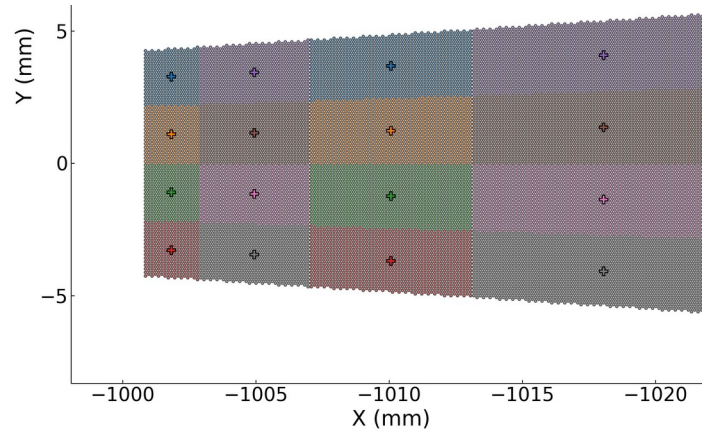
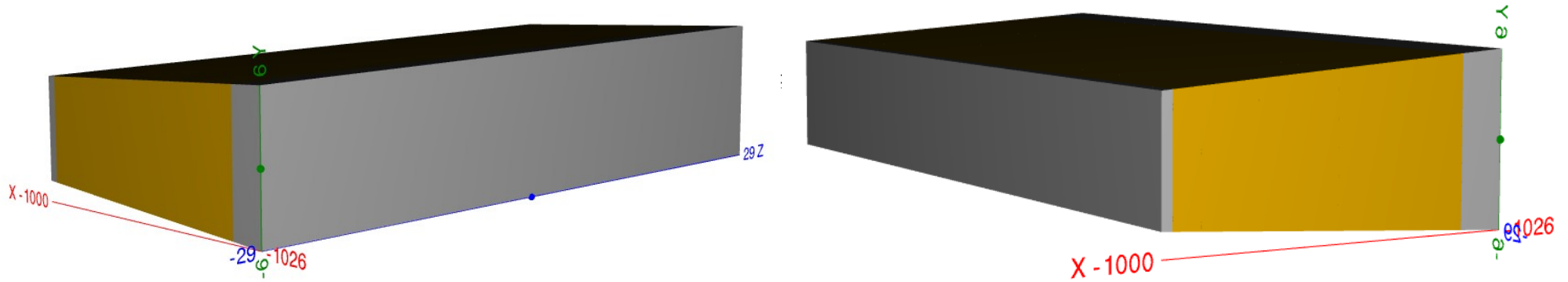


BabyBCal Simulation
Sampling Fractions
Calibration Constants
FTBF June 2024

Geometry and Grid Fibers



Pre-Attenuation

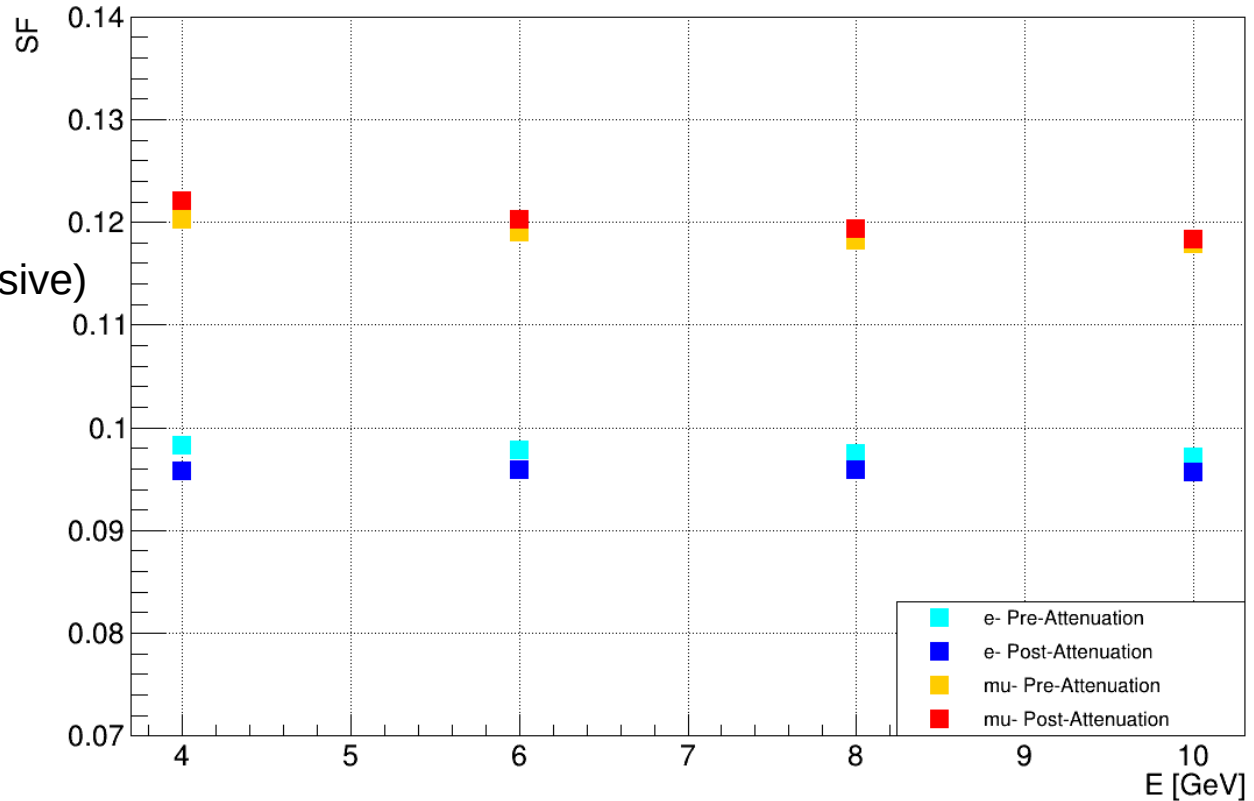
- Mono-energetic Beam
- Aimed at Center of BabyBCal
- Without Angular Smearing
- Extra Scintillator Material Removed

Post-Attenuation

- With Momentum Smearing
- Aimed with Offset
- With Angular Smearing
- Extra Scintillator Material Installed

Sampling Fractions

e- mu- Sampling Fraction Comparison

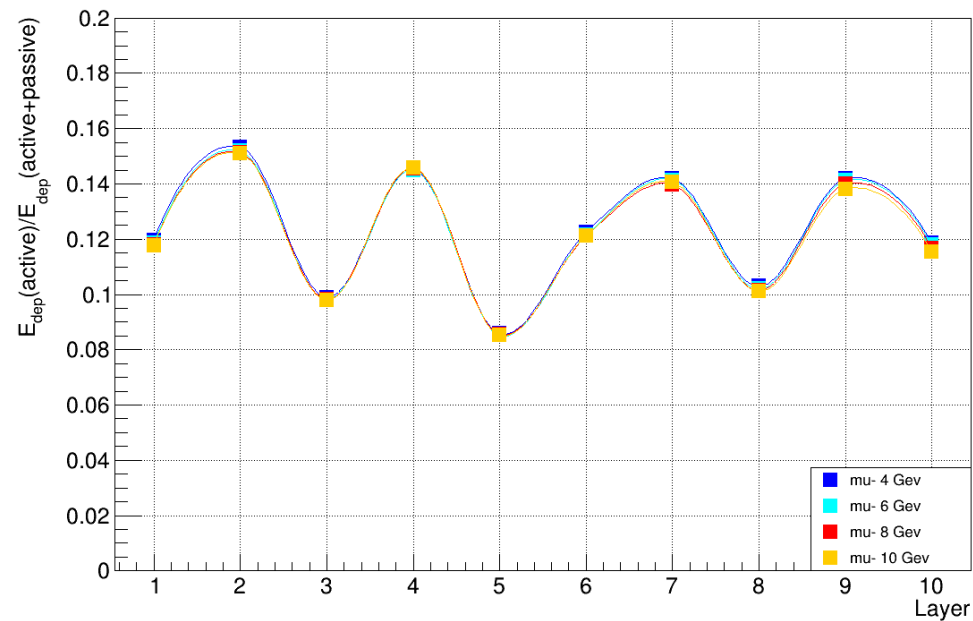


$$SF_{\mu^-} = E_{\text{dep}}(\text{active}) / E_{\text{dep}}(\text{active} + \text{passive})$$

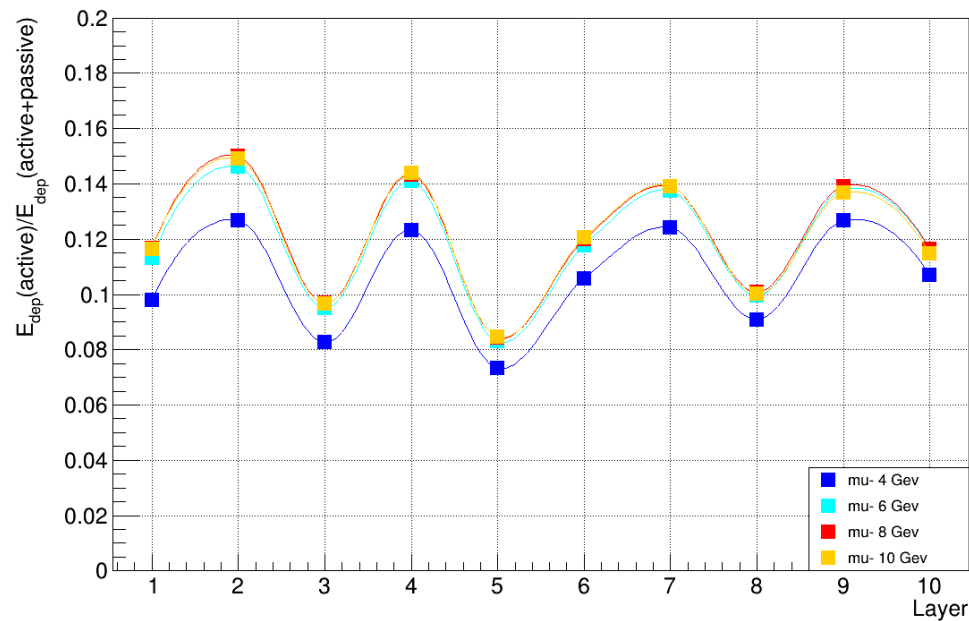
$$SF_{e^-} = E_{\text{dep}} / E_{\text{thrown}}$$

Sampling Fraction by Layer

mu- Sampling Fraction, Pre-Attenuation

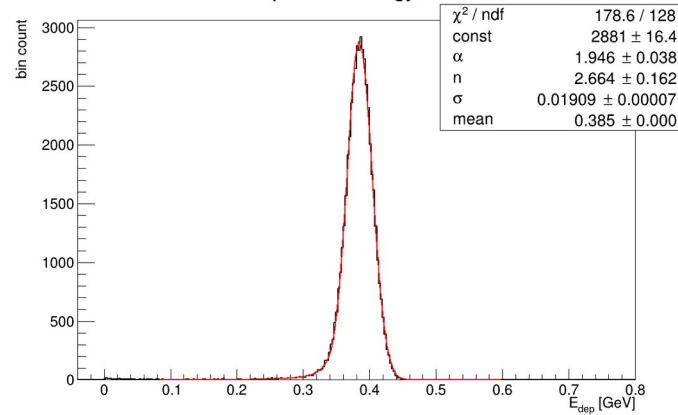


mu- Sampling Fraction, Post-Attenuation

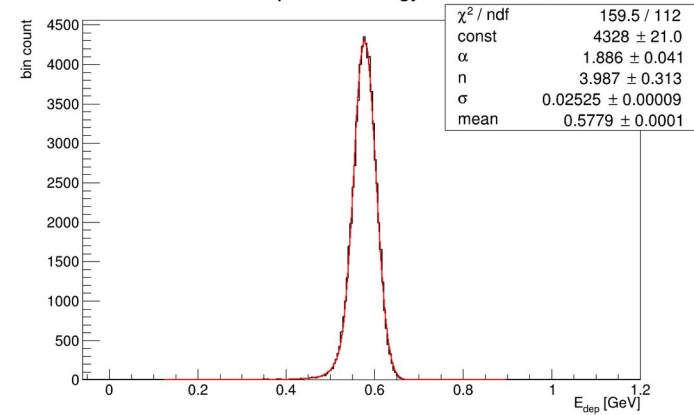


Electron Response

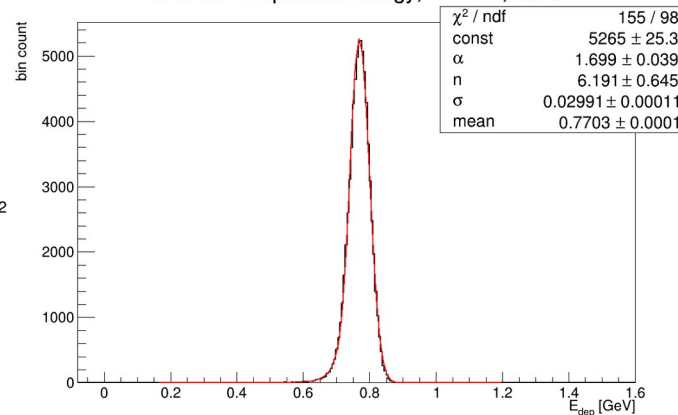
e- 4 GeV Deposited Energy, r = 10m, cut:3



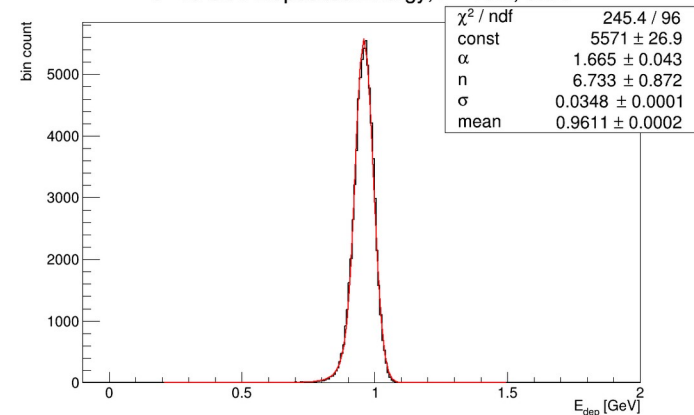
e- 6 GeV Deposited Energy, r = 10m, cut:3



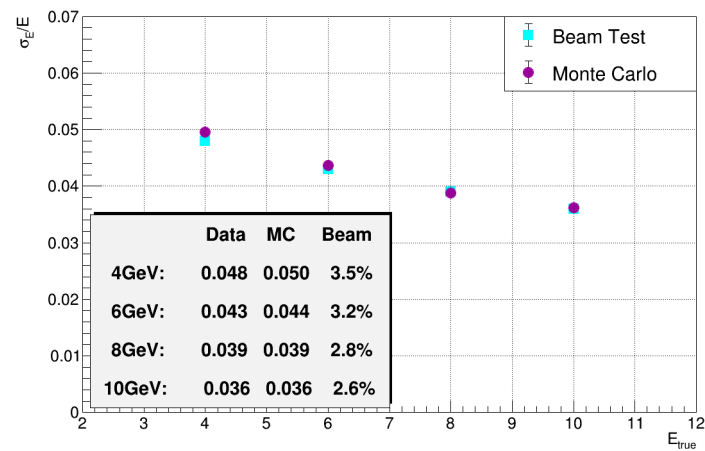
e- 8 GeV Deposited Energy, r = 10m, cut:3



e- 10 GeV Deposited Energy, r = 10m, cut:3

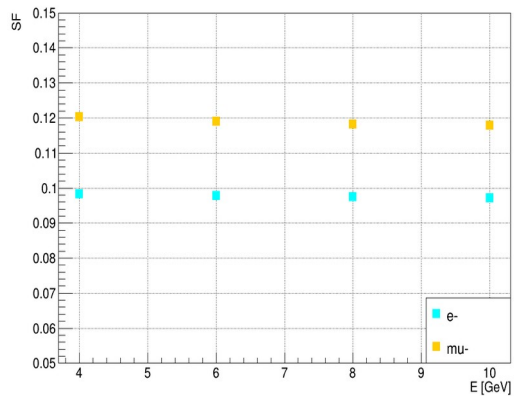


Electron Energy Resolution Comparison

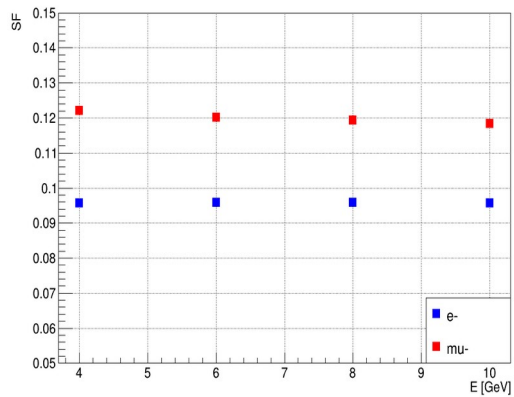


Electron SF

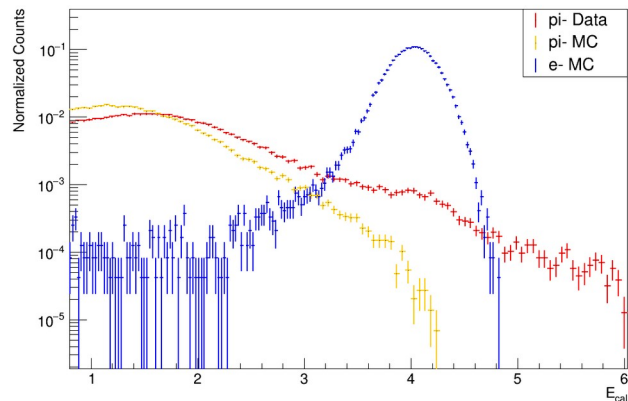
e- mu- Sampling Fraction Comparison, Pre-Attenuation



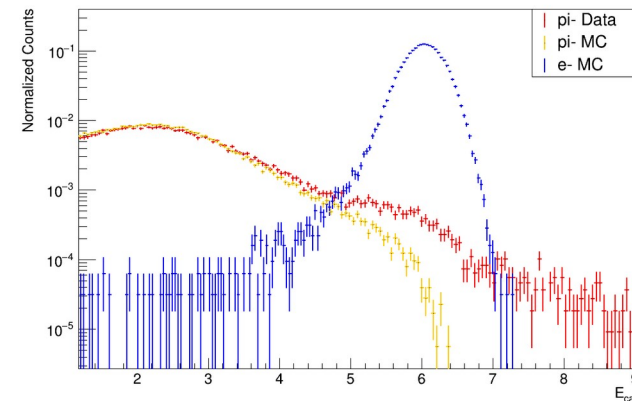
e- mu- Sampling Fraction Comparison, Post-Attenuation



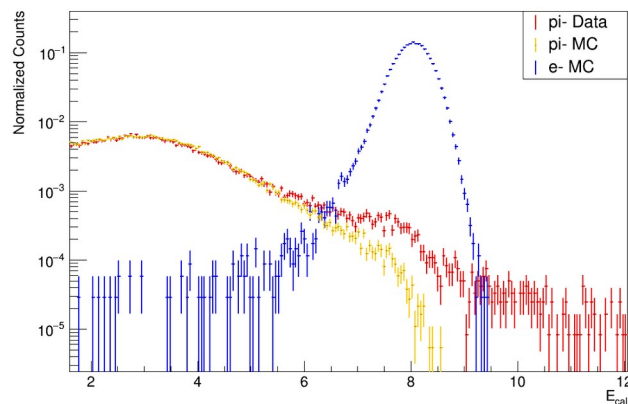
e/π 4GeV



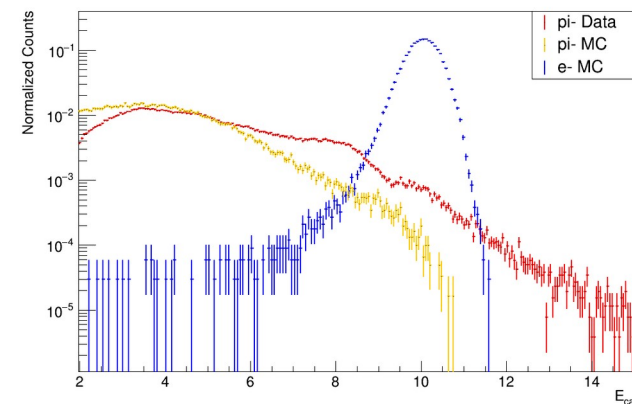
e/π 6GeV



e/π 8GeV

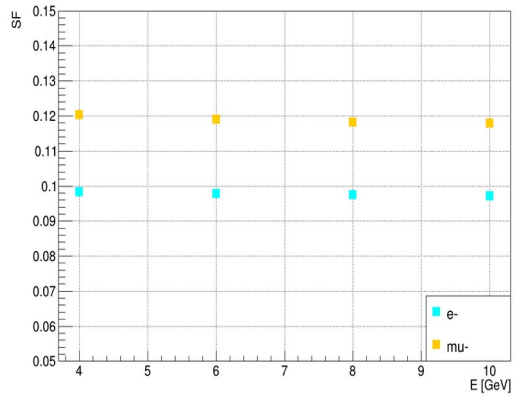


e/π 10GeV

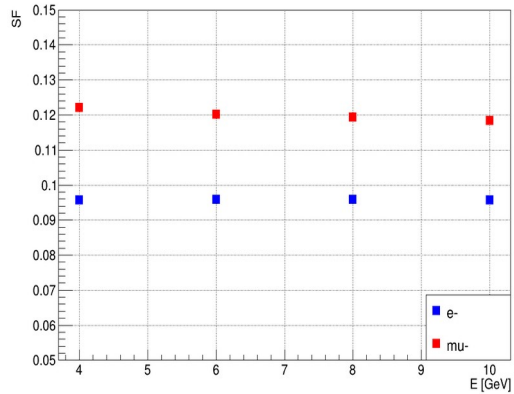


Electron SF

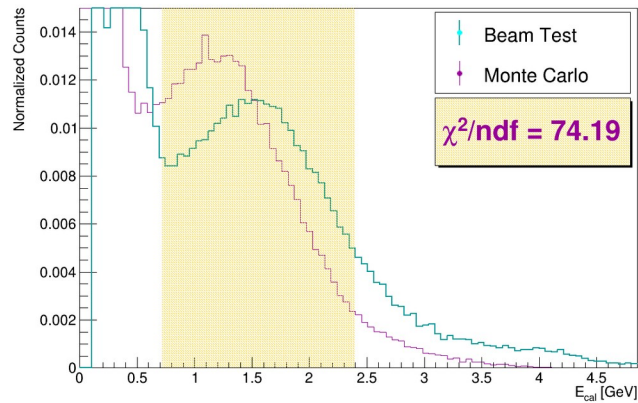
e- mu- Sampling Fraction Comparison, Pre-Attenuation



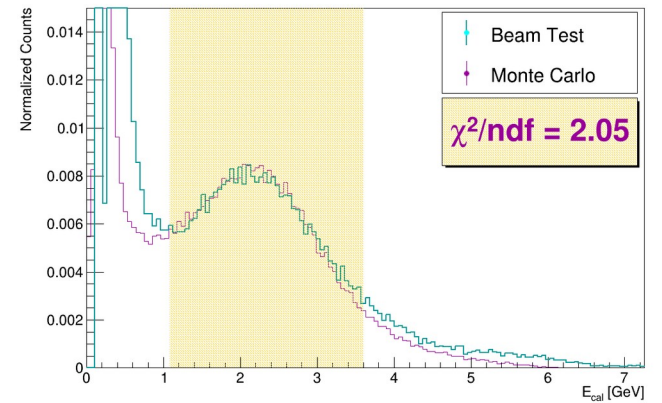
e- mu- Sampling Fraction Comparison, Post-Attenuation



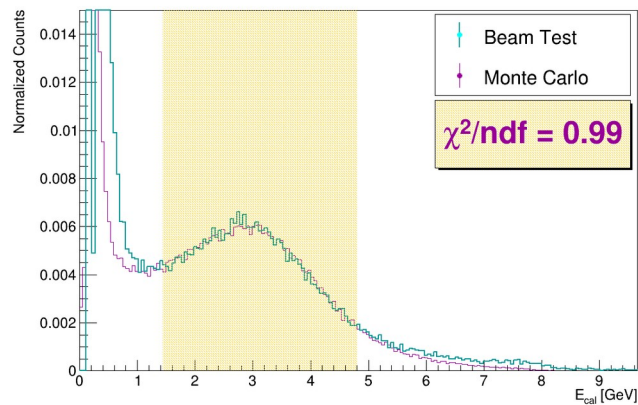
4GeV Pion Energy Response Comparison



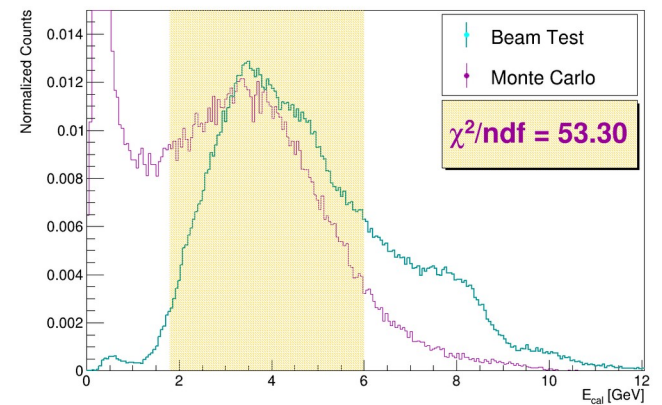
6GeV Pion Energy Response Comparison



8GeV Pion Energy Response Comparison

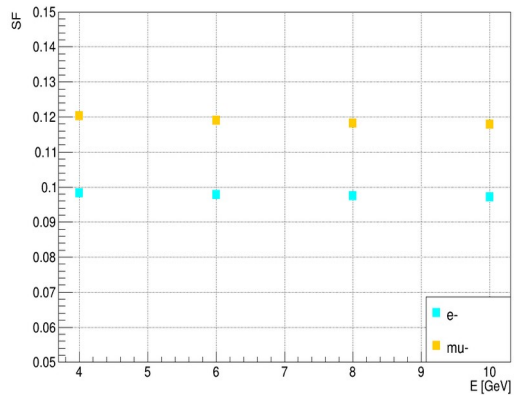


10GeV Pion Energy Response Comparison

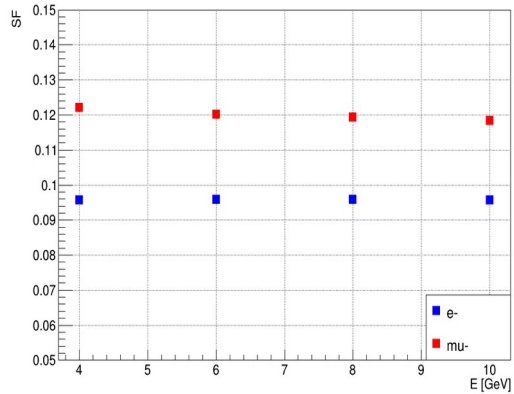


Muon SF

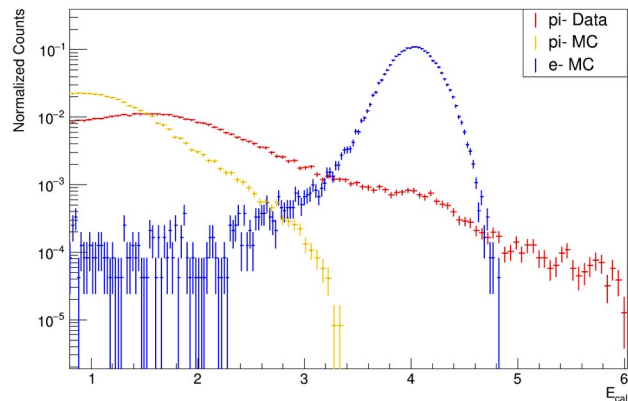
e- mu- Sampling Fraction Comparison, Pre-Attenuation



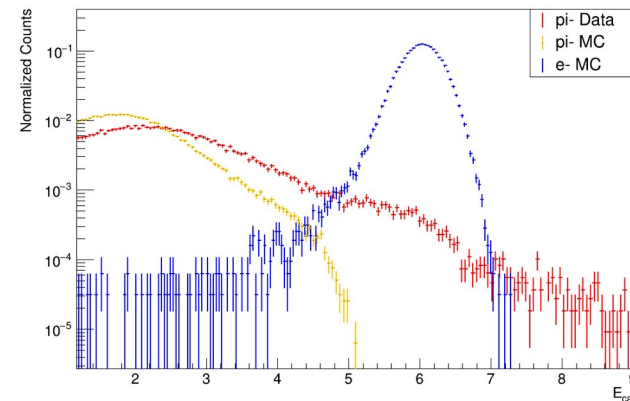
e- mu- Sampling Fraction Comparison, Post-Attenuation



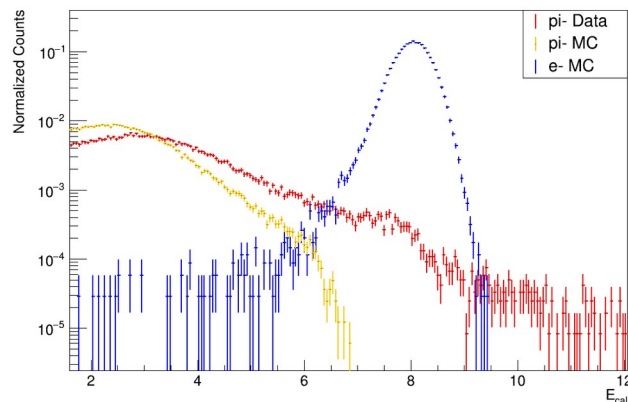
e/π 4GeV



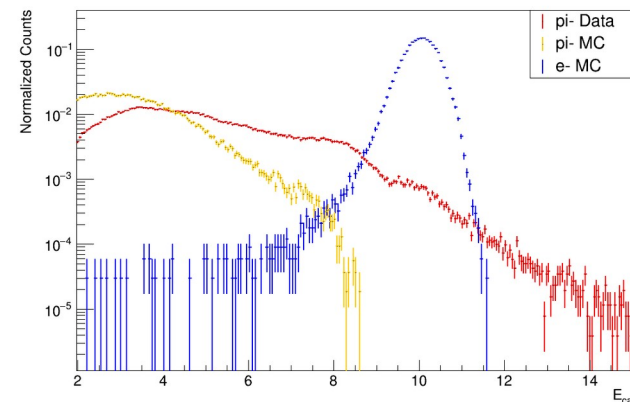
e/π 6GeV



e/π 8GeV

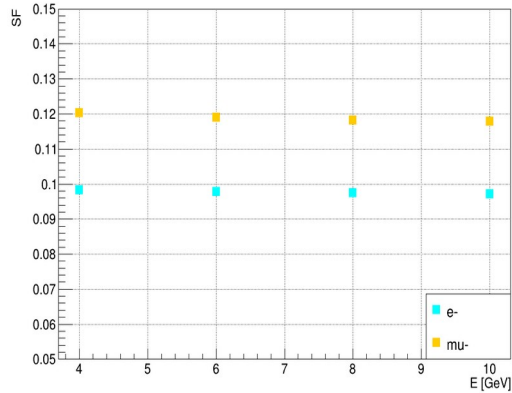


e/π 10GeV

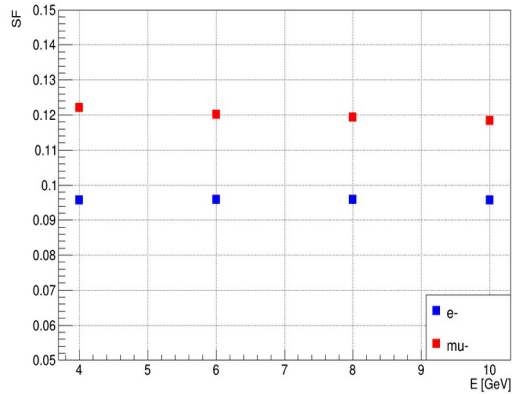


Muon SF

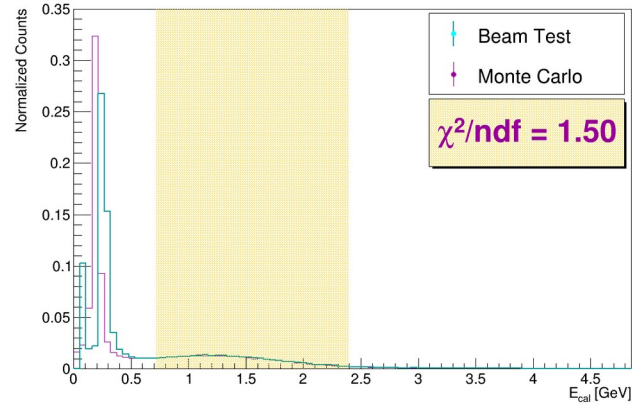
e- mu- Sampling Fraction Comparison, Pre-Attenuation



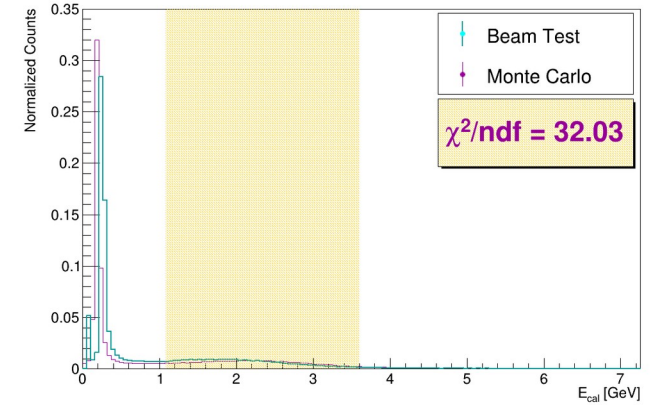
e- mu- Sampling Fraction Comparison, Post-Attenuation



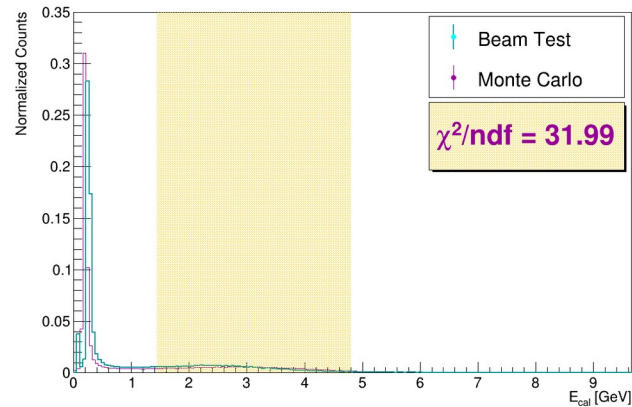
4GeV Pion Energy Response Comparison



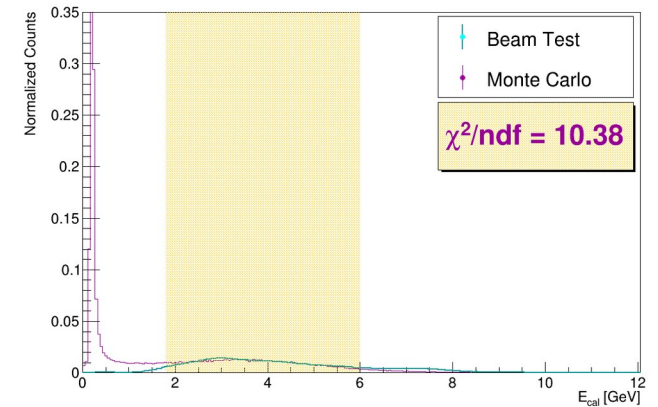
6GeV Pion Energy Response Comparison



8GeV Pion Energy Response Comparison

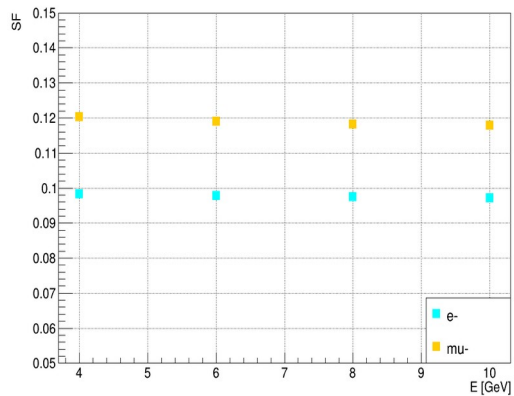


10GeV Pion Energy Response Comparison

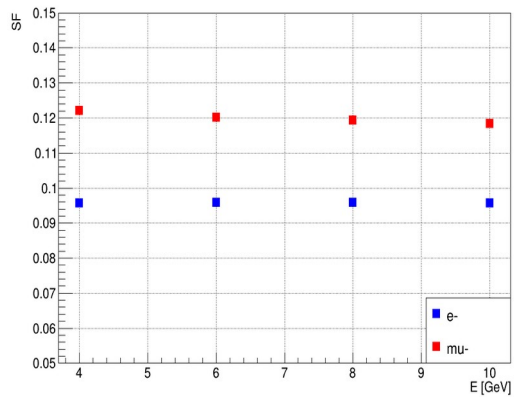


Compare SF

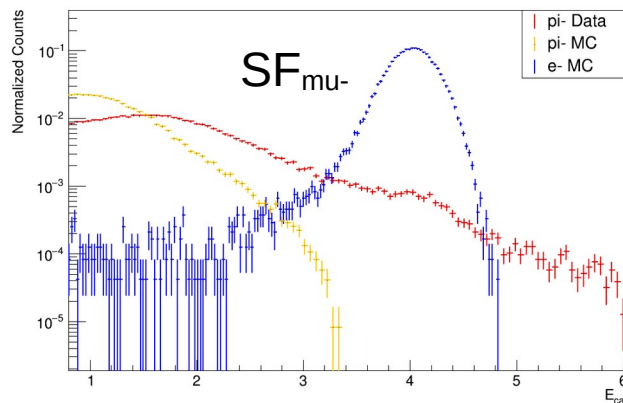
e- mu- Sampling Fraction Comparison, Pre-Attenuation



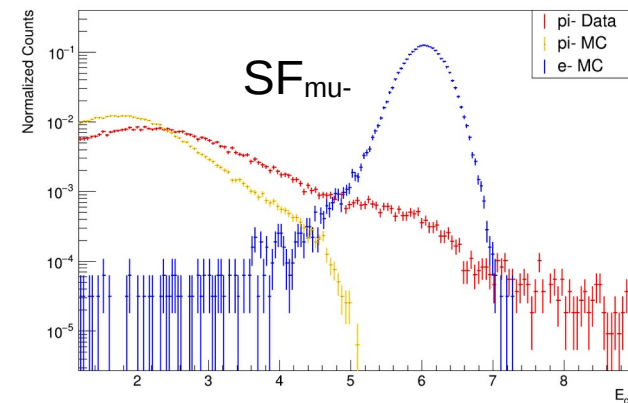
e- mu- Sampling Fraction Comparison, Post-Attenuation



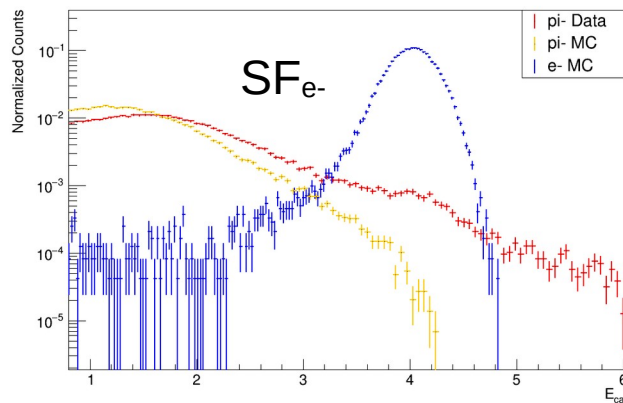
e/ π 4GeV



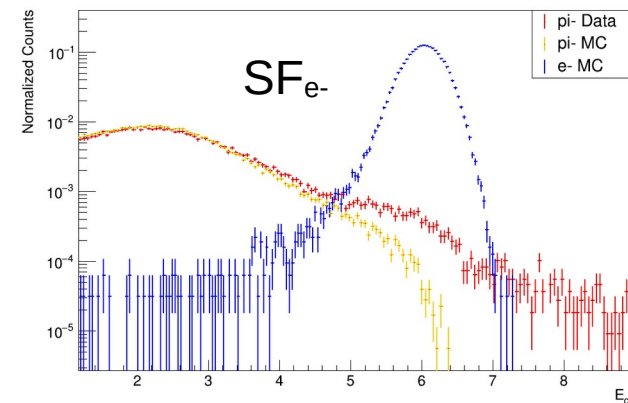
e/ π 6GeV



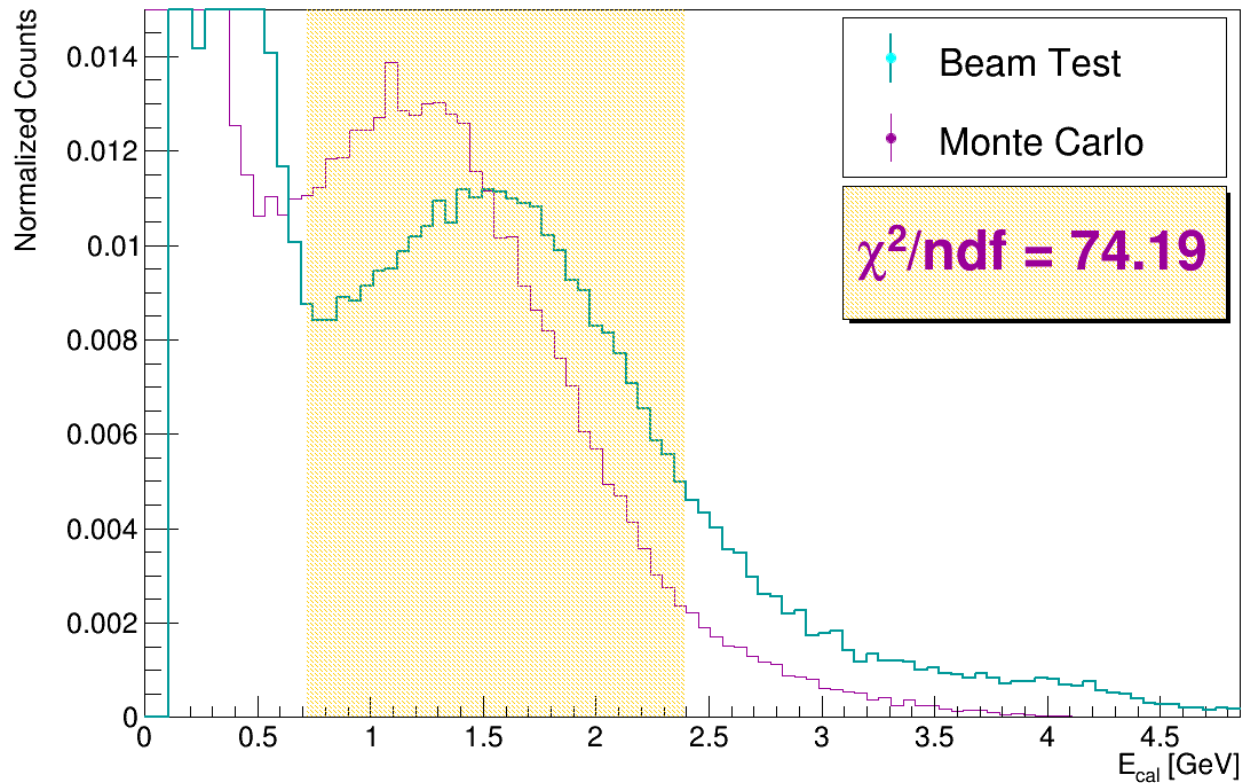
e/ π 4GeV



e/ π 6GeV



4GeV Pion Energy Response Comparison



Next Steps

- Simulate e- (active+passive) for SF(Layer) study
- Match MC calibrations with Data calibrations for each scheme