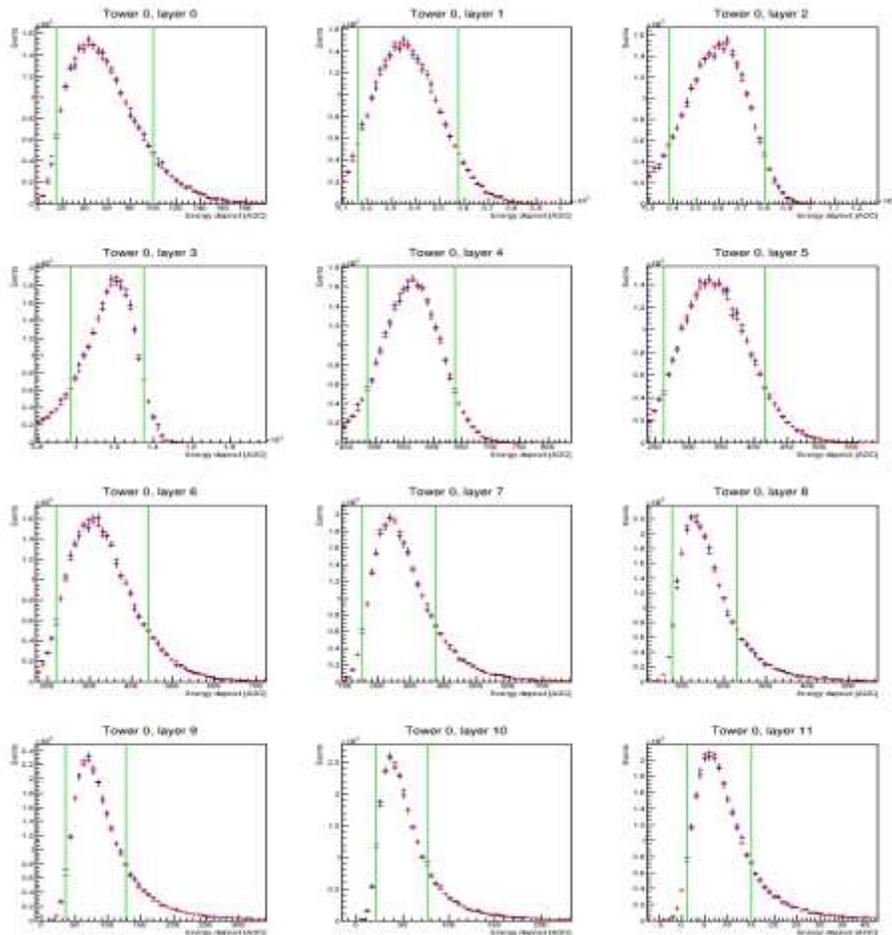


200 GEV FRONT

SMALL TOWER

ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



TO BE PREPARED

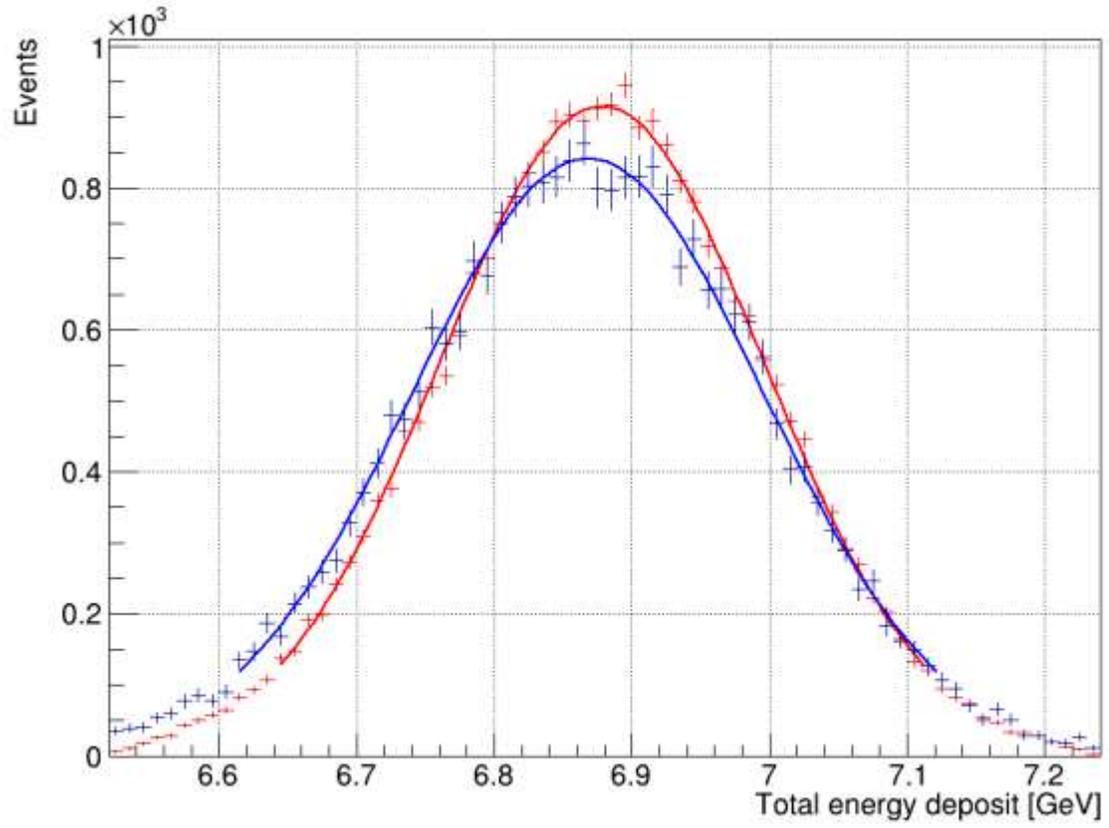


200 GEV FRONT

TOTAL ENERGY DEPOSIT DISTRIBUTIONS

SMALL TOWER

LARGE TOWER



TO BE PREPARED



200 GEV BACK

SMALL TOWER

χ^2 Distributions

LARGE TOWER

TO BE PREPARED

TO BE PREPARED



200 GEV BACK

SMALL TOWER

ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



TO BE PREPARED

TO BE PREPARED



200 GEV BACK

SMALL TOWER

TOTAL ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



TO BE PREPARED

TO BE PREPARED

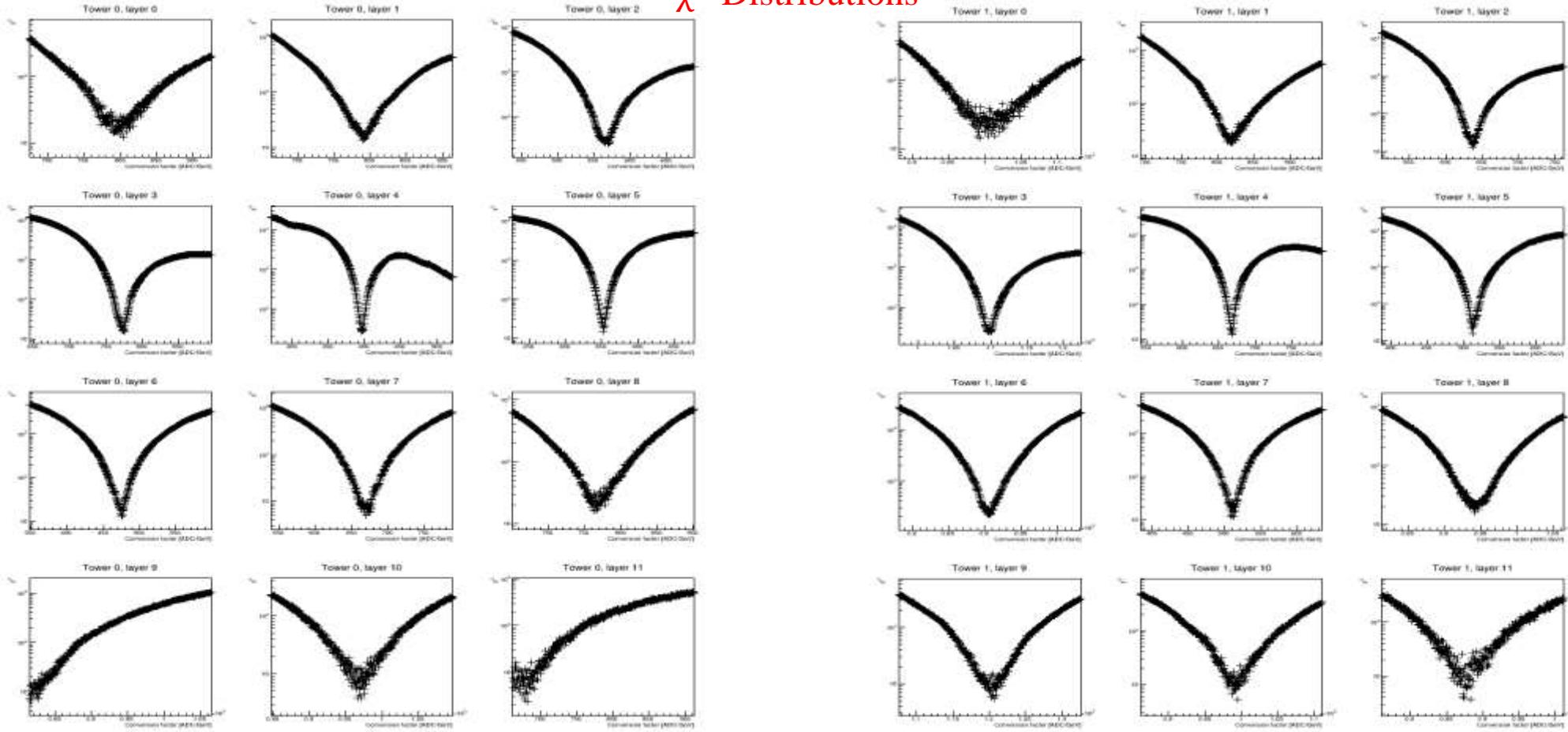


250 GEV

SMALL TOWER

χ^2 Distributions

LARGE TOWER



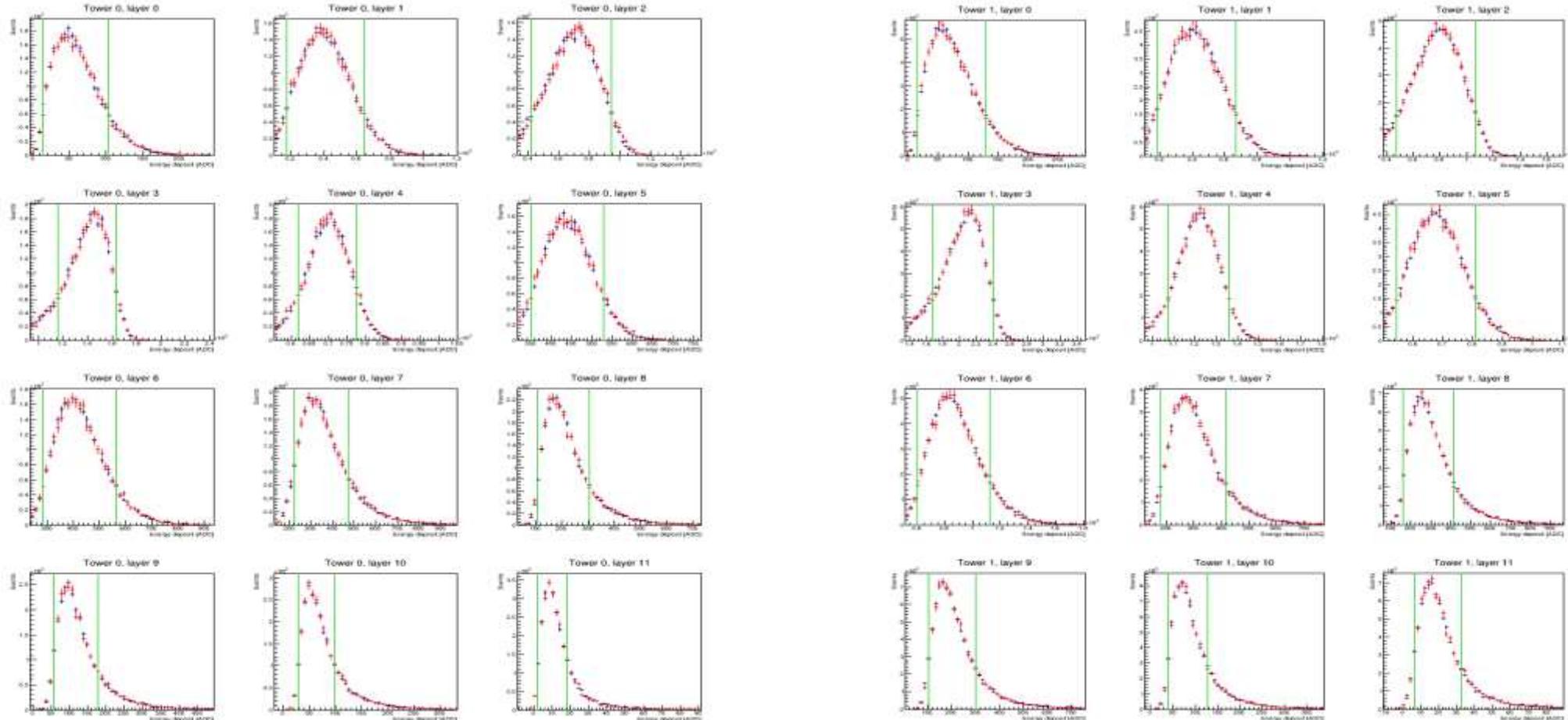


250 GEV

SMALL TOWER

ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



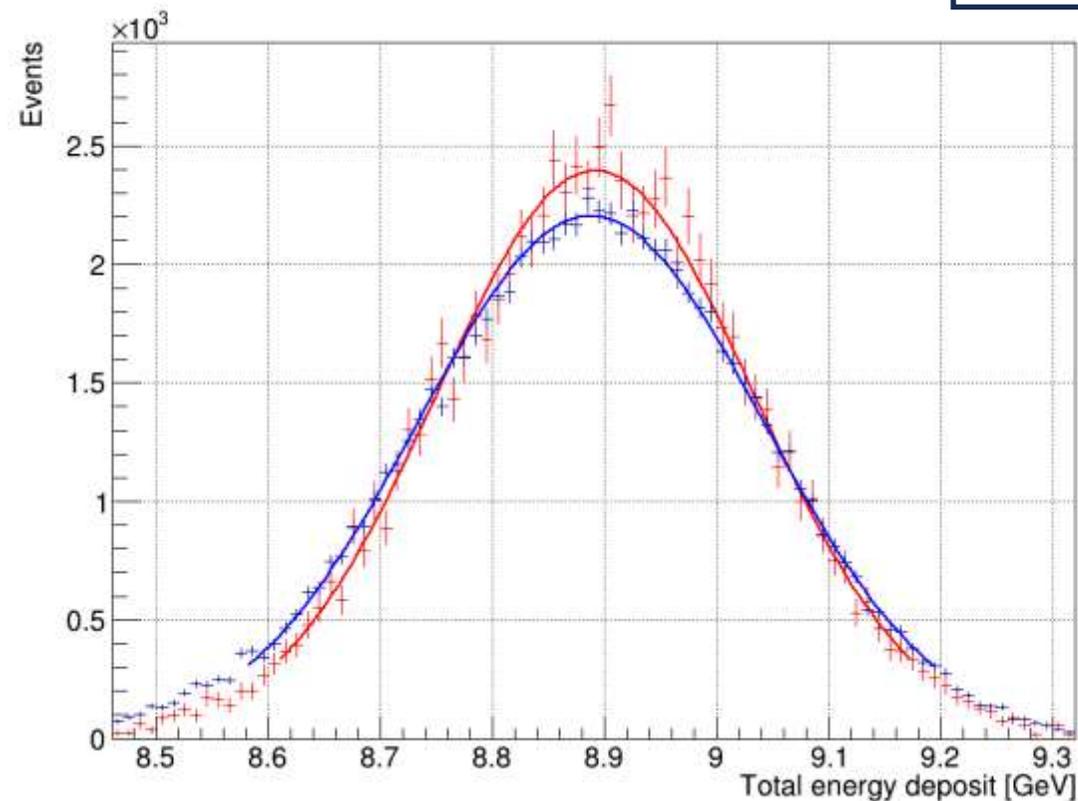
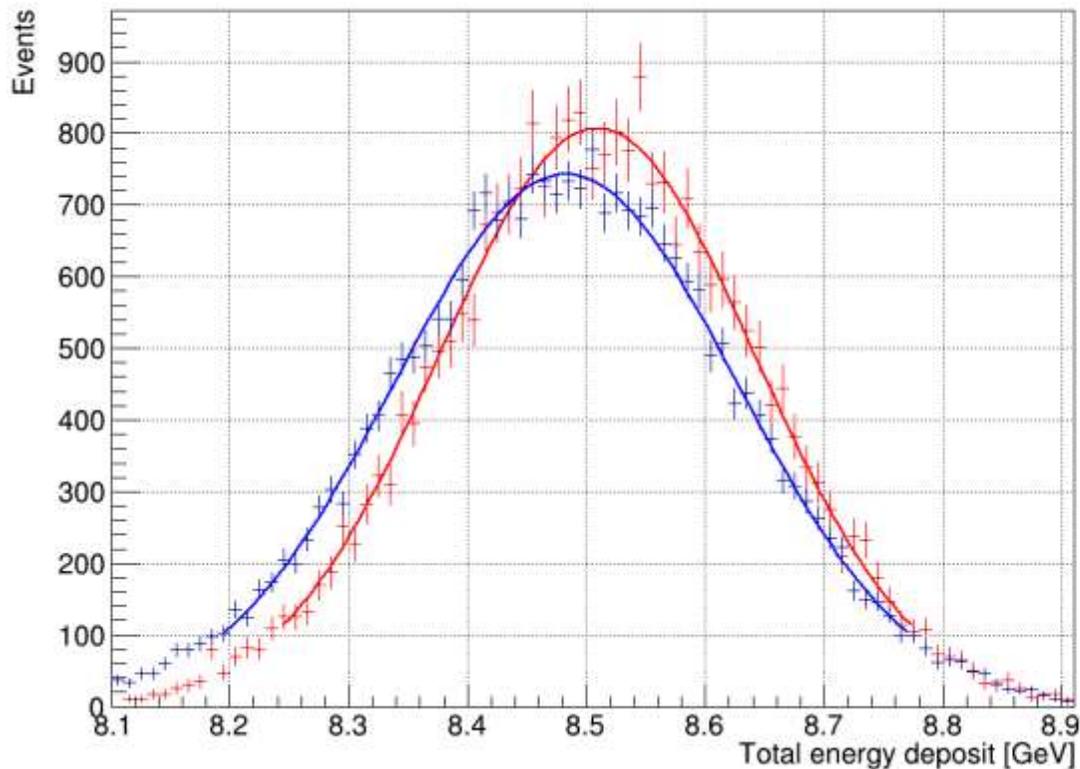


250 GEV

TOTAL ENERGY DEPOSIT DISTRIBUTIONS

SMALL TOWER

LARGE TOWER



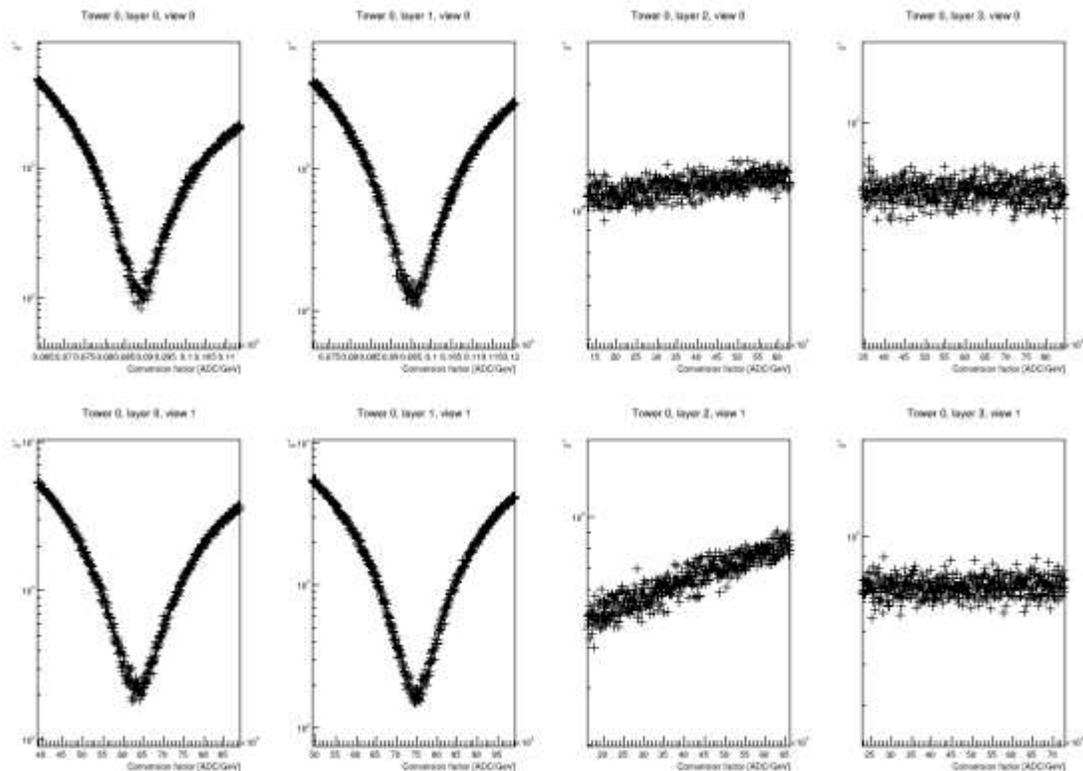


SILICON 200 GEV FRONT

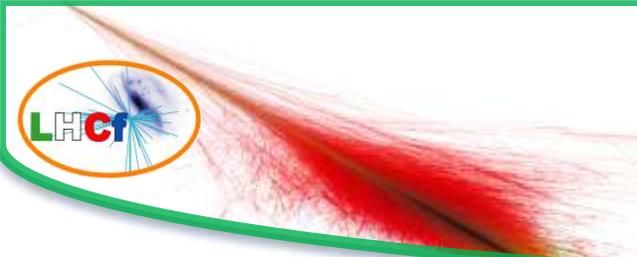
SMALL TOWER

χ^2 Distributions

LARGE TOWER



TO BE PREPARED

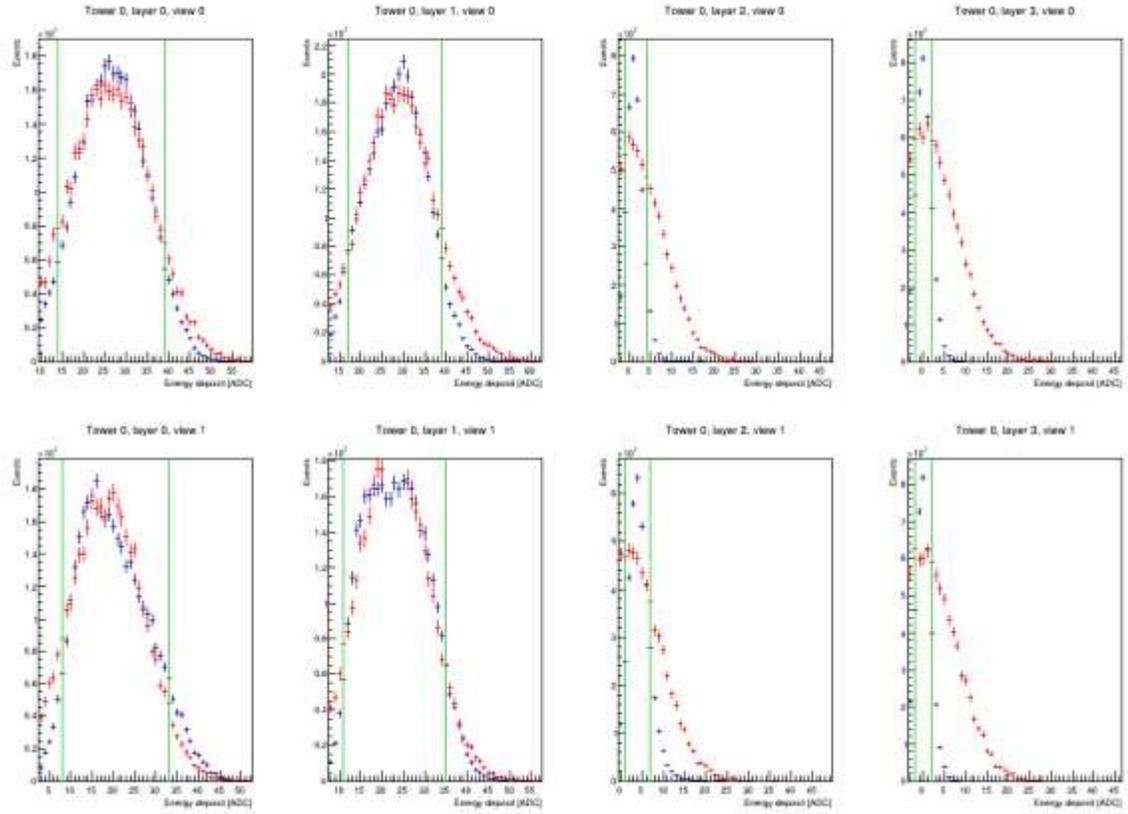


SILICON 200 GEV FRONT

SMALL TOWER

ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



TO BE PREPARED



SILICON 200 GEV BACK

SMALL TOWER

χ^2 Distributions

LARGE TOWER

TO BE PREPARED

TO BE PREPARED



SILICON 200 GEV BACK

SMALL TOWER

ENERGY DEPOSIT DISTRIBUTIONS

LARGE TOWER



TO BE PREPARED

TO BE PREPARED



NEXT STEPS

1. Finish processing the data in the missing energies/configurations.
2. Calibrate the silicon microstrip layers using **real pedestals** for smearing.
3. Relaunch **all calibrations** by adding the cut on multihits (?).
4. **Comparison of calibration factors** between different energies and front-back for data at 200 GeV.
5. Reconstruct data for different positions and study the **position dependency** of calibration factors.
6. Calculating **energy resolution** at various energies and estimating the energy dependency of the resolution.
7. Calculate parameters of the **sumdE-E conversion function**.

THANK YOU FOR THE ATTENTION!!



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