More Updates Alt sPHENIX Spacal Variations

Justin Frantz - Ohio University

07/06/2021

ECCE Calorimetry WG Meeting
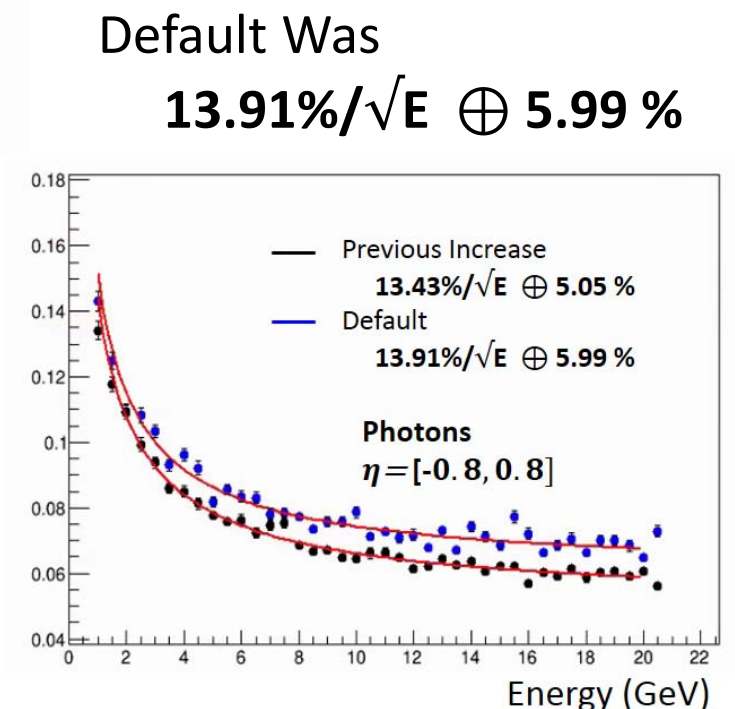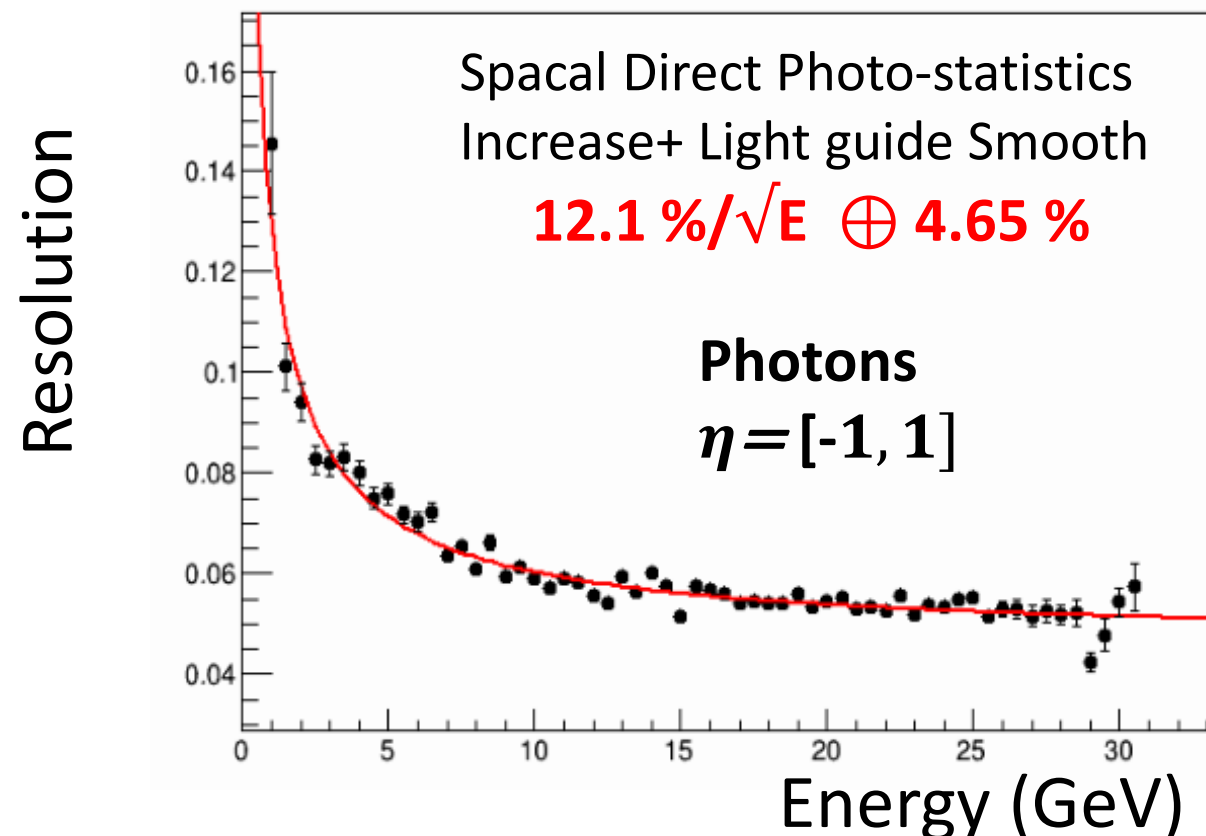
"Perfect" Light Collection : 3 Changes Made

- Besides light guide non-uniformity now also implemented direct increase in photo statistics
- This and improved fitting brought down both resolution terms further
- Also implemented rough further position dependence correction (not shown) further improvement of at least constant term by at least 0.5% further – cluster based –where to apply?
- For "checking in"
  - Added new calib files to implement light guide part, waiting in fun4all_eiccalibrations. (also new macro to generate)
  - Photo statistics increase can be done with only changing G4_Cemc_Spacal.C
  - Not sure where and how to proceed though given latest changes – add latter to Modular detector?

Prepping Pull Requests for above are ready now

Cluster pos. dep correction??
Now work on modified fiber density

Spacal Direct Photo-statistics Increase+ Light guide Smooth

12.1 %/√E ⊕ 4.65 %

Photons
$\eta = [-1, 1]$

Resolution

Energy (GeV)

Default Was
13.91%/√E ⊕ 5.99 %

— Previous Increase
13.43%/√E ⊕ 5.05 %
— Default
13.91%/√E ⊕ 5.99 %

Photons
$\eta = [-0.8, 0.8]$

Energy (GeV)

Position Dependence Correction

- Need new position dependence correction (not previously being used) because sphenix main one mostly driven by light guide non-uniformity

- First quick and dirty correction: correct by inverse of below response plot vs pseudo rapidity -- Cluster level

Simulation Cluster energy response vs pseudorap after light guide + photo-stats increase

e/ge:eta {ge > 5 && e/ge > 0.5}

Pseudorapidity