

# GLAST LAT G4 validation for DC2 1<sup>st</sup> report

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thanks to R. Giannitrapani, N.Giglietto, R.Rando



# G4 tests for DC2

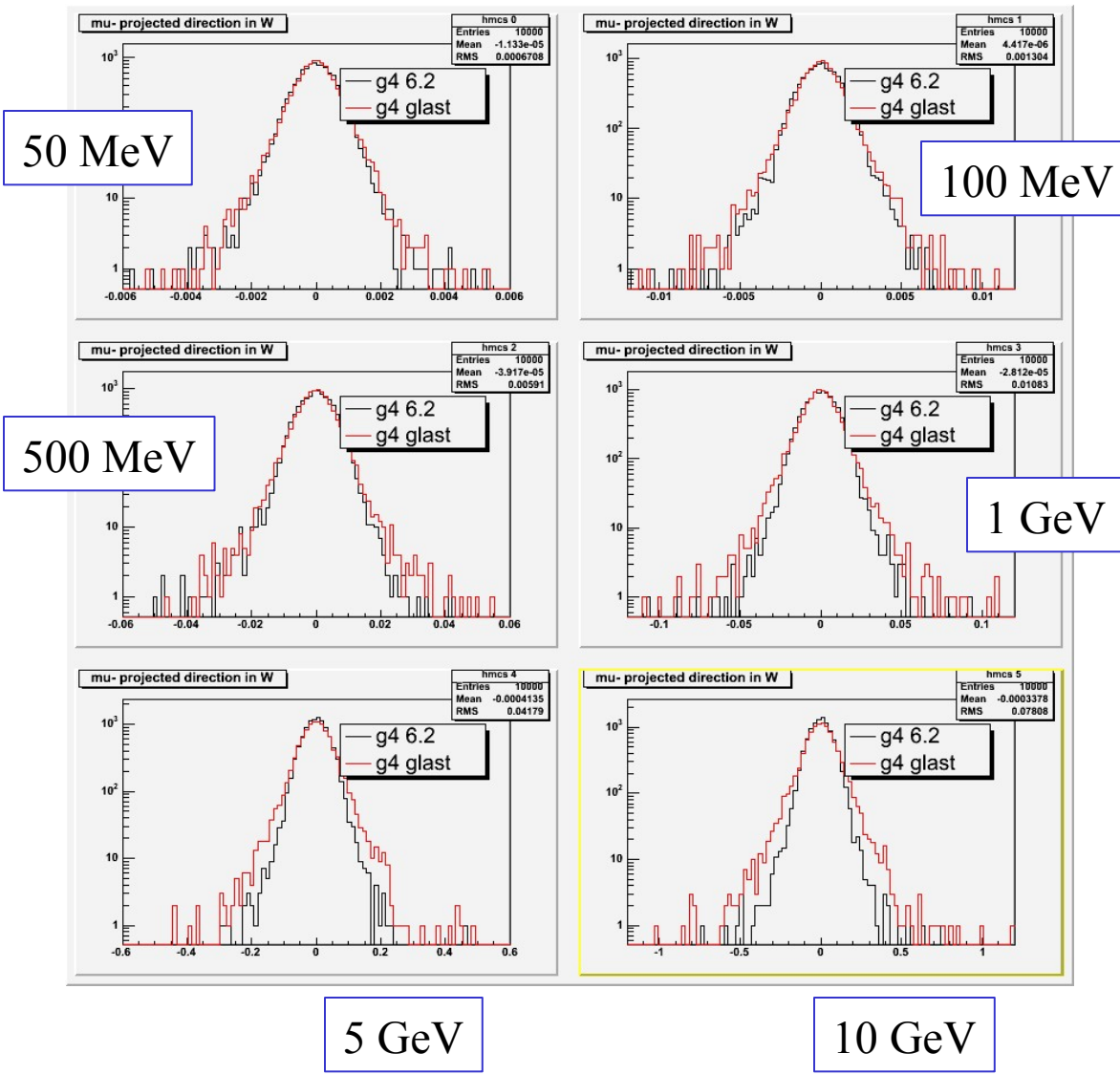
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- Following Steve's request three tests were performed
  - **MCS distributions using GEANT4TEST package**
    - G4 6.2.p02 (“native”) vs G4 6.2.p02 + MCS 3.2 (“official”)
    - Electrons and Muons at different Energies through W 723 microns thick
    - 50 MeV, 100 MeV, 500 MeV, 1 GeV, 5 GeV, 10 GeV
  - **MCS simulations compared with AGILE TB data (2003)**
    - Electrons of 79 MeV and 650 MeV
    - Comparison of data vs native and official MCS
  - **Range cut validation**
    - 5 sets of cuts selected (TKR, CAL)
    - 100 – 100 micron
    - 200 – 200 micron
    - 400 – 400 micron
    - 700 – 700 micron
    - 100 – 700 micron (“official”)
    - Simulated with last version of EngineeringModel (4 Tower) and compared with experimental data (run 135002769)
    - Two variables checked so far “TkrNumStrips” and “CalNumHit” in SVAC ntuples
    - No significant differences in number of events and execution time (muons?)



# GEANT4TEST

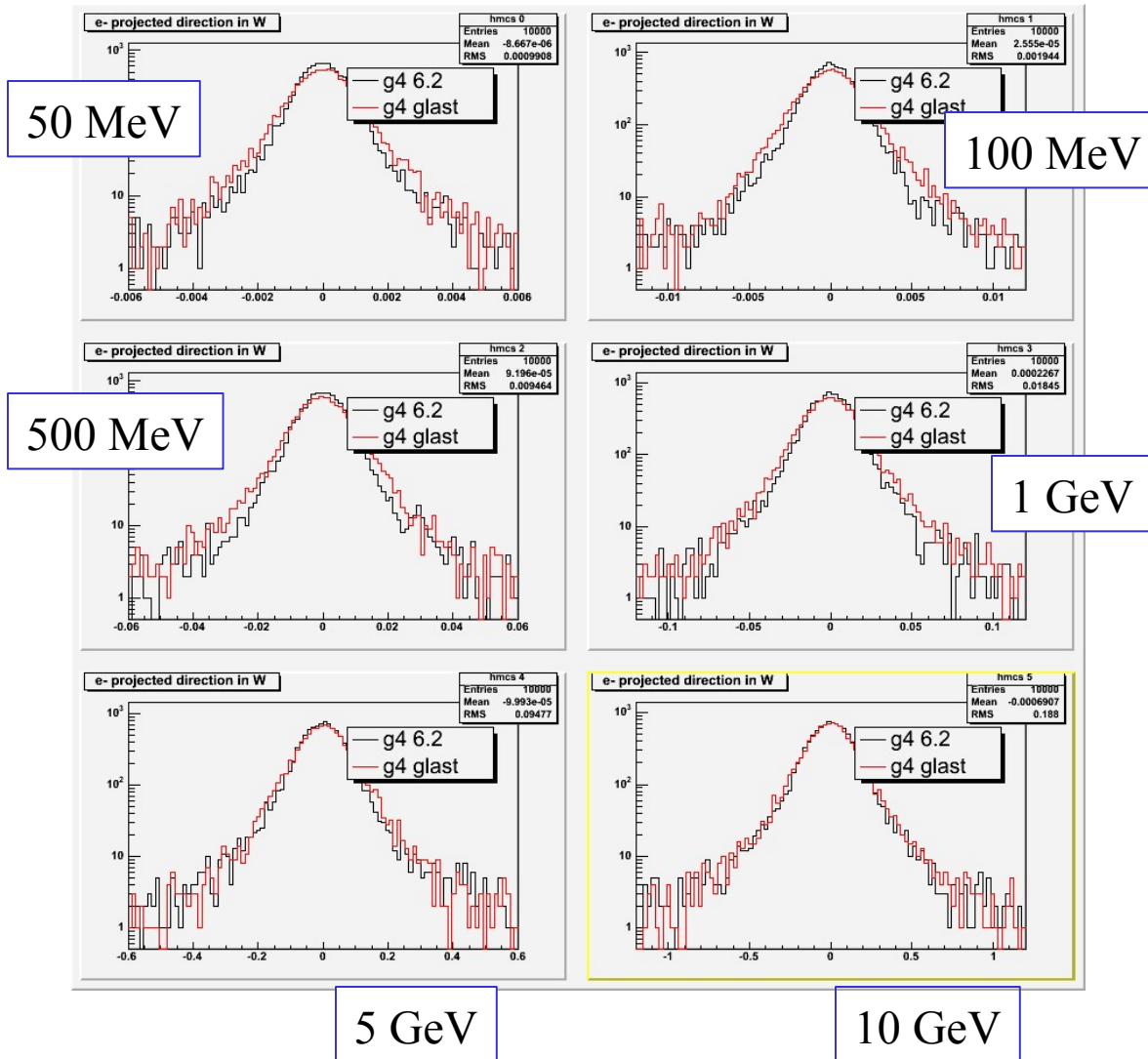
- mu<sup>-</sup> W 723 microns
- Differences at HighE





# GEANT4TEST

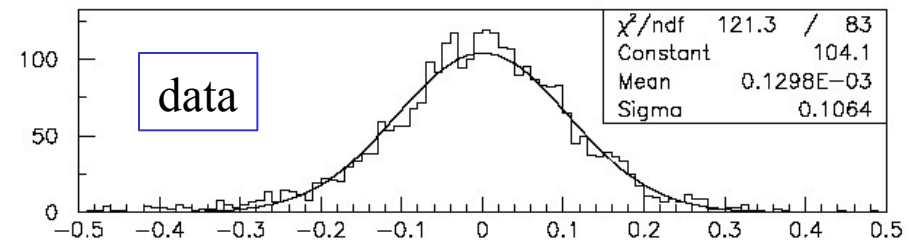
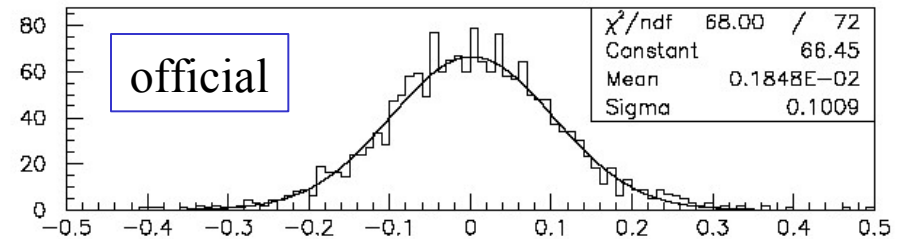
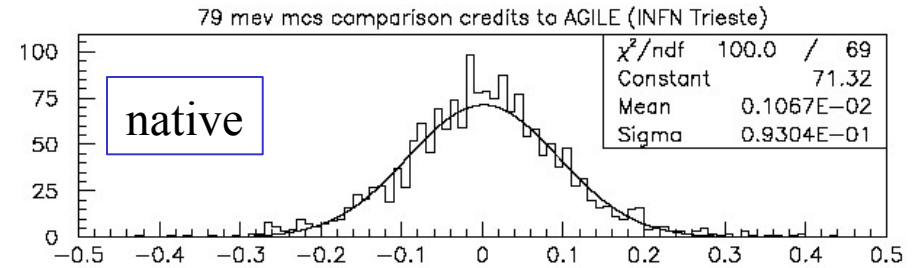
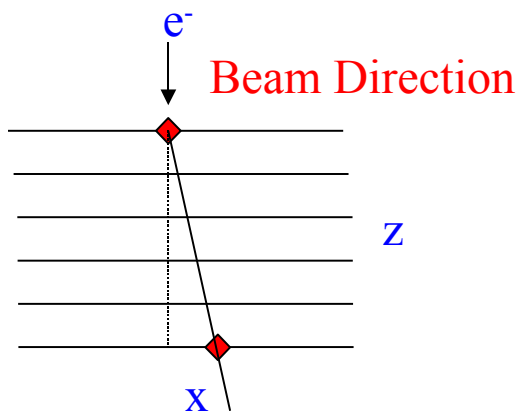
- e<sup>-</sup> W 723 microns
- Differences at LoWE
- Tails difference





# AGILE tests

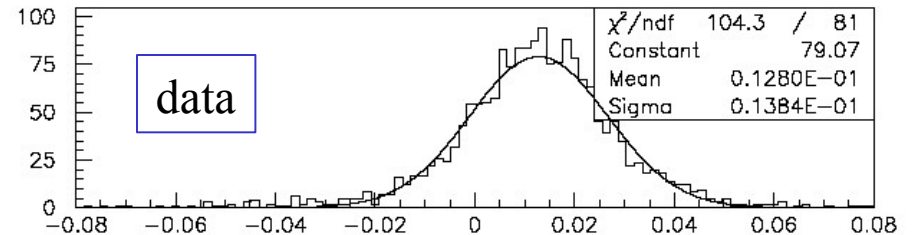
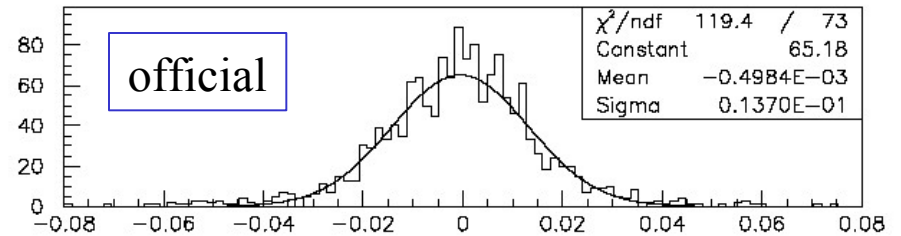
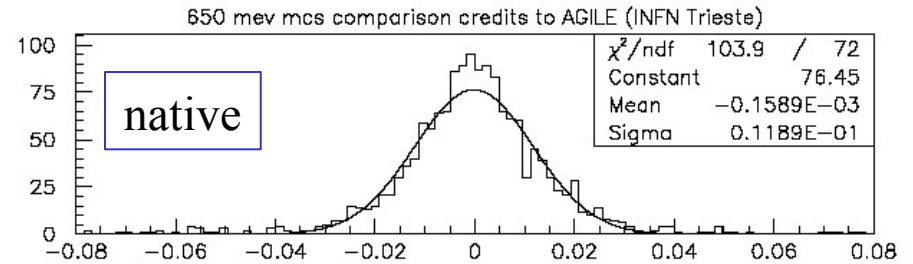
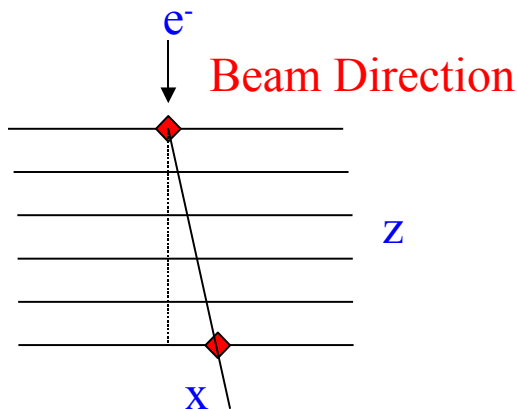
- Electron test beam at Frascati for AGILE, (2003)
- Geometry:
  - 6 planes with 300  $\mu\text{m}$  of W
  - Inter-plane distance 1.6 cm
- Analysis:
  - Require single cluster on the 1<sup>st</sup> and 6<sup>th</sup> plane
  - plot  $x/z$
- e- 79 MeV
- “native” vs “official”





# AGILE tests

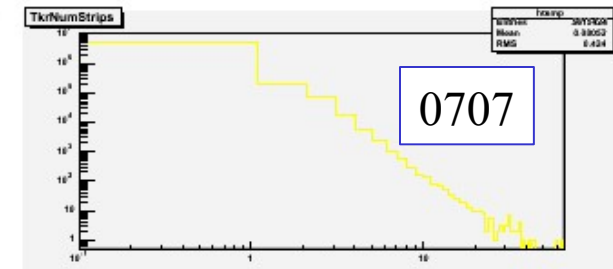
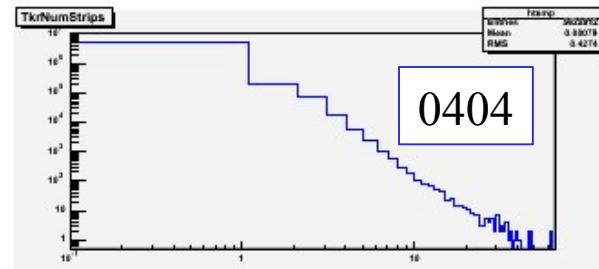
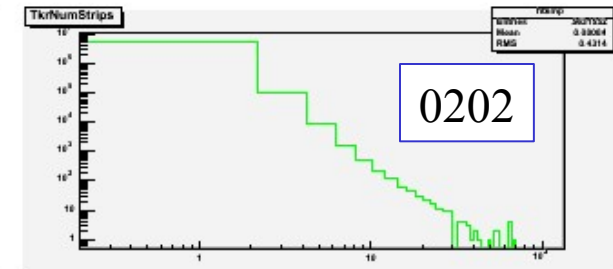
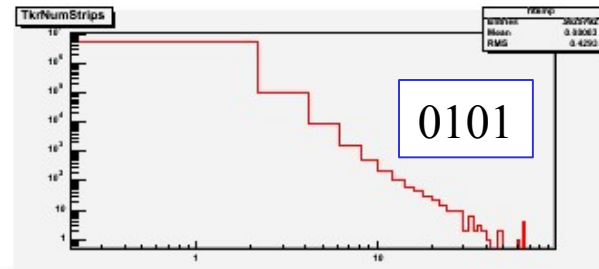
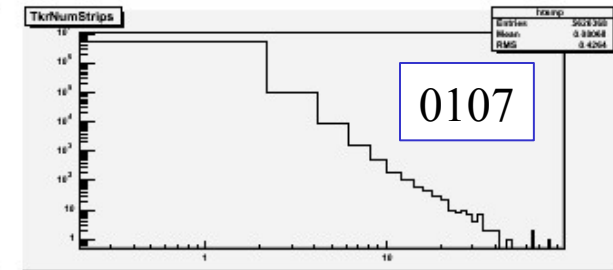
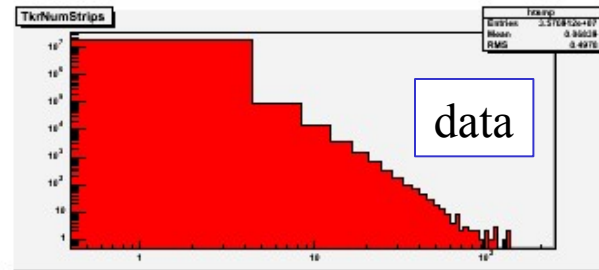
- Electron test beam at Frascati for AGILE, (2003)
- Geometry:
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- Analysis:
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  - plot  $x/z$
- e- 650 MeV
- “native” vs “official”





# Engineering model

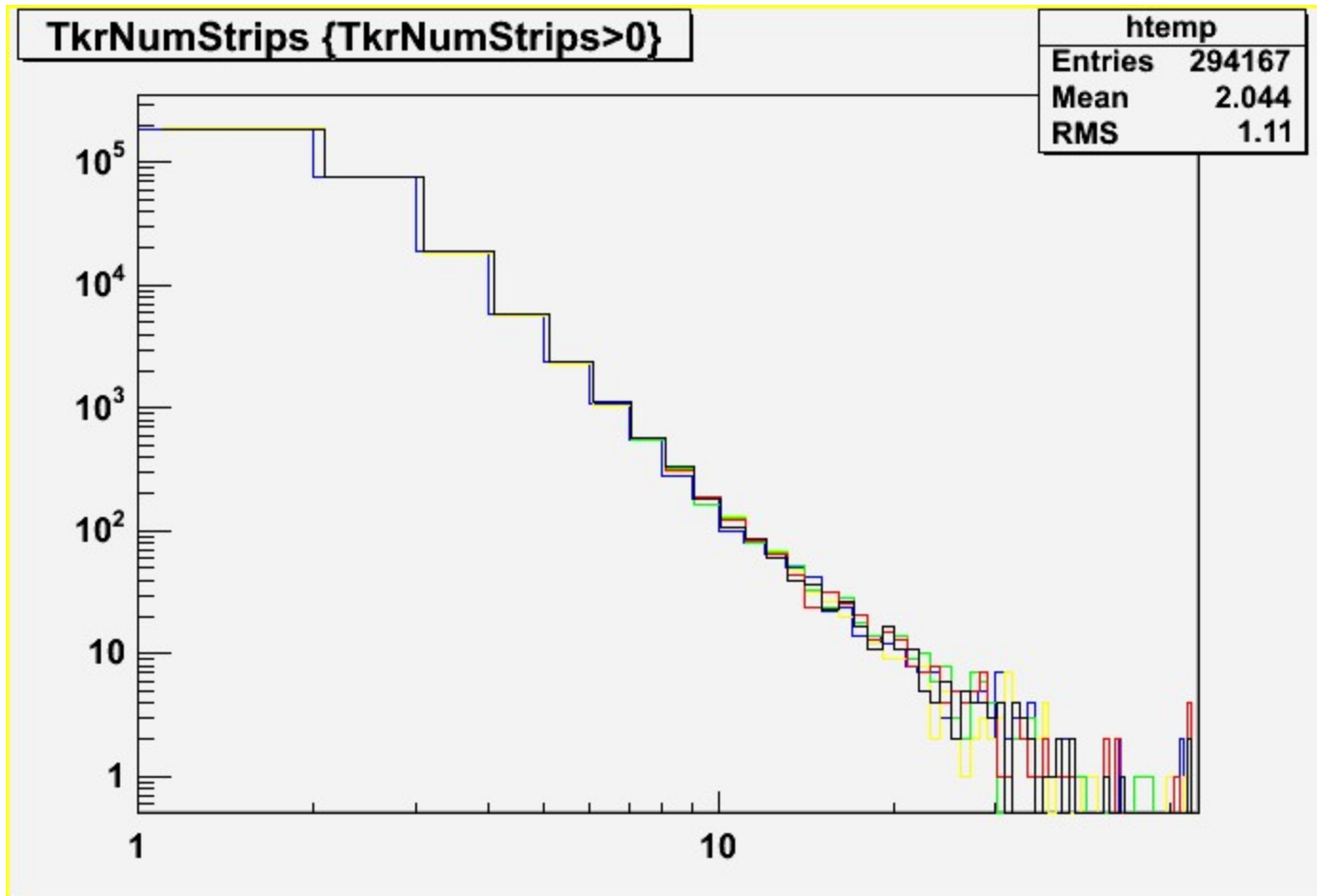
- Test on range cuts
- EM v5r0608p2
- Changed cuts in G4Generator
- Generation of surface muons on 4 towers
- Look at SVAC variables
- TKR NumStrips





# Engineering Model

- Only simulations
- Same colors

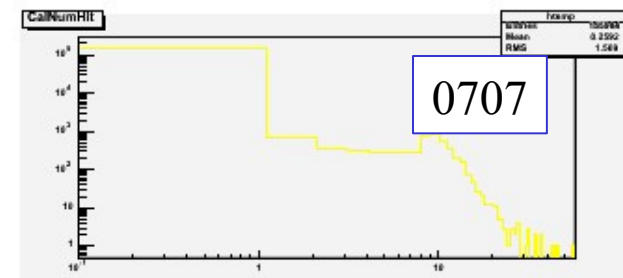
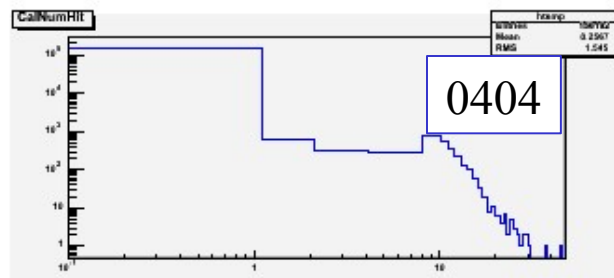
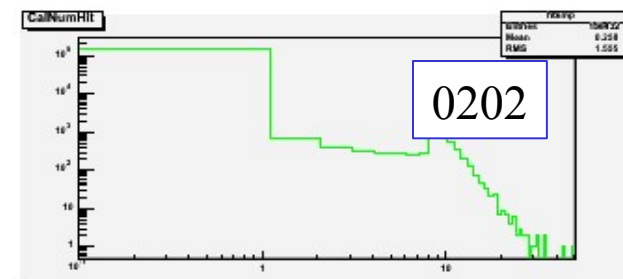
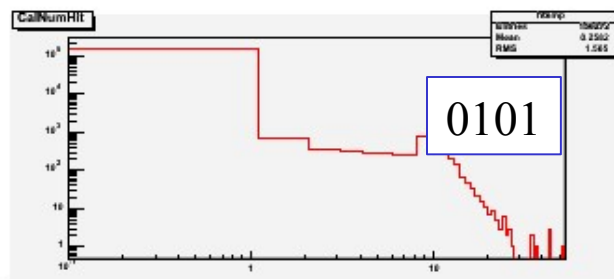
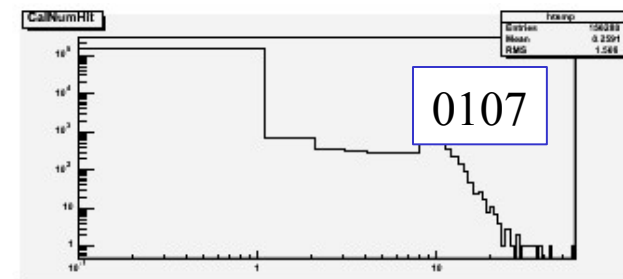
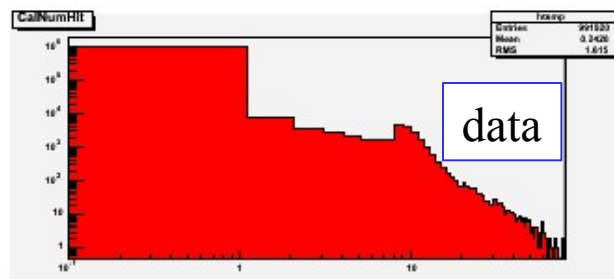






# Engineering model

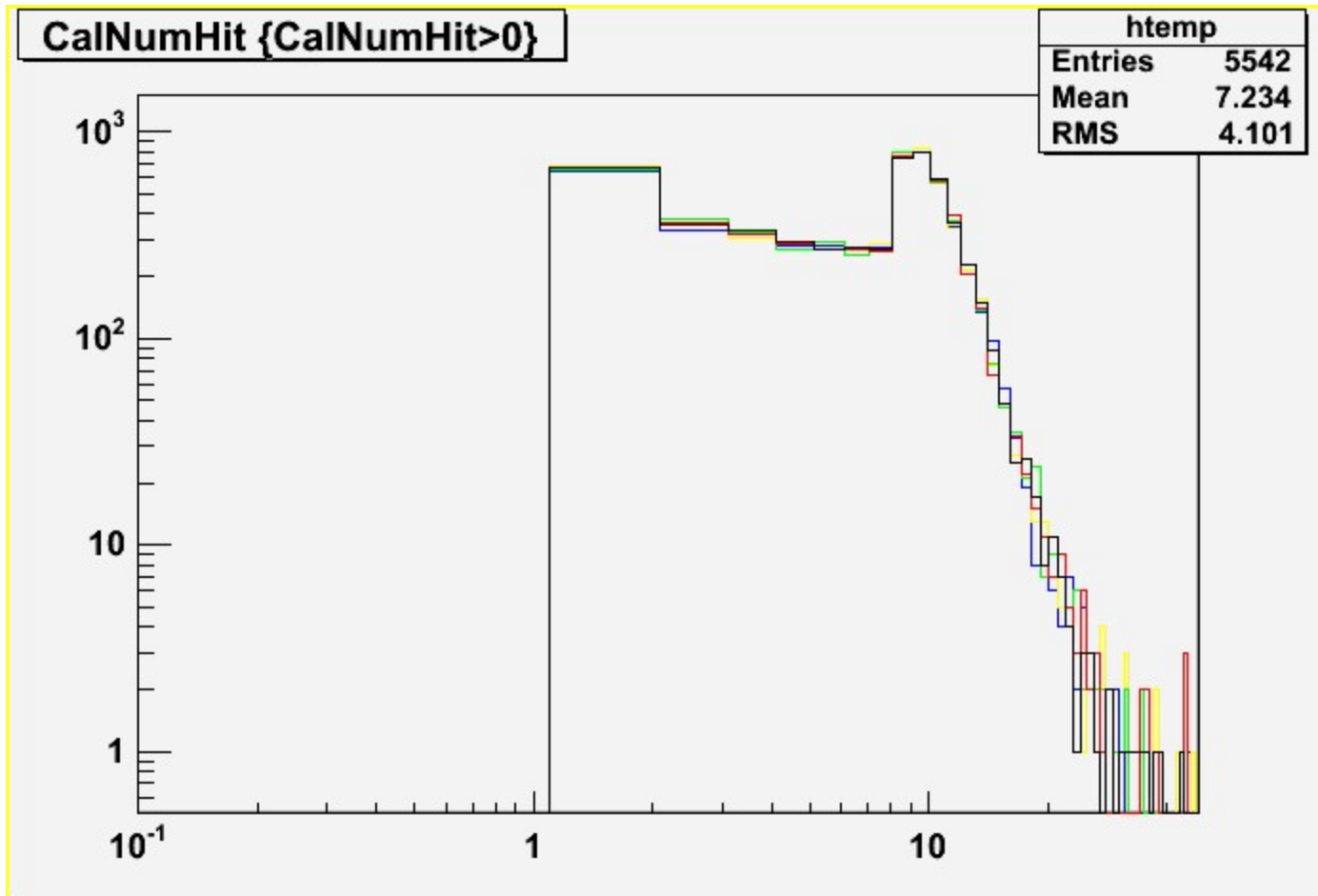
- Test on range cuts
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- Look at SVAC variables
- CAL NumHit





# Engineering Model

- Only simulations
- Same colors





# Engineering Model

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- **Test on Range Cuts**
  - 100  $\mu\text{m}$  in Si  $\sim$  120 keV (e-)
  - 700  $\mu\text{m}$  in Si  $\sim$  400 keV (e-)
  - 100  $\mu\text{m}$  in W  $\sim$  350 keV (e-)
  - 700  $\mu\text{m}$  in W  $\sim$  1.6 MeV (e-)
  - 100  $\mu\text{m}$  in CsI  $\sim$  150 keV (e-)
  - 700  $\mu\text{m}$  in CsI  $\sim$  500 keV (e-)
- **No significant differences in execution time**