

Updated sampling fraction
Removed flux return overlap bug

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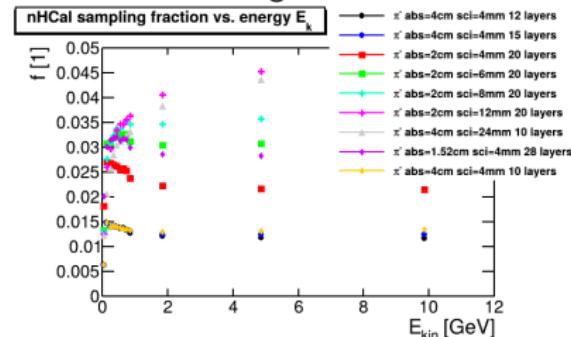
1 Updates

$$f_s = \frac{\sum E_{scint}}{E_k}$$

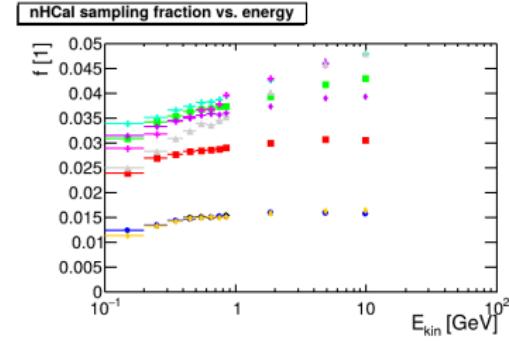
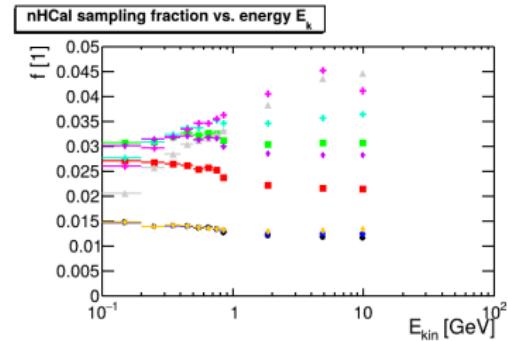
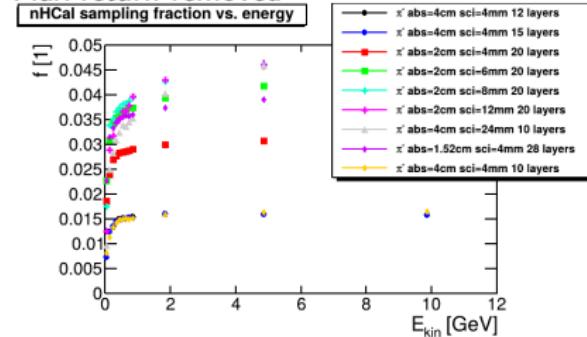
- Sampling fraction calculated by filling a TProfile with a ratio of sum of energy deposits in scintillator tiles E_{scint} over kinetic energy of incoming particle
- calculates correct e/h response ratios
 - same method as used in beam tests (kinetic energy as a reference)
 - this is not the case when using sum of energy deposits in steel and plastic in the denominator (LFHCAL method)
 - missing energy for pions
- made all geometry versions 5× thicker ($\lambda/\lambda_0 > 10$)
 - This minimizes leakage and relates to the real energy deposits
- Previous calculations included flux return steel which overlapped with extended nHCAL
 - Not detected by the overlap check, now fixed
 - It effectively added extra material

Sampling fraction - pions

With flux return bug



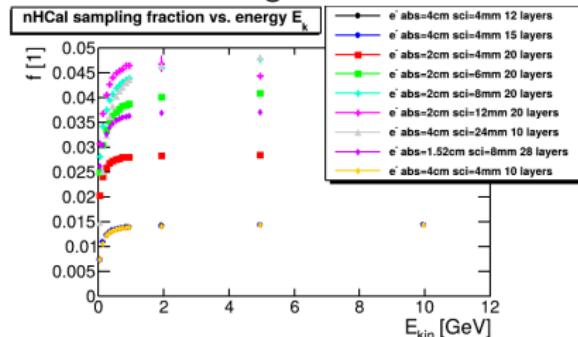
Flux return removed



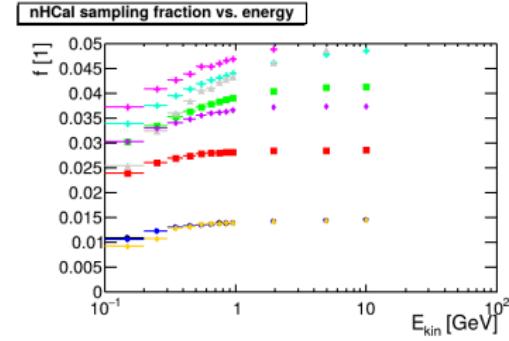
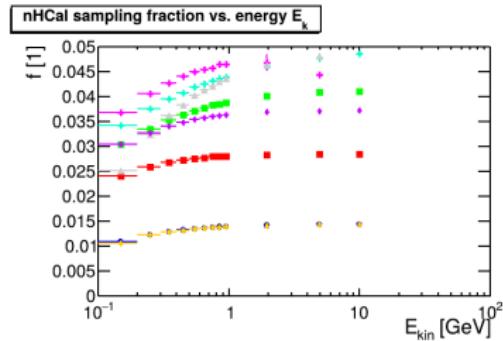
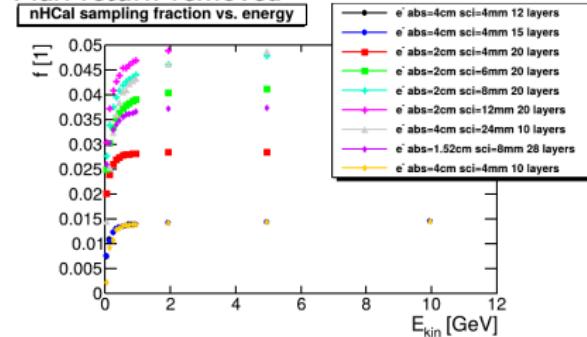
- Bug artificially increased sampling fraction at low energy - now fixed!

Sampling fraction - electrons

With flux return bug

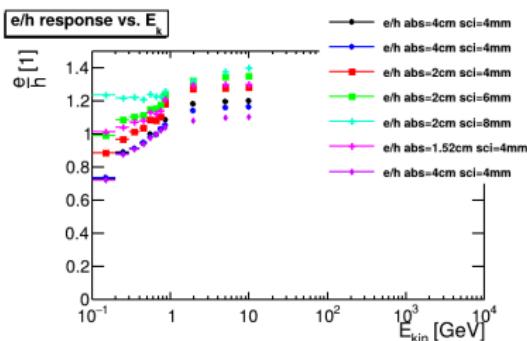
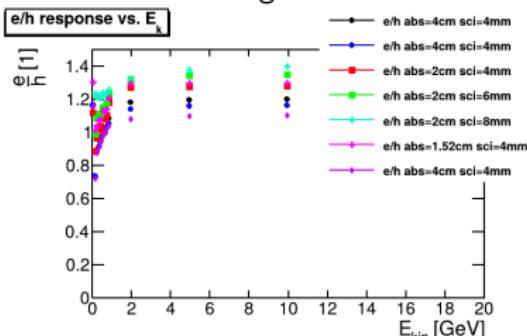


Flux return removed

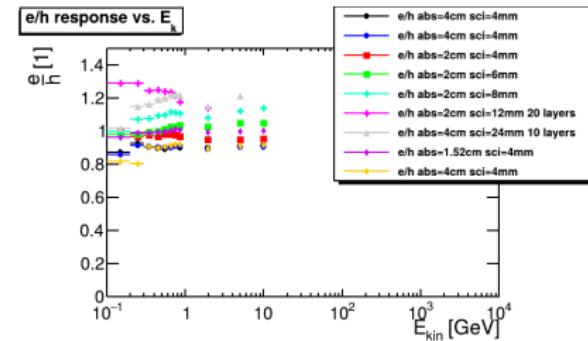
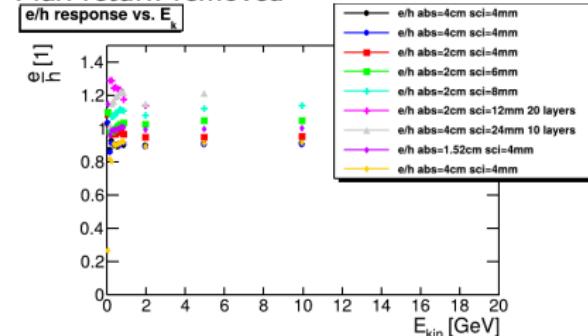


- Bug artificially increased sampling fraction at low energy - now fixed!

With flux return bug



Flux return removed



- Bug artificially increased e/h response
- Now fixed, closer to 1

- Fixed the bug with sampling fraction calculation
- It effectively added extra material, which is now removed
- This artificially increased sampling fraction at low energy

BACKUP