Pion-LT/Kaon-LT Collaboration Meeting

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Pion Absorption Correction

- **Followed Alicia's instructions to set up the pion absorption correction Geant4.**
- **Turned on NGC.**
- **Set Aerogel tray to 11 (n=1.011)**
- **Set SHMS momentum to 5.127 GeV (Q2 = 3.85, W = 2.62, t = 0.21)**
- **Set particle type to pi+**
- **Ran for 150000 events.**
- **Calculated particle absorption factor:**

  Absorption Factor (%) = ((Total events – event passed ¾ trigger) / Total events) * 100

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Total events: 150000
Missed 3/4 triggers: 1537 or 1.02%
Total stopped tracks: 9839 or 6.56%
3/4 was triggered by: 919 p+, 144814 pi+, 1431 K+, 15 e+, and 1148 contaminated tracks
------------------------------------------------
Absorption correction in percentage (by incident particle type):
Physics Setting: Q3p85_W2p02_t0p21  at Central Momentum: 5.127 GeV
pi+ Absorption: 3.457 +/- 0.005%
pi+ Absorption Correction: 0.96543 +/- 0.00005
================================================
Absorption corrections saved to Q3p85_W2p02_t0p21_pion_absorption_corrections_5.127GeV.csv
Info in <TCanvas::Print>: pdf file Pion_Absorption_Corr_NPE_Distributions_Q3p85_W2p02_t0p21_5.127GeV.pdf has been created
Process completed successfully.
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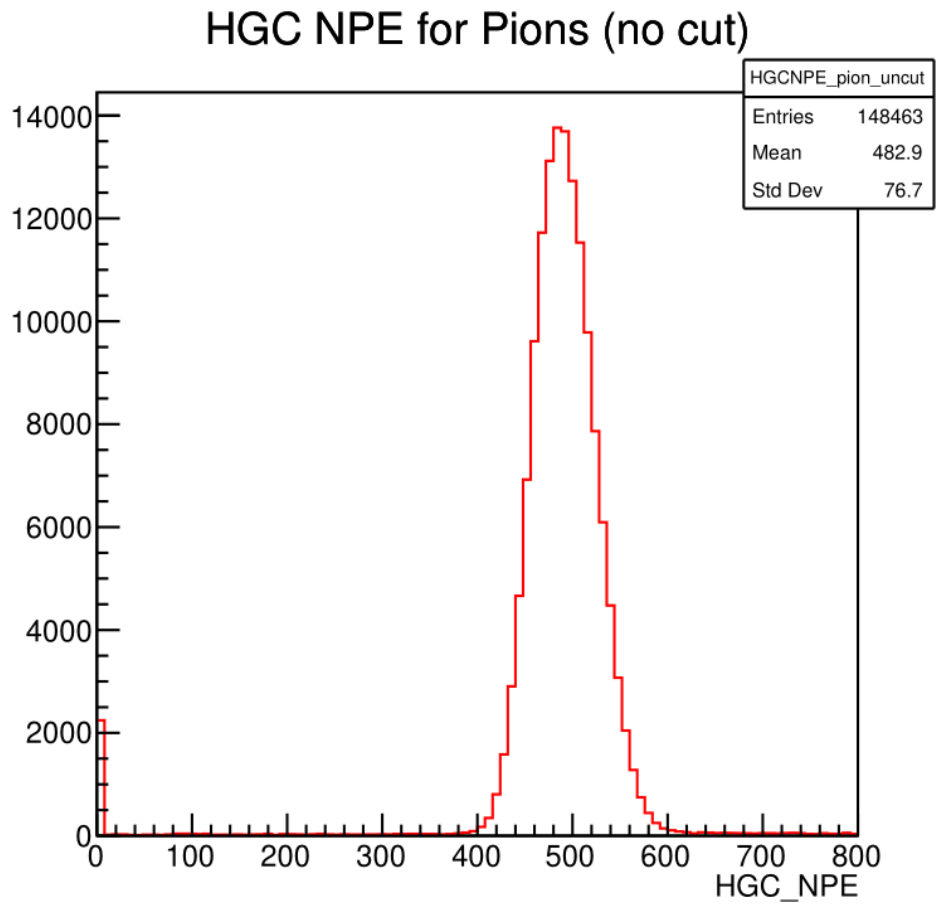
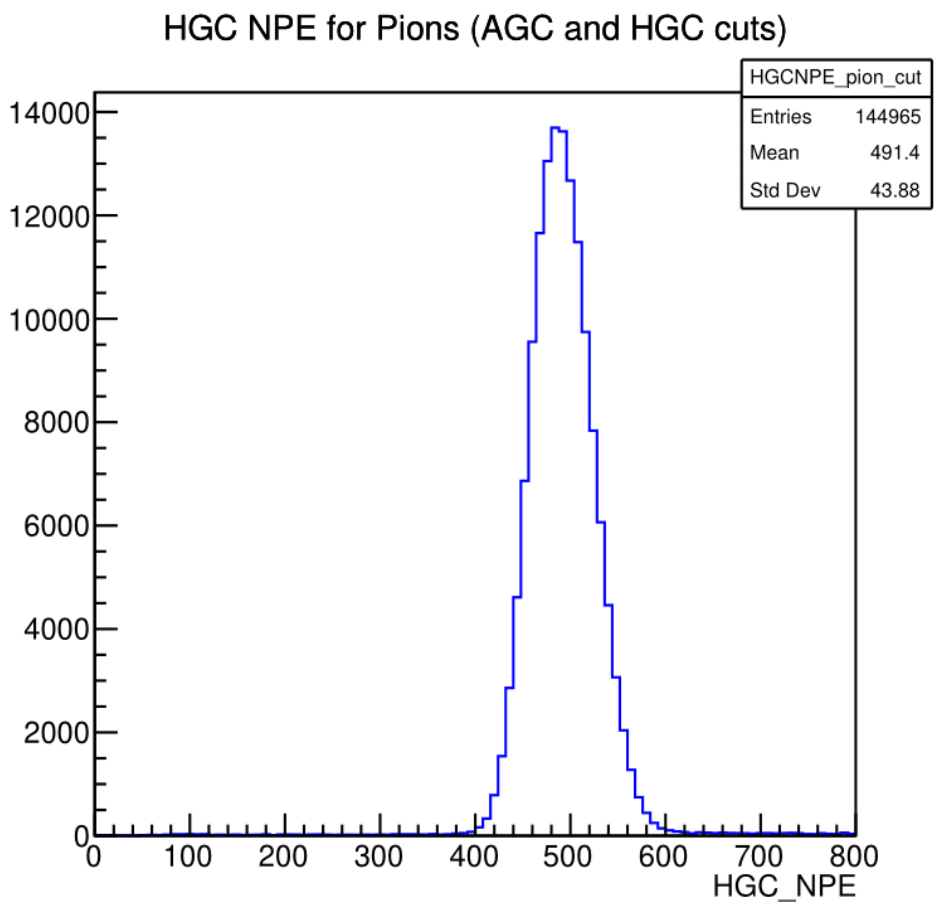
Pion Absorption Correction

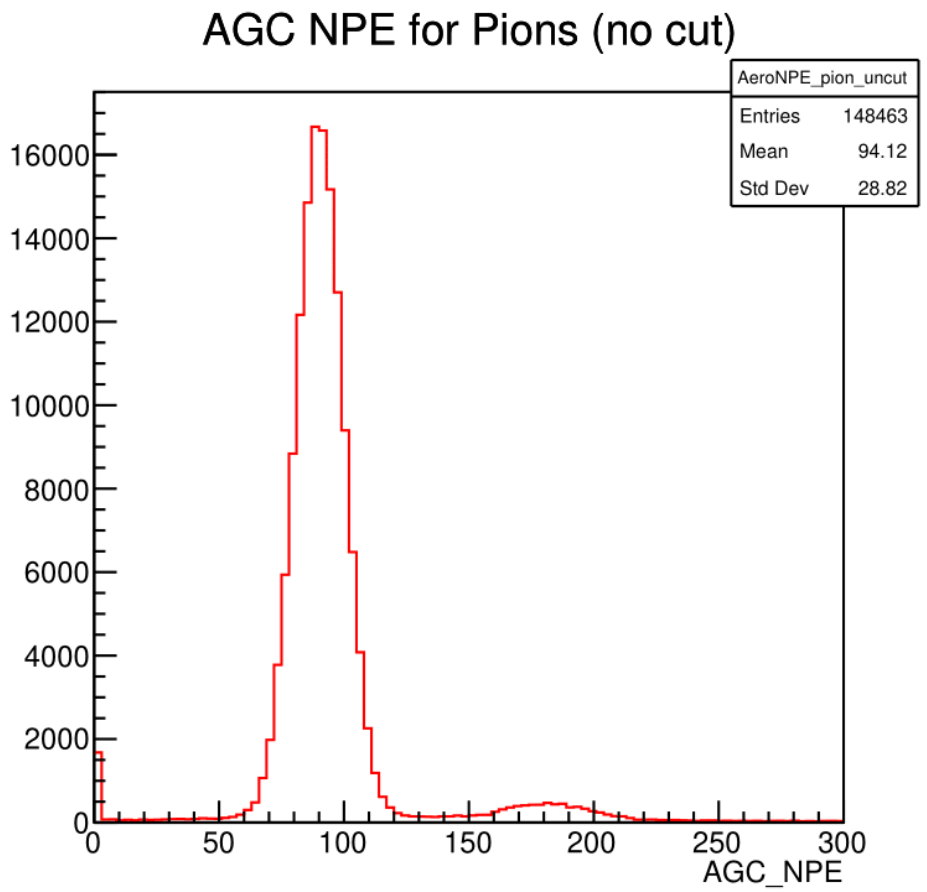
- **Applied cuts: AGC_NPE > 20 and HGC_NPE > 50**

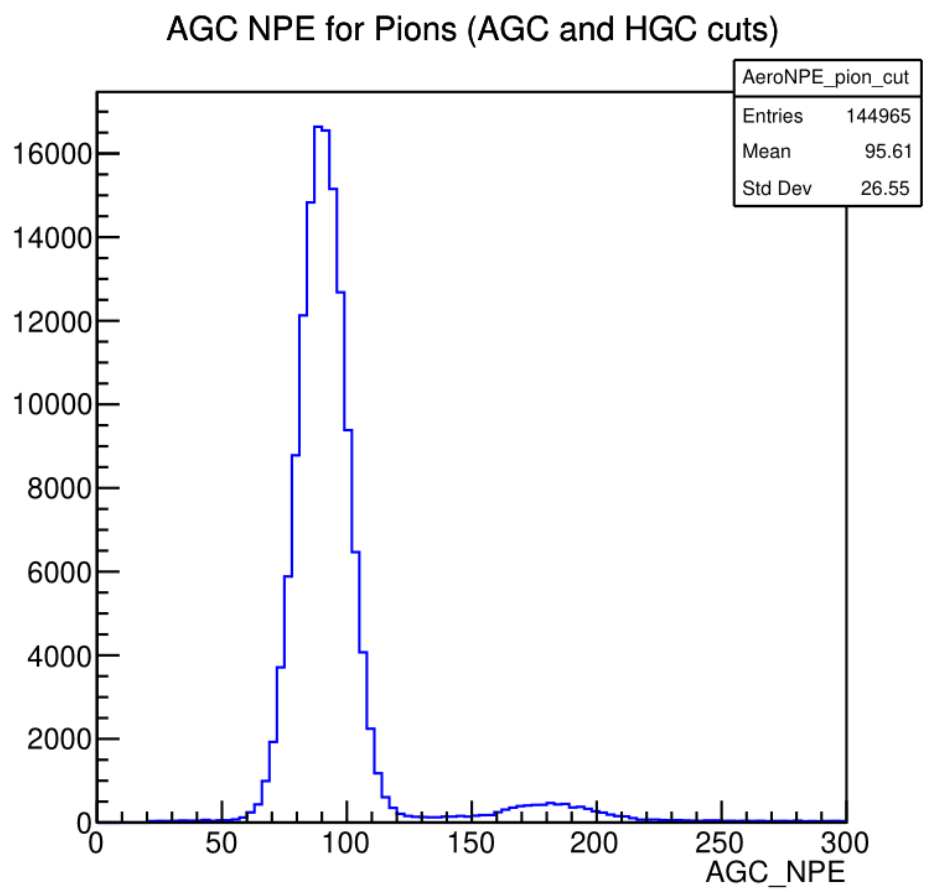




Pion Absorption Correction

- **Applied cuts: AGC_NPE > 20 and HGC_NPE > 50**





RF Efficiency Studies

- **Cuts applied for RF efficiency Calculation for physics setting "Q2 = 3.85, W = 2.62, t = 0.21 (2 epsilons)"**

HMS Cuts (Electrons)
-8 < H_gtr_dp < 8
-0.08 < H_gtr_th < 0.08
-0.045 < H_gtr_ph < 0.045
HMS_Cal_etottracknorm > 0.7
H_Cer_npeSum > 1.5

SHMS Cuts (Pions)
-10 < P_gtr_dp < 20
-0.06 < P_gtr_th < 0.06
-0.04 < P_gtr_ph < 0.04
Ctime_epCoinTime_ROC1 (Prompt & Rand)
P_hgcer_npesum > 1.5
P_aero_npeSum > 2.5
1.2 < P_RF_Dist < 3.4

RF Efficiency Studies

- **RF Efficiency Calculation:**

$$\epsilon_{RF} = \frac{N_{\mathrm{Did}}}{N_{\mathrm{Should}}}$$

Where

N_{Did} **= Number of Events with Accept cut + Detector cut + CoinTime cut +Rf cut**

N_{Should} **= Number of Events with Accept cut + Detector cut + CoinTime cut**

$$\delta\epsilon_{RF} = \sqrt{\frac{(N_{\mathrm{Did}} \times N_{Should}) - (N_{\mathrm{Did}})^2}{(N_{Should})^3}}$$

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###### RF Efficiency Calculation #########
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RF Ndid: 405914.00
RF Nshould: 406718.00
RF Efficiency: 0.99802 +/- 0.00007
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Wrote RF efficiency to /group/c-pionlt/USERS/junaid/hallc_replay_lt/UTI
fficiency_data.csv
Info in <TCanvas::Print>: pdf file /group/c-pionlt/USERS/junaid/hallc_r
2p62_t0p21_PionLT_coin_prod_RF_efficiency.pdf has been created
Processing Complete
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RF Efficiency Studies

- **Calculated pion absorption correction for physics setting: "Q2 = 3.85, W = 2.62, t = 0.21 (2 epsilons)"**
- **Calculated RF efficiency for physics setting: "Q2 = 3.85, W = 2.62, t = 0.21 (2 epsilons)"**

- **In progress:**

- Working on PID cuts for **"Q2 = 3.85, W = 2.02, t = 0.49 (2 epsilons)"**