

Collaboration Review on Combined Scintillator Paper

Oskar Hartbrich

Combined Scintillator Paper Draft

- Combined ScECAL+AHCAL+TCMT analysis
 - Pions from testbeam campaign FNAL 2009
 - Beam energy range 4-32GeV, standard and software compensation reconstruction
- Paper supersedes CAN-056
 - Mostly improved estimation of systematic uncertainties
 - Most ScECAL validation referenced out to Katsu's recently published ScECAL paper
- Paper draft in collaboration review since Feb. 13

- Thank you to the referees Daniel, Djamel and Jerry as well as Felix and Marina!

Comments received from collaboration

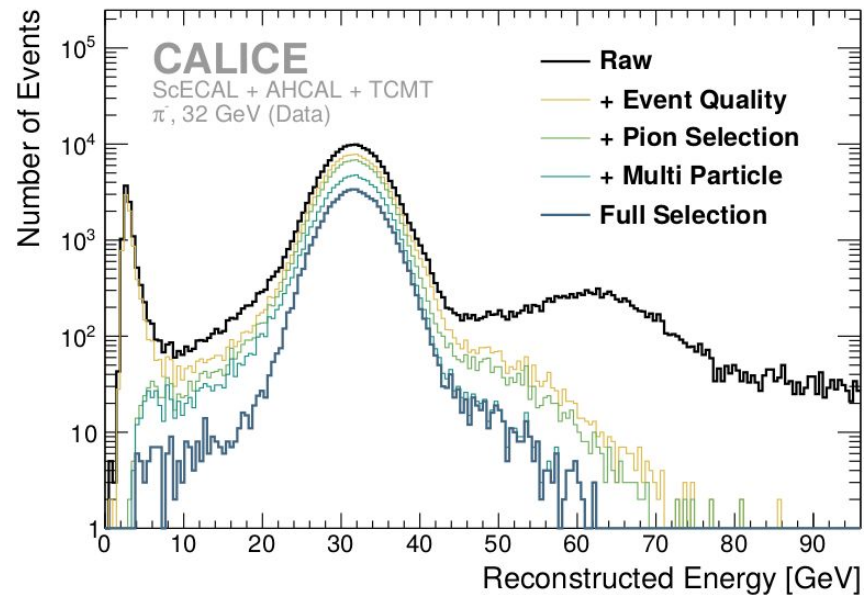
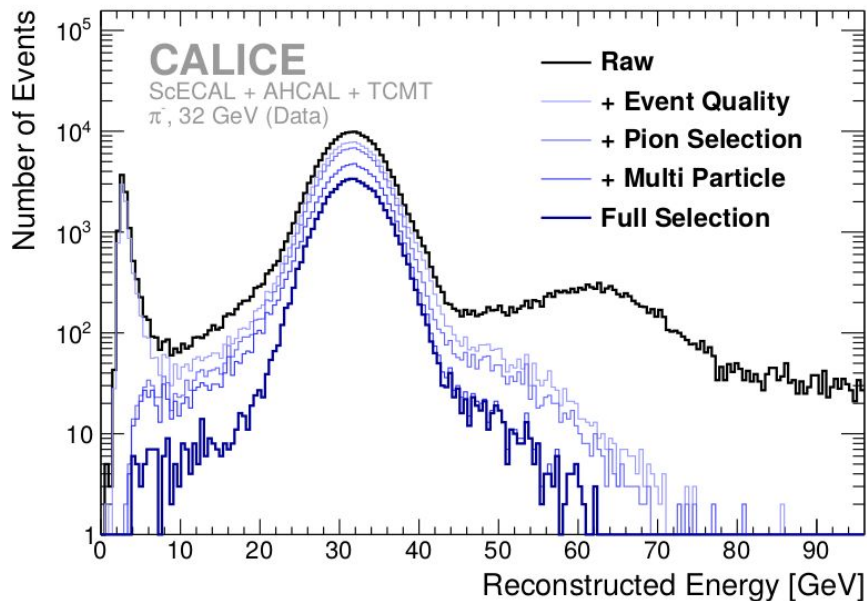
- Received four sets of detailed comments:
 - Matthew, Erika, Frank and Marina

- All: Not enough (outside) references, especially in introduction part
- Twice: Plot details: color schemes, axis scaling, how and where to print extra info (particle type, energy, data/MC)
- Systematic uncertainties due to SiPM saturation factor
- Origin of high energy “tail” in reconstructed energy spectra
- Minor text adjustments

References

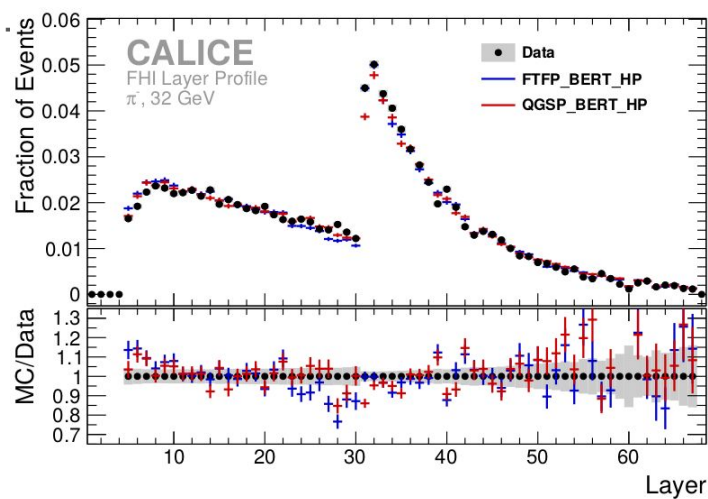
- Received input and suggestions which references to include
- Will be implemented for next draft

Plot details: Color schemes:

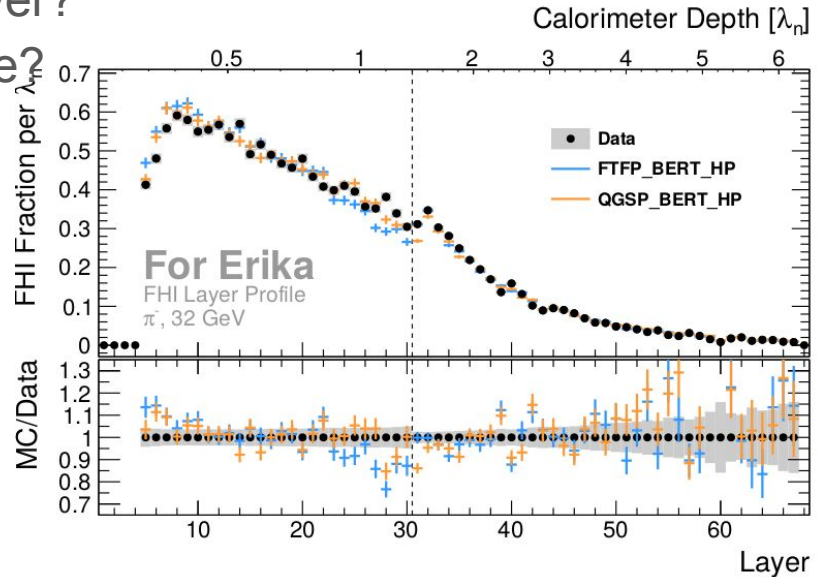


Plot details: axis scaling

- Asked to show longitudinal profiles as function of lambda instead of layer
 - Compresses ECAL points too much in my opinion, added secondary x-axis with lambda instead
- Normalise entries to lambda per layer?

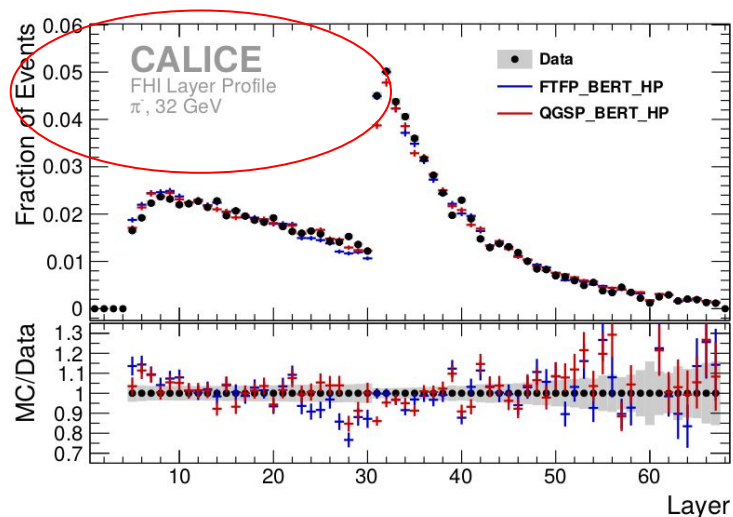
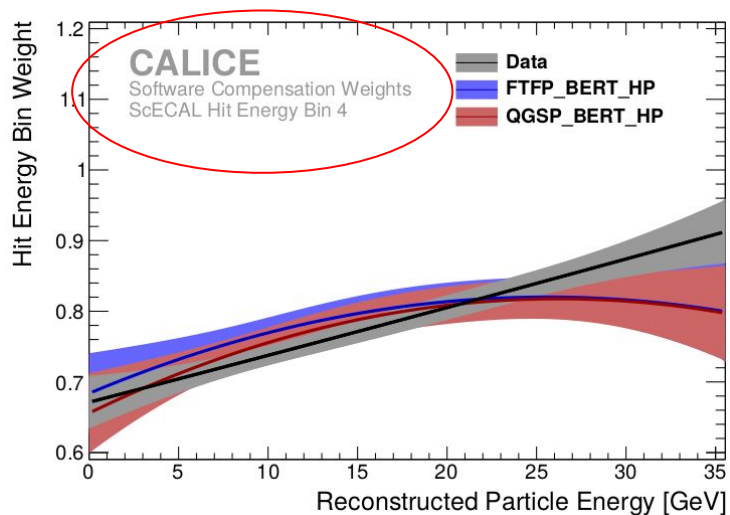


d/blue?



Plot details: Extra info + subdetector names

- CALICE watermark label should only include subdetector names
 - Subdetector s names are a complicated issue, will only include in result plots
- Extra information will move to legend header, plot title will disappear

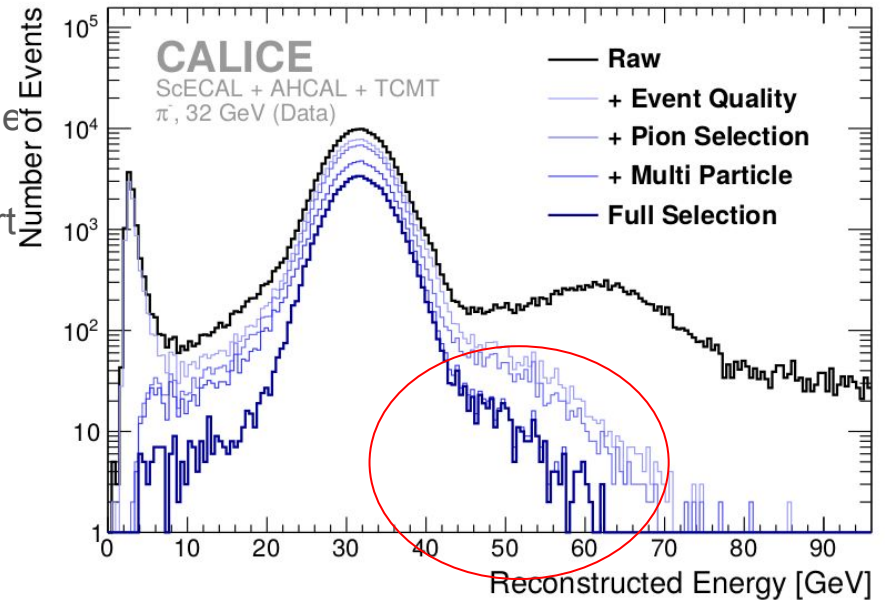


Systematics from SiPM Saturation

- Paper states energy reconstruction uncertainty from SiPM saturation negligible, was asked to provide a more precise number
 - Did a rough check long ago, but numbers not available anymore
- AHCAL SC paper states influence negligible
 - Thus AHCAL part in this analysis also negligible: lower energies, less energy in AHCAL on average
- Available ScECAL data: all saturation parameters shifted by -25% (2.5 sigma)
 - Extreme change far outside of a normal systematics
 - 1.6% effect at 32GeV down to 0.1% at 4GeV
 - Found some more reconstructed runs, but need to check details

Data Event Contamination Tail

- In data only: high reconstructed energy tail of unclear origin
- Assumed to be due to event contamination of additional particles with $E < E_{\text{beam}}$
 - Detailed systematics study based on contamination model scanning over possible contamination shapes.
 - Significant contribution to systematic uncertainty. But not entirely dominating
- Yasmine's combined analysis now sees similar tails in data and MC
 - Due to individual large hits in ECAL
 - But mostly for lower energies?
 - See her talk later today



Summary

- No show stopper comments, mostly details
- Can provide new draft with updated plots etc. within 1-2 weeks
 - First beams in SuperKEKB in two weeks...

- Which journal do we target? Might be eligible for free access in NIMA due to FNAL participation?
- More comments in the pipeline?