

Energy Loss

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Energy Loss

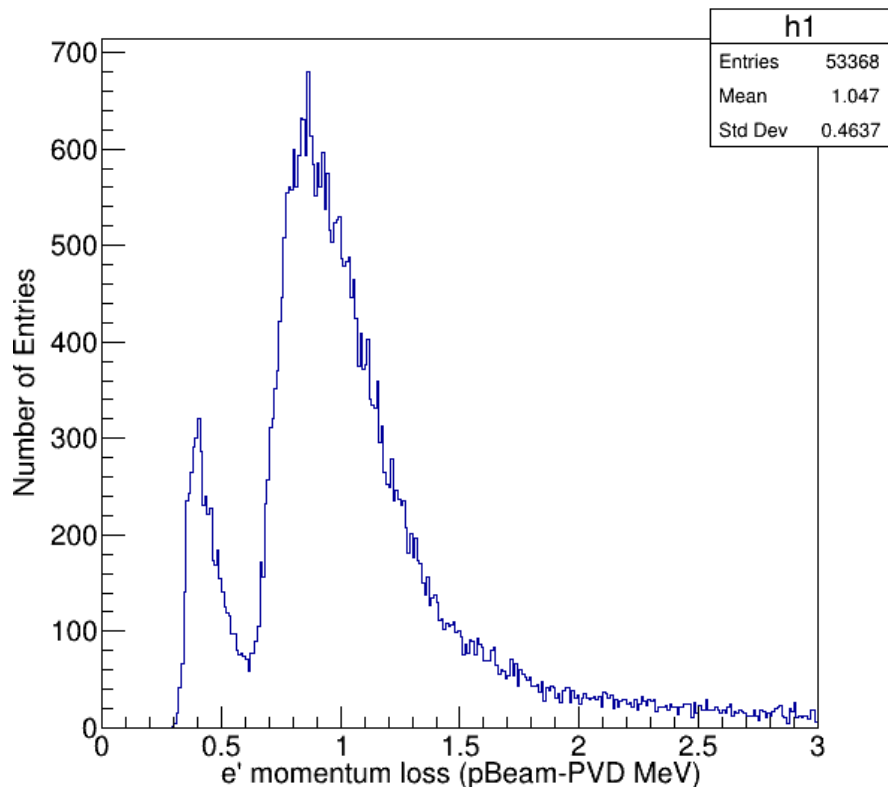
- Energy (momentum) loss for electrons and kaons through Tritium target with a thickness of 0.4 mm or 0.04 cm.
- Energy values for electrons and kaons were taken from past experiment. Electrons 2.218 GeV/c and kaons 1.823 GeV/c.
- Angles for e^- and k^+ were 13.2 deg.
- Energy loss for beam electrons using Aluminum target is included at the end. Energy for beam electron was 4.326 GeV.

Energy Loss

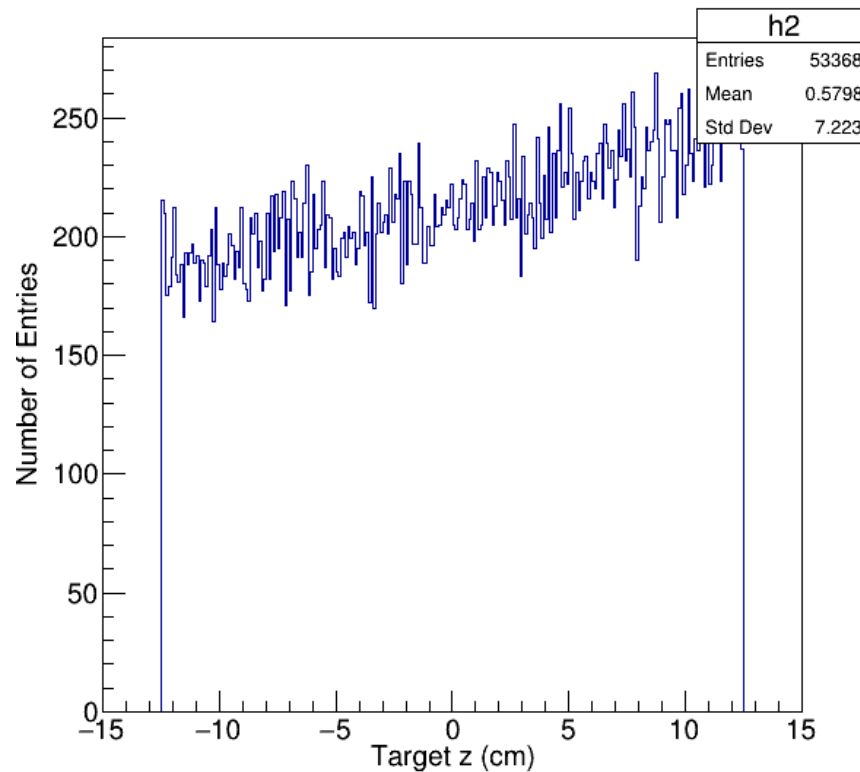
- Two regions in the energy loss are seen
- $z > 9.6$ the energy loss is smaller and tighter due to the thinner and more uniform Al spherical cap.
- $Z < 9.6$ the energy loss is greater and spread out due to the varying path length of the particles through the side of the target cell.

Tritium scattered electron energy loss

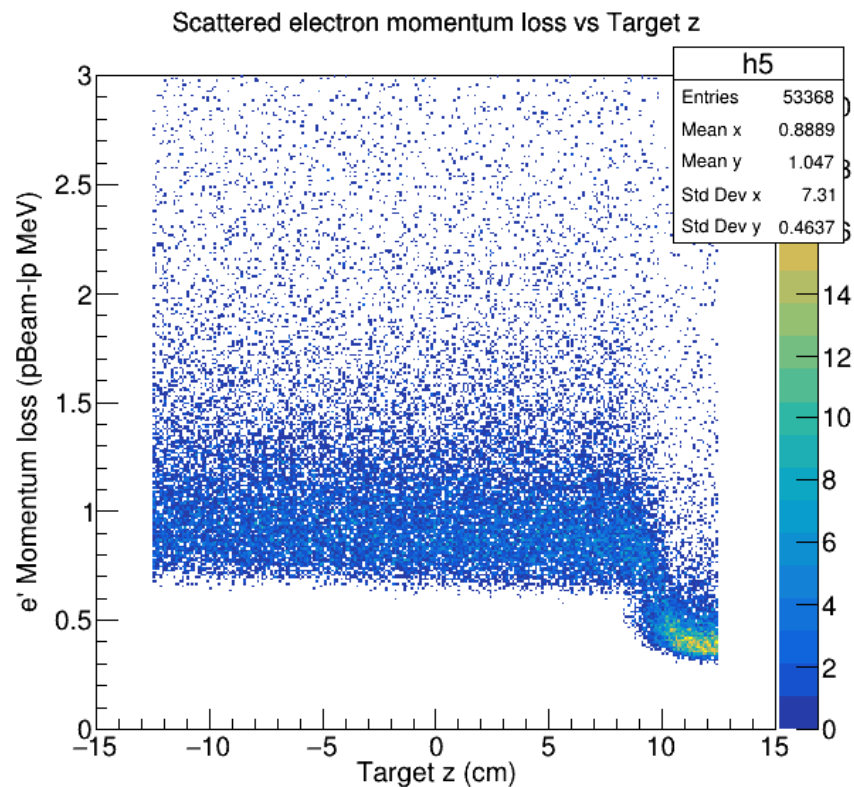
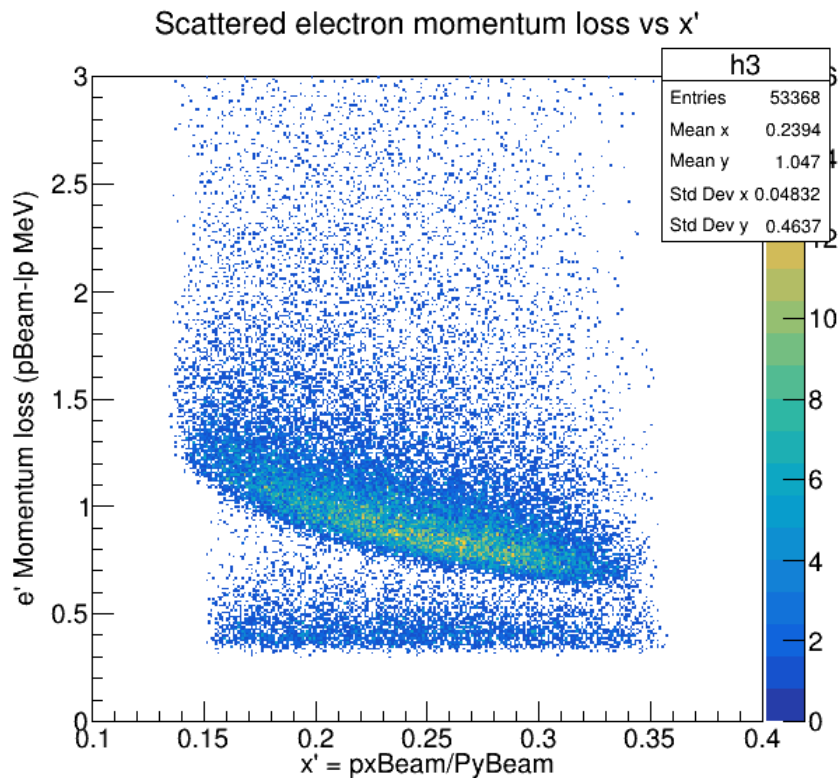
Tritium target 0.4mm, Beam electron momentum loss, Momentum = 2.218 GeV



Scattered electron z

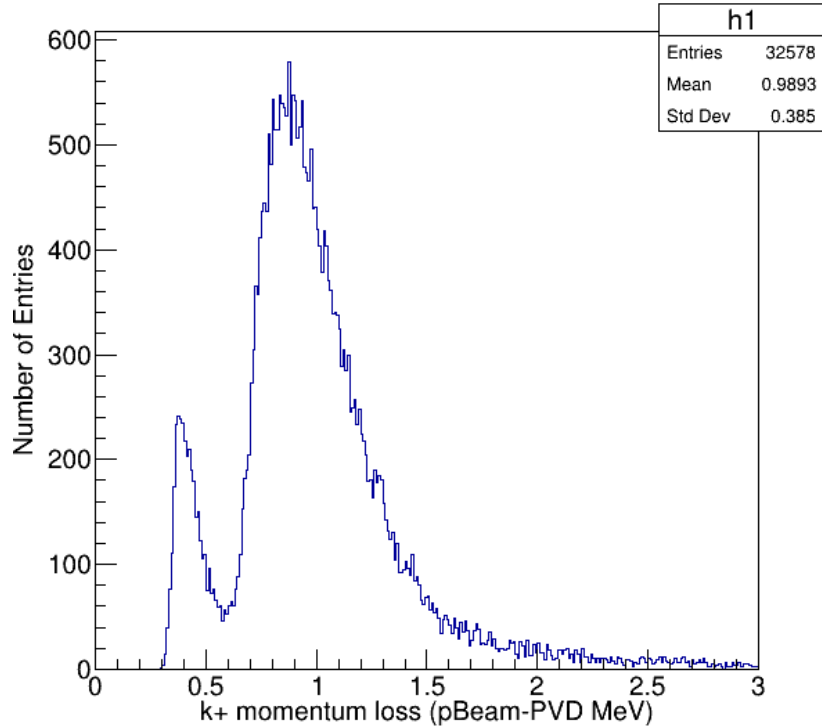


Tritium scattered electron energy loss

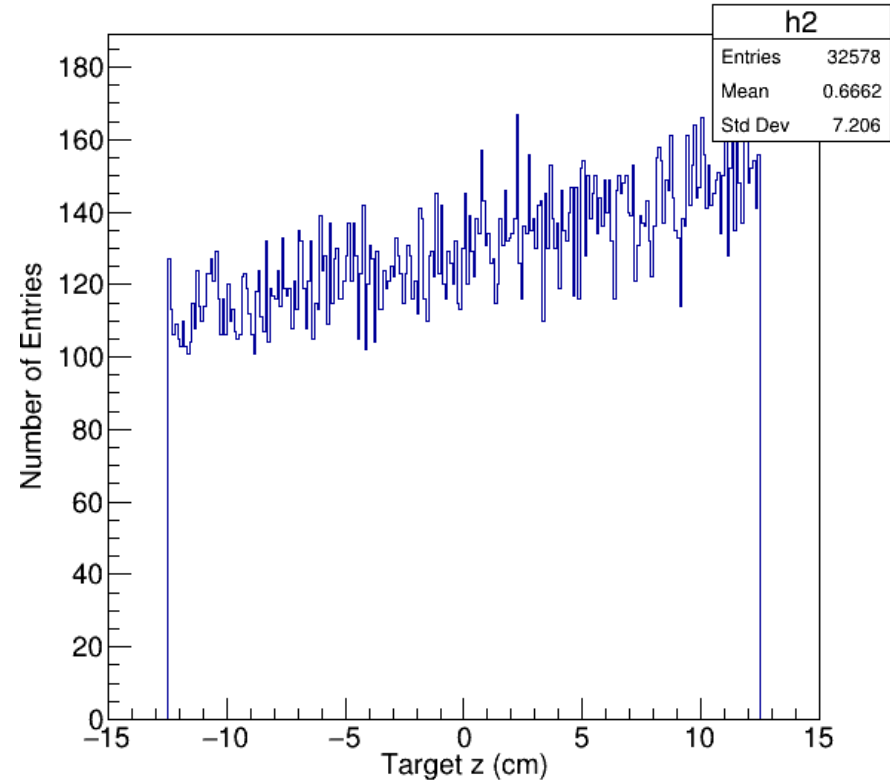


Tritium Kaon energy loss

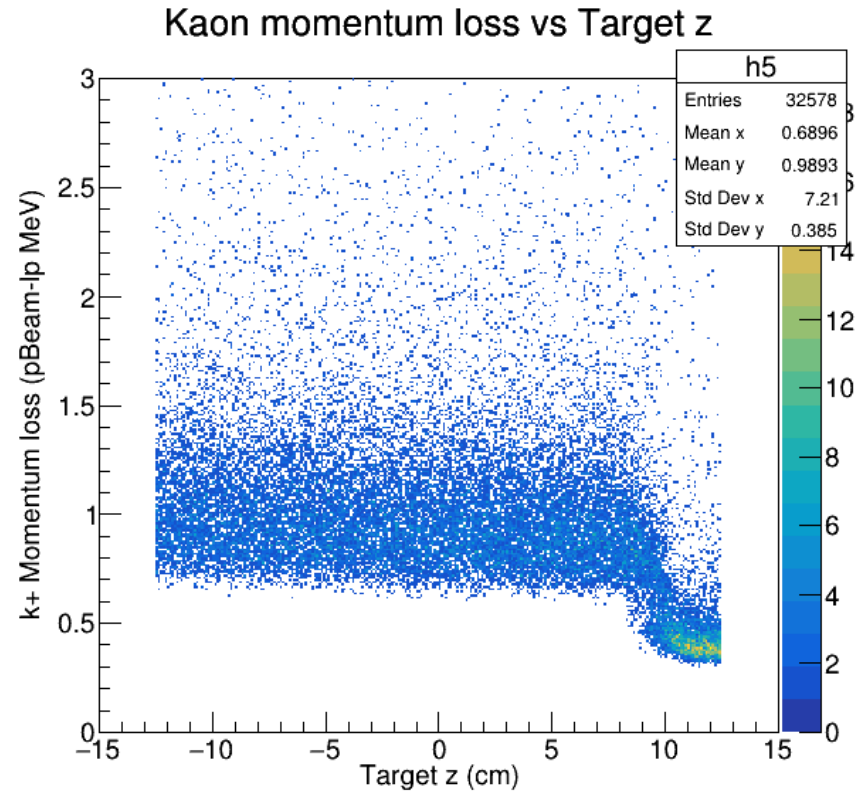
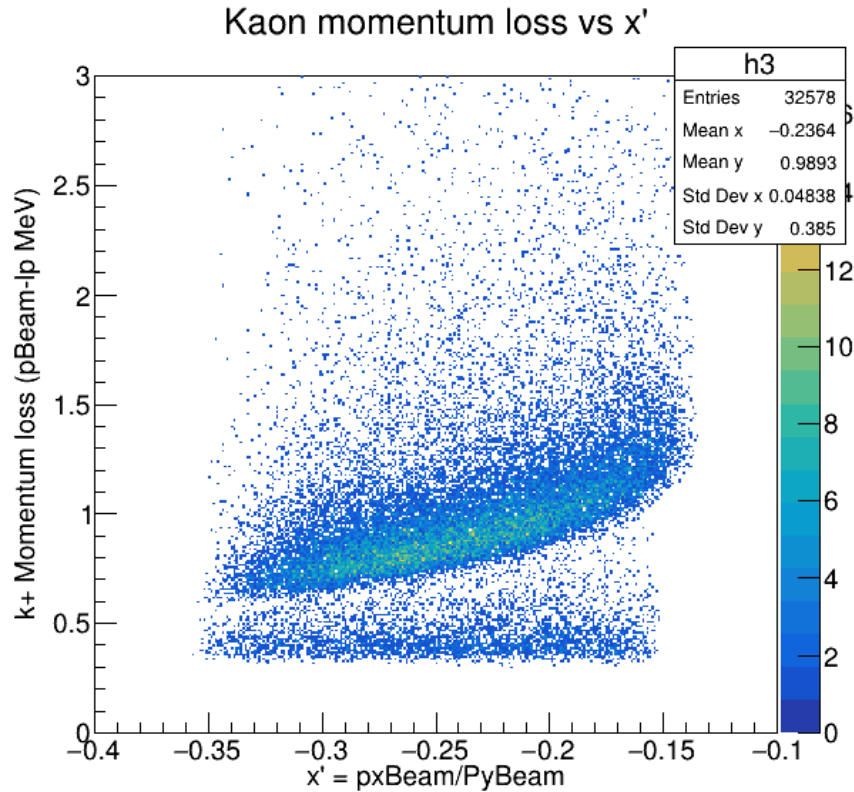
Tritium target 0.4mm, Kaon momentum loss, Momentum = 4.326 GeV



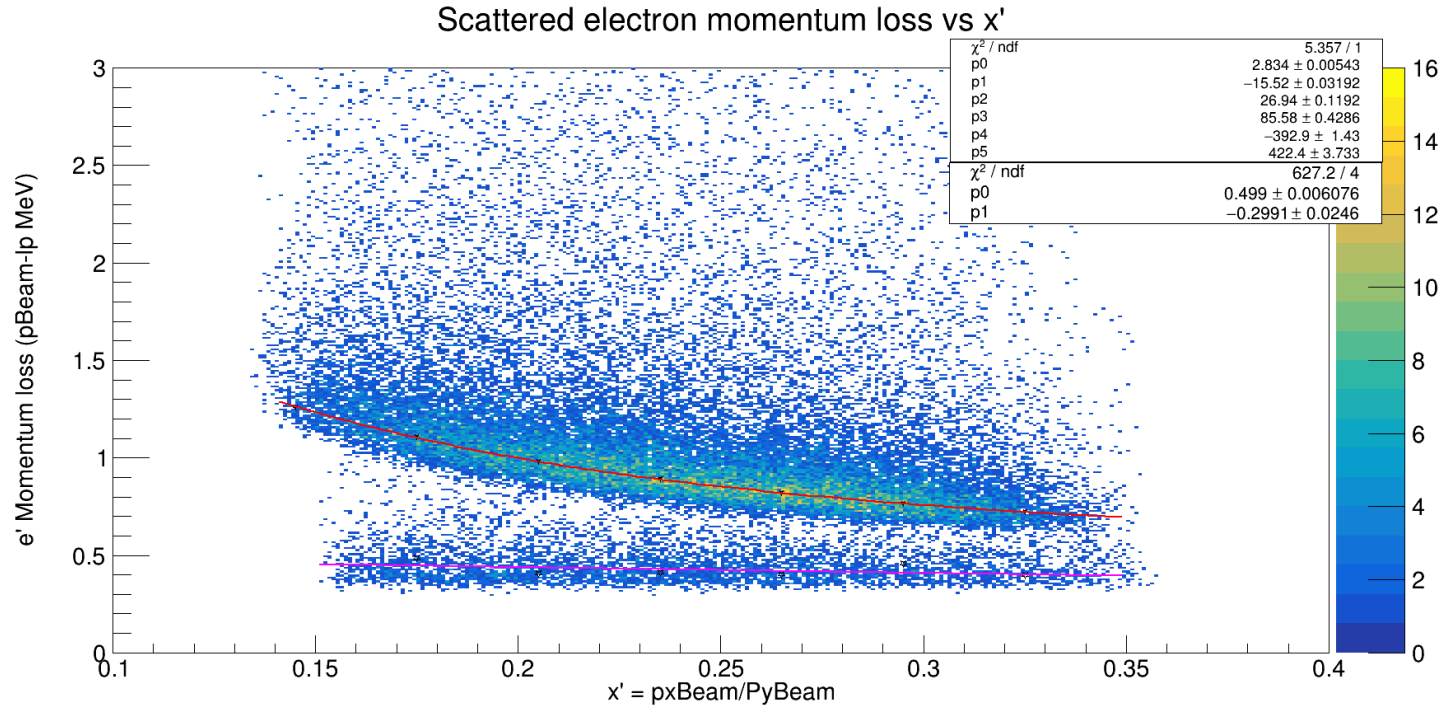
Kaon z



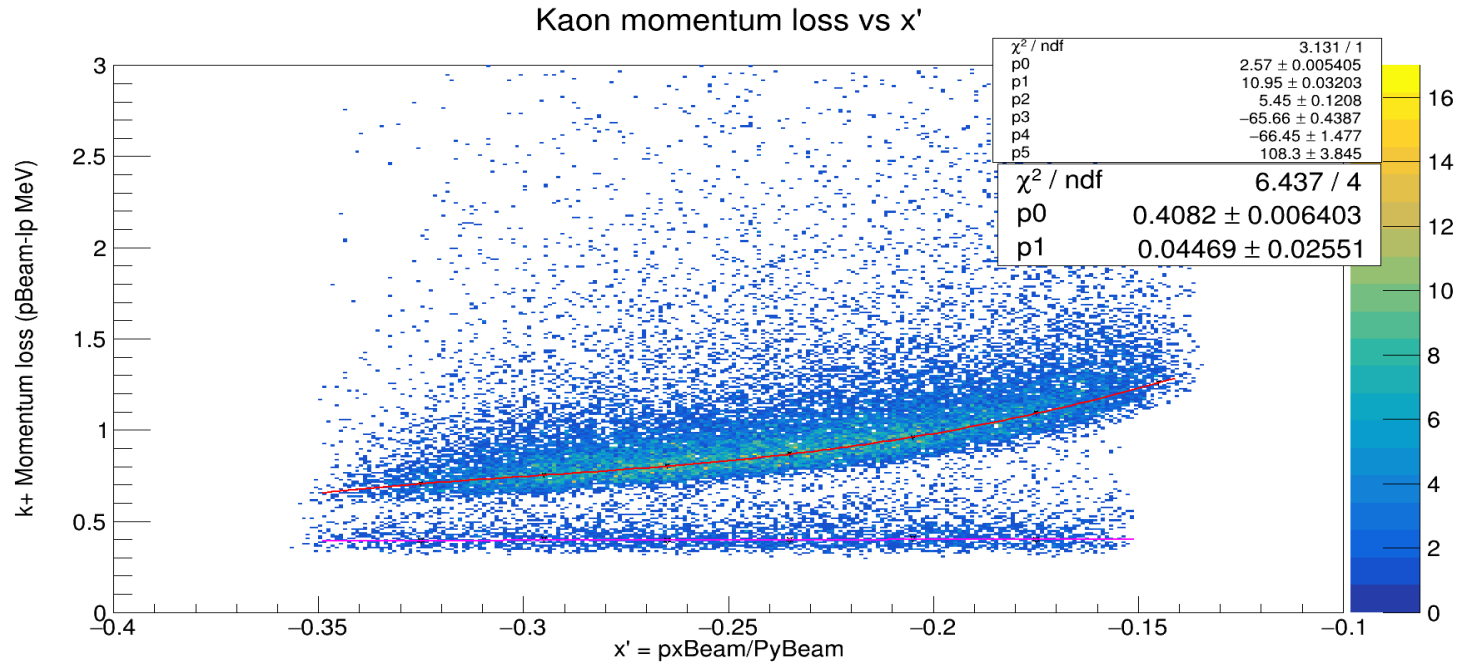
Tritium Kaon energy loss



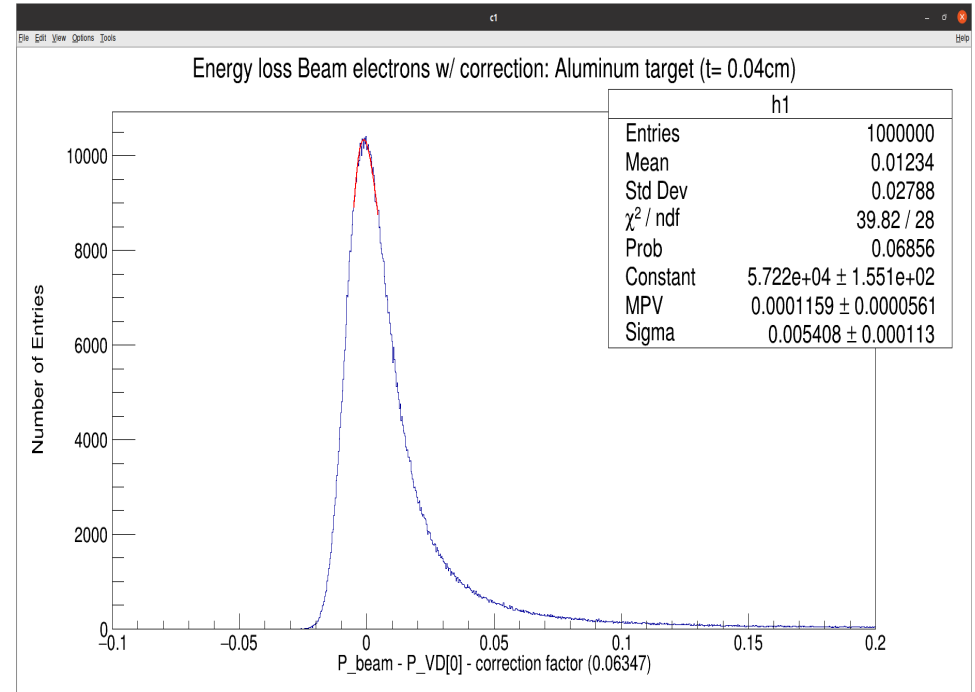
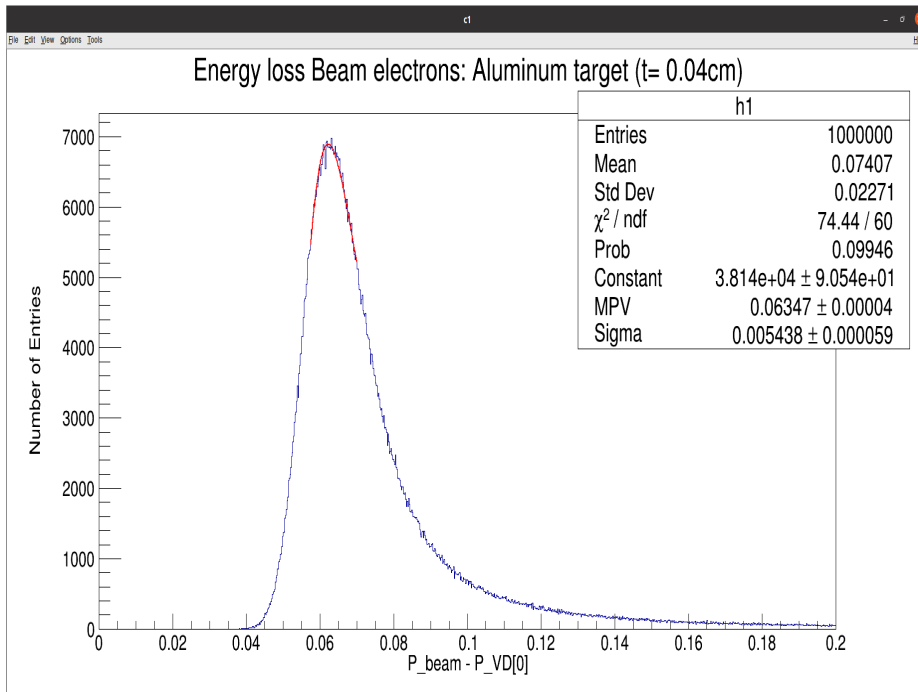
Tritium scattered electron energy loss fitted



Tritium kaon energy loss fitted



Beam electrons energy loss



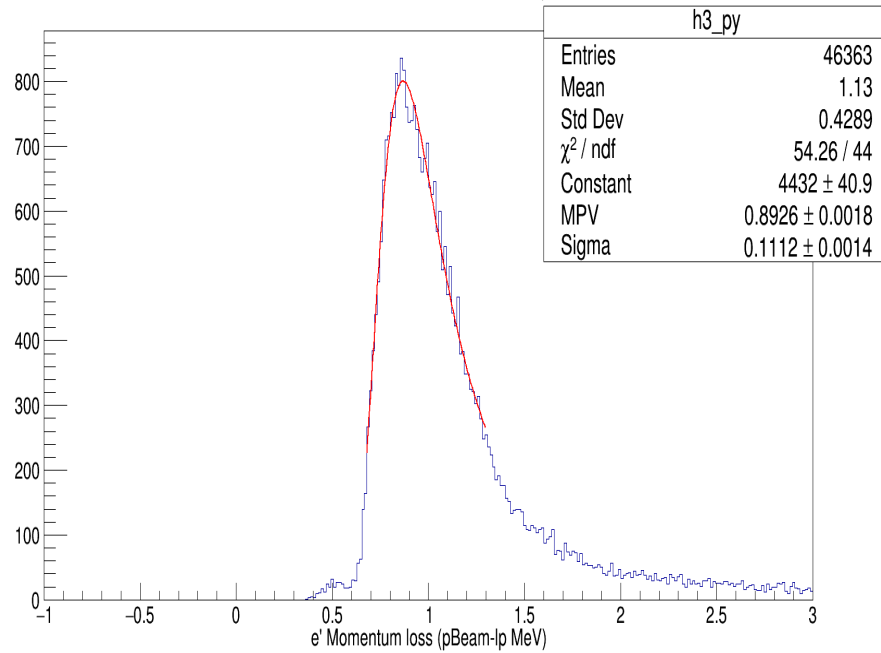
Correction factor: 0.06347

Tritium corrections from fits for e' & k^+

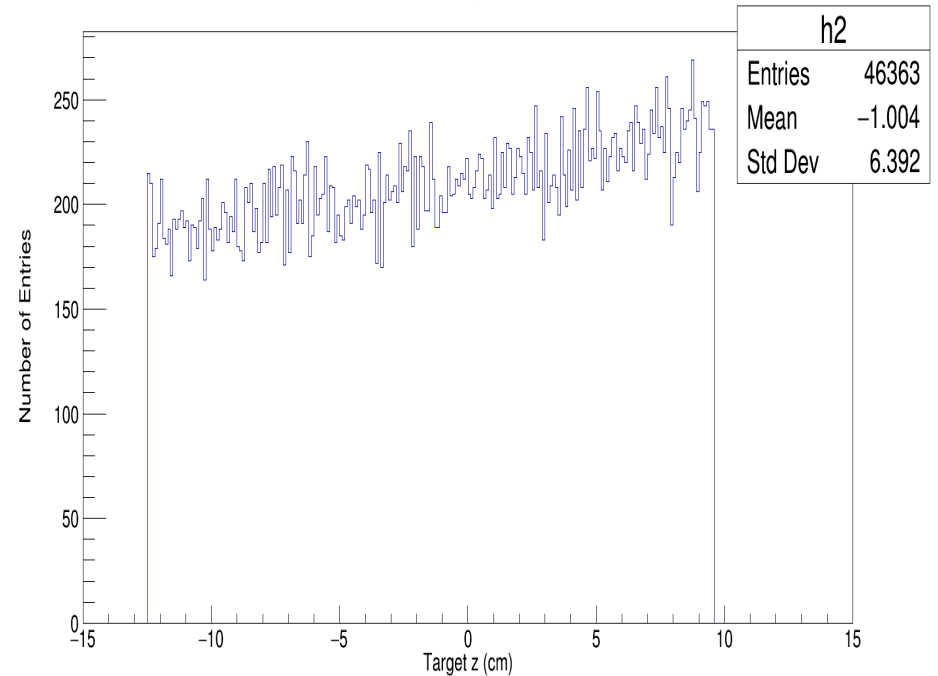
- First added cut of $z\text{Beam} < 9.6$
- Subtracted the fit function (5th degree polynomial) from the momentum loss
- Repeated for $z\text{Beam} > 9.6$
- Subtracted the fit function (1st degree polynomial) from the momentum loss

Tritium scattered electron cut zBeam < 9.6

Scattered electron momentum loss vs x', Cut zBeam < 9.6

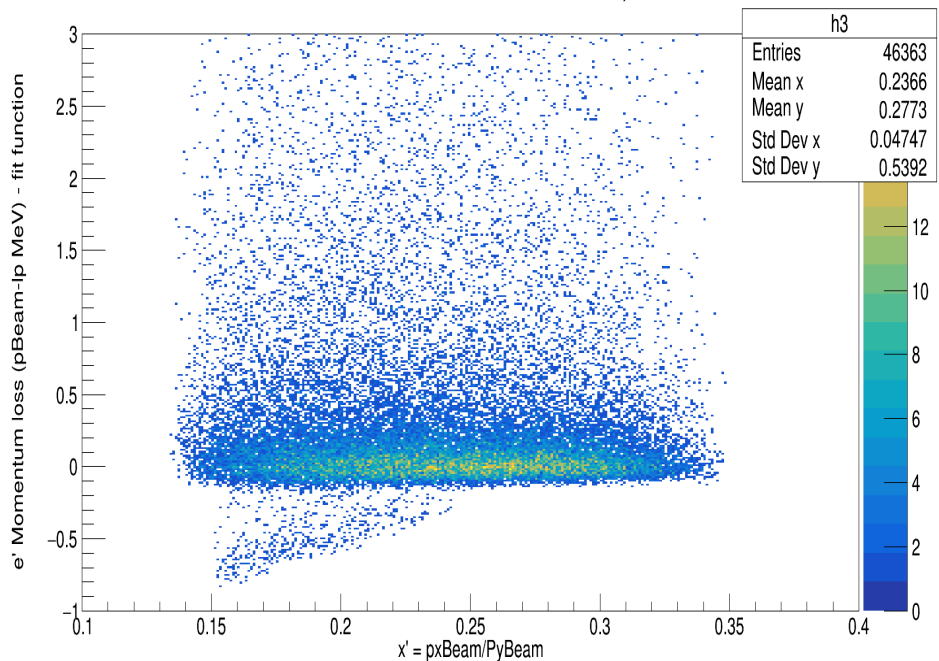


Scattered electron z, Cut zBeam < 9.6

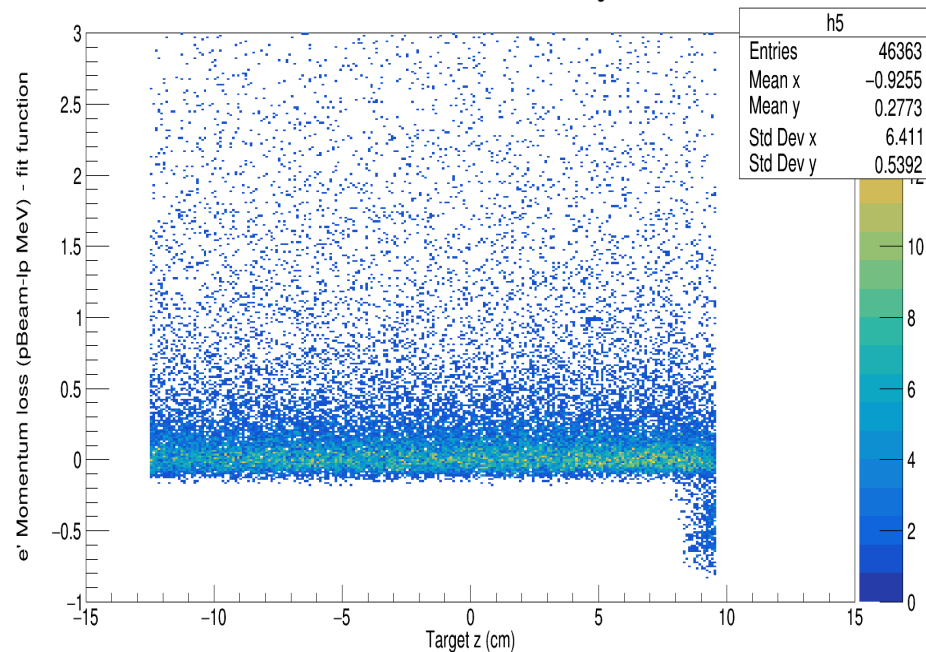


Tritium scattered electron correction cut zBeam < 9.6

Scattered electron momentum loss - fit function vs x', Cut zBeam < 9.6



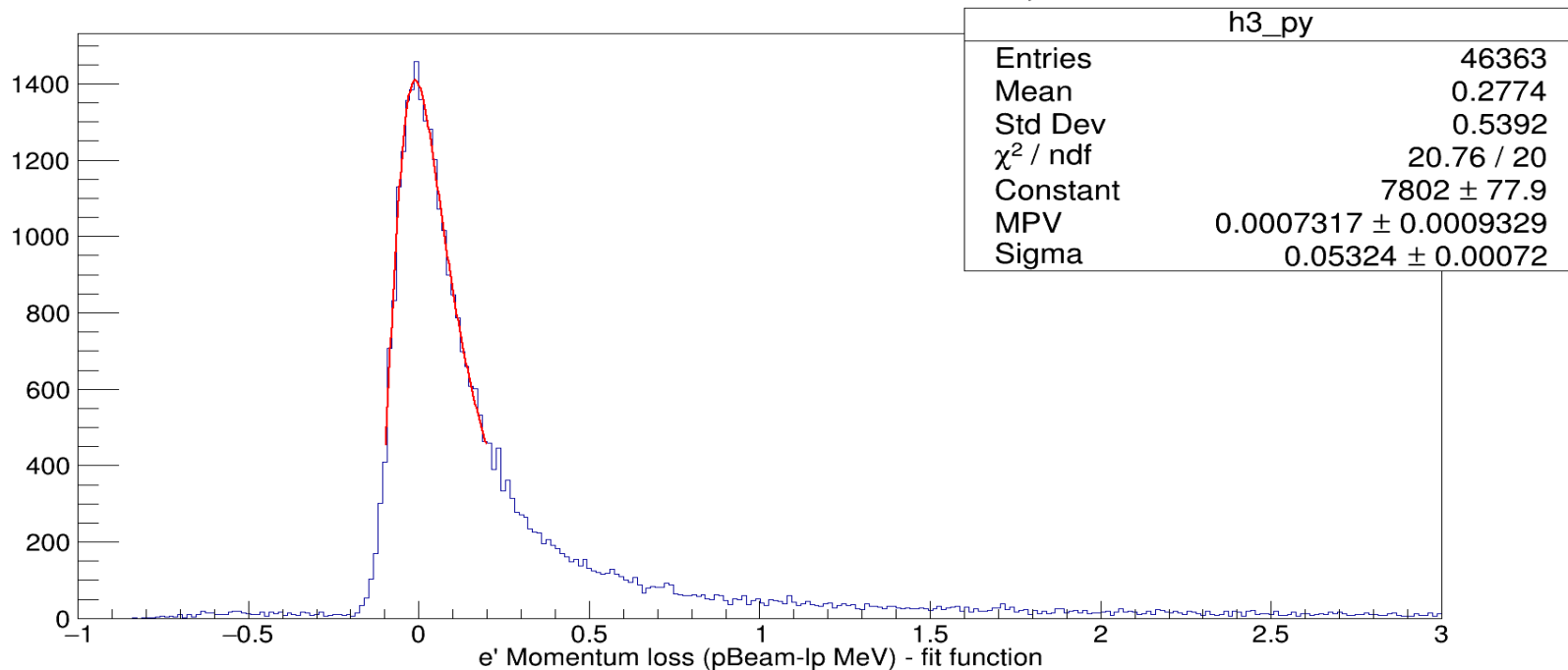
Scattered electron momentum loss - fit function vs Target z, Cut zBeam < 9.6



Fit function: $2.834 - 15.52 * x' + 26.94 * x'^2 + 85.58 * x'^3 - 392.9 * x'^4 + 422.4 * x'^5$

Tritium scattered electron correction cut zBeam < 9.6

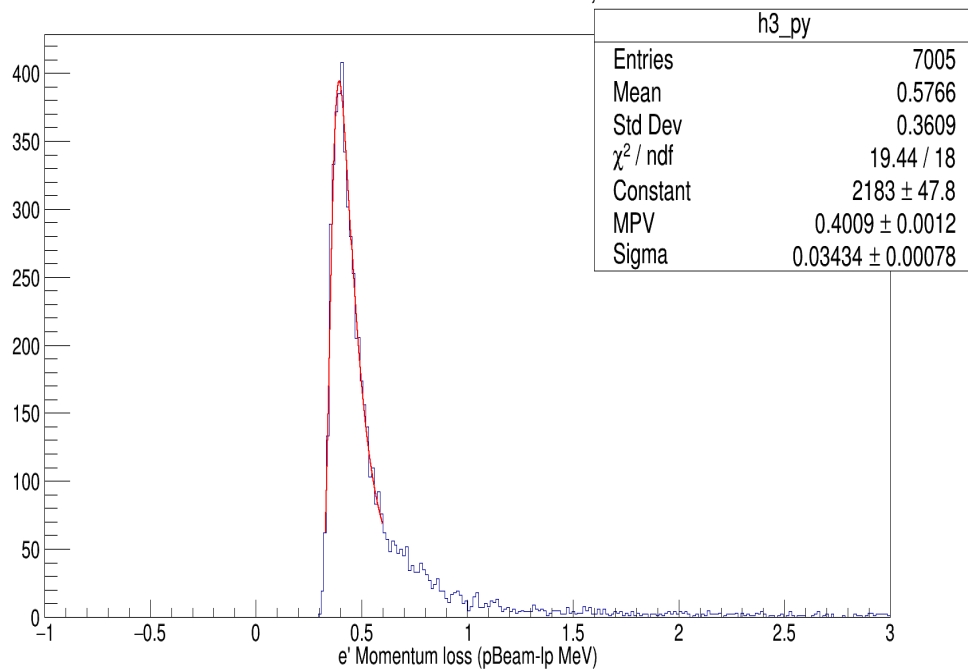
Scattered electron momentum loss - fit function vs x', Cut zBeam < 9.6



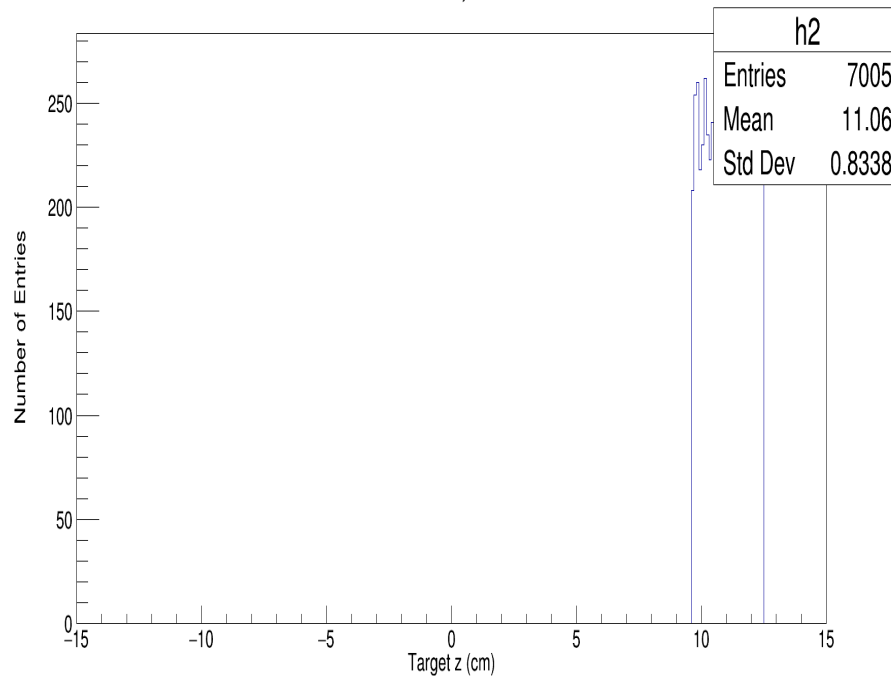
Fit function: $2.834 - 15.52 * x' + 26.94 * x'^2 + 85.58 * x'^3 - 392.9 * x'^4 + 422.4 * x'^5$

Tritium scattered electron cut $z_{\text{Beam}} > 9.6$

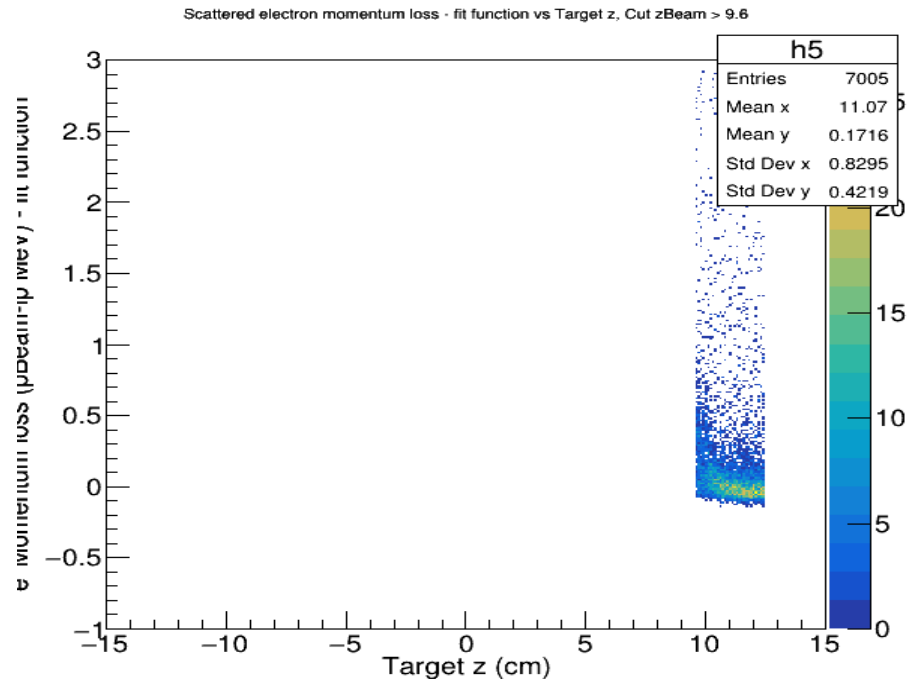
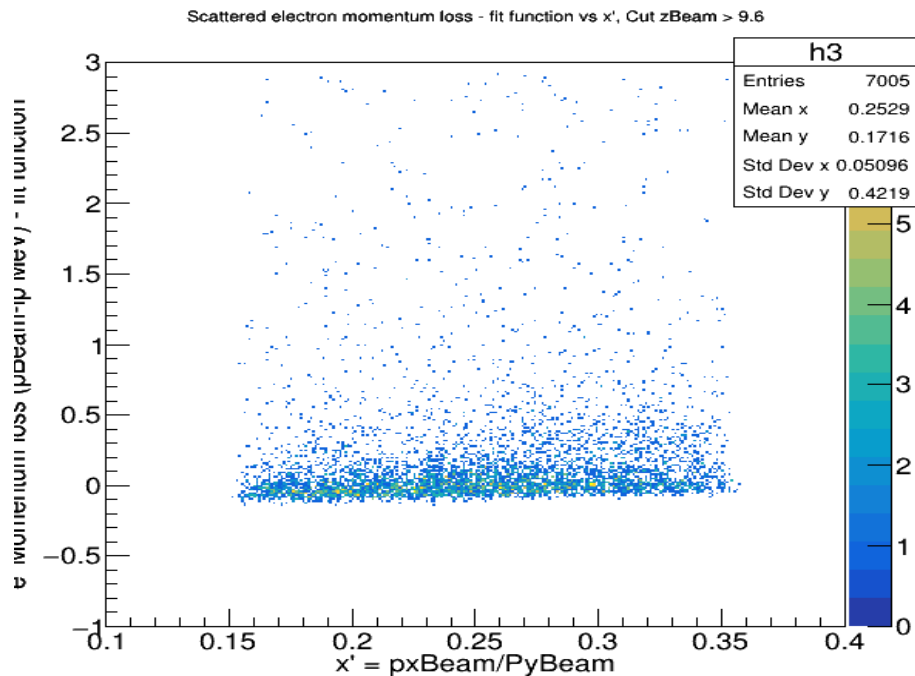
Scattered electron momentum loss vs x' , Cut $z_{\text{Beam}} > 9.6$



Scattered electron z , Cut $z_{\text{Beam}} > 9.6$



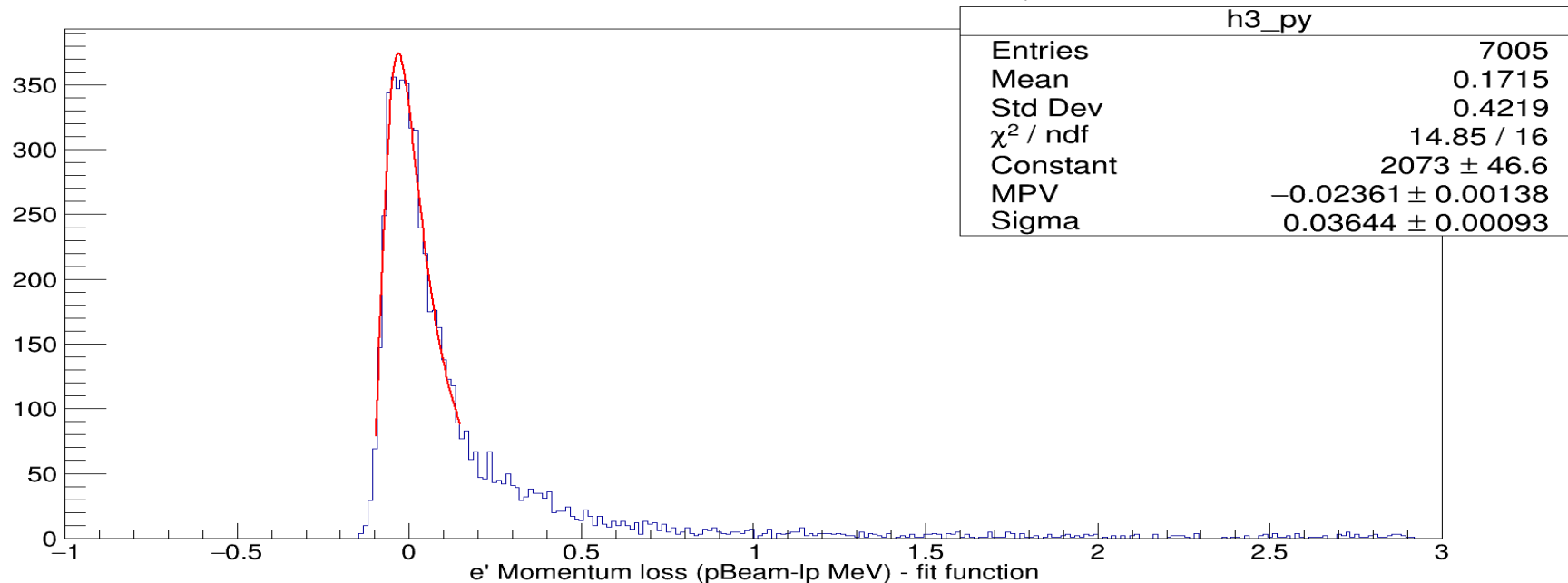
Tritium scattered electron correction cut zBeam > 9.6



Fit function: $0.499 - 0.2991 * x'$

Tritium scattered electron correction zBeam > 9.6

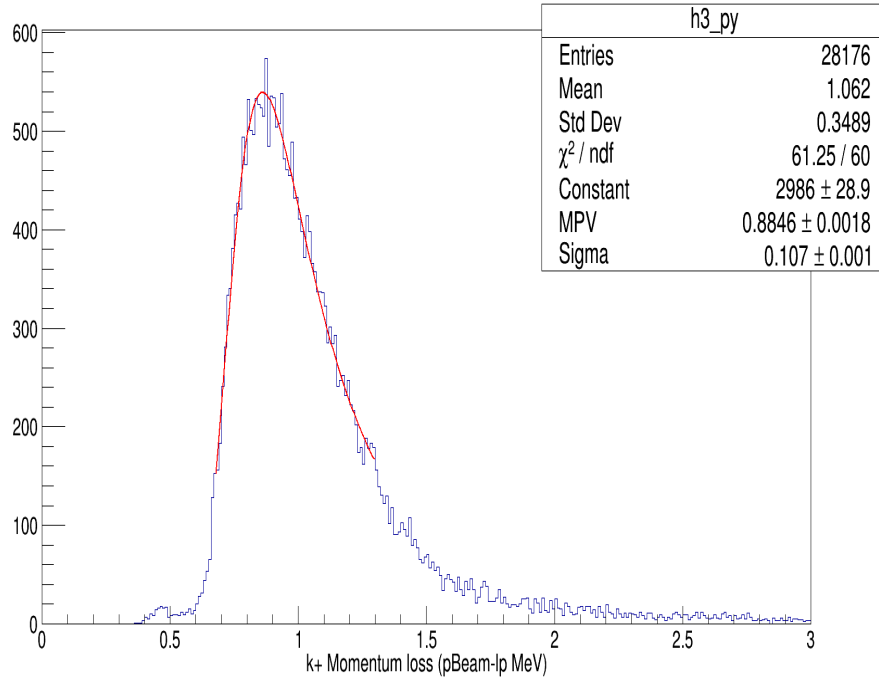
Scattered electron momentum loss - fit function vs x' , Cut zBeam > 9.6



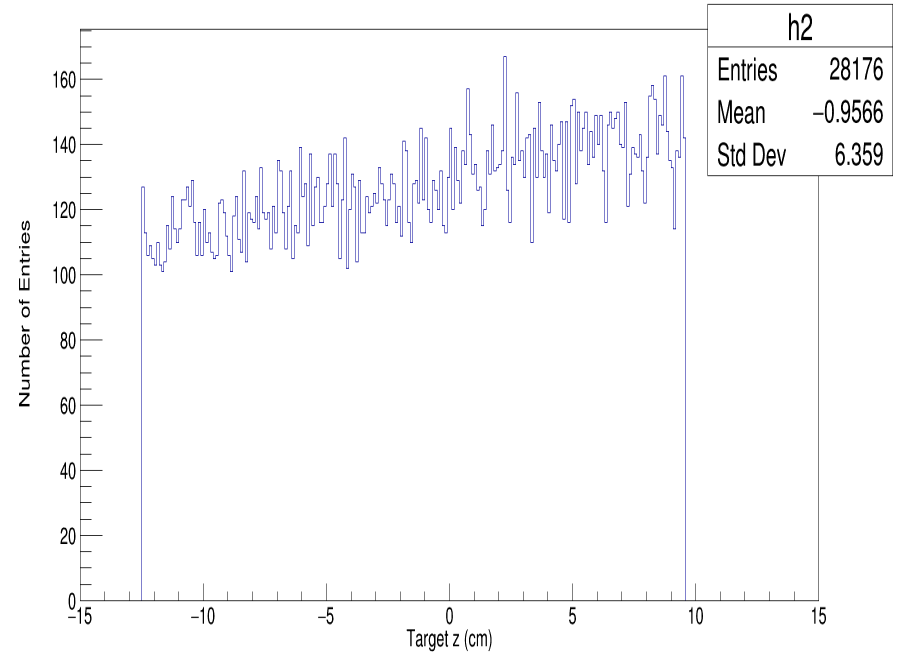
Fit function: $0.499 - 0.2991 * x'$

Tritium kaon cut zBeam < 9.6

Kaon momentum loss vs x', Cut zBeam < 9.6

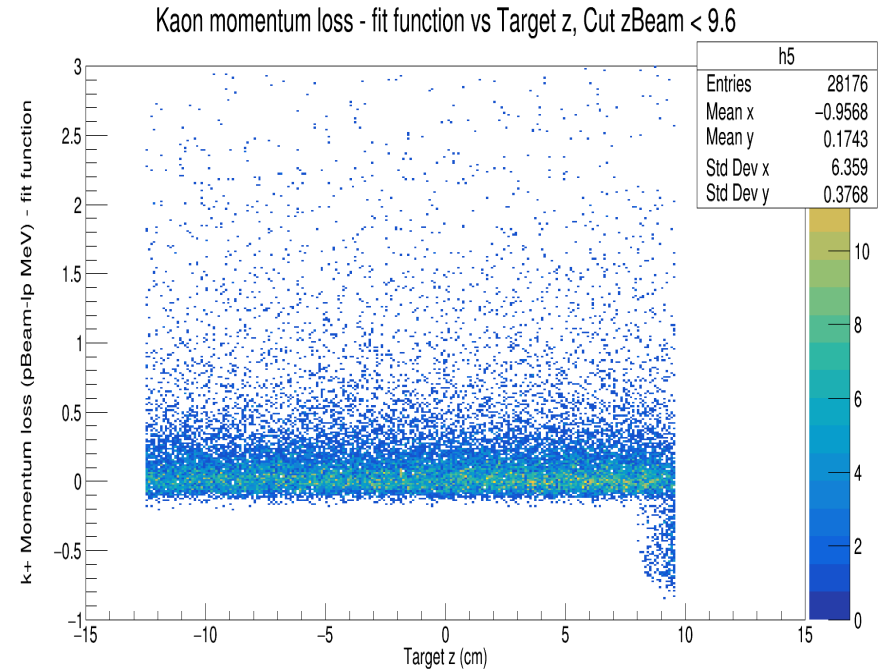
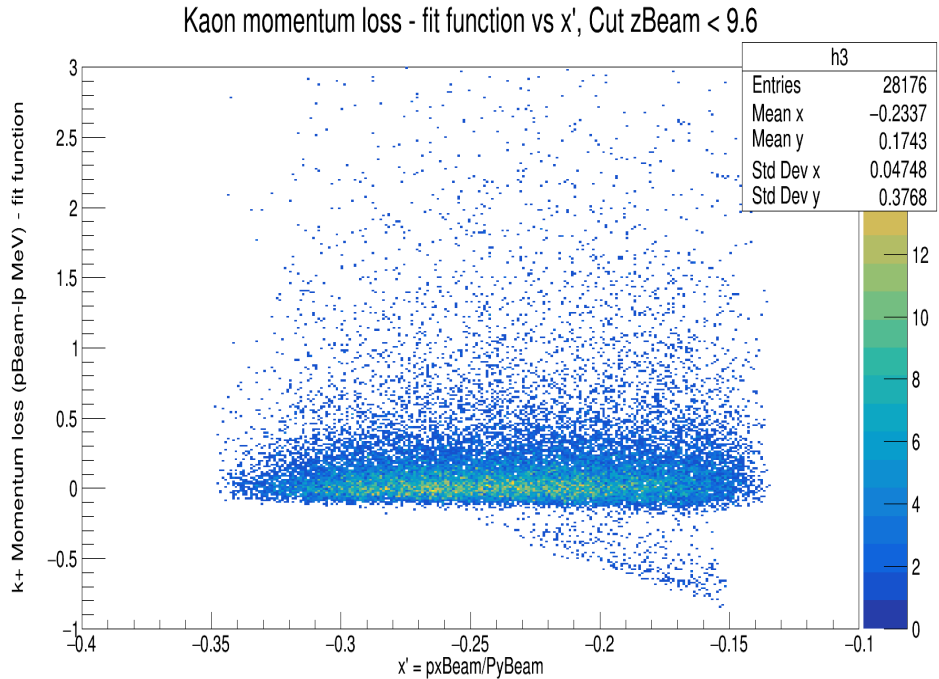


Kaon z, Cut zBeam < 9.6



Tritium kaon correction cut zBeam < 9.6

9.6

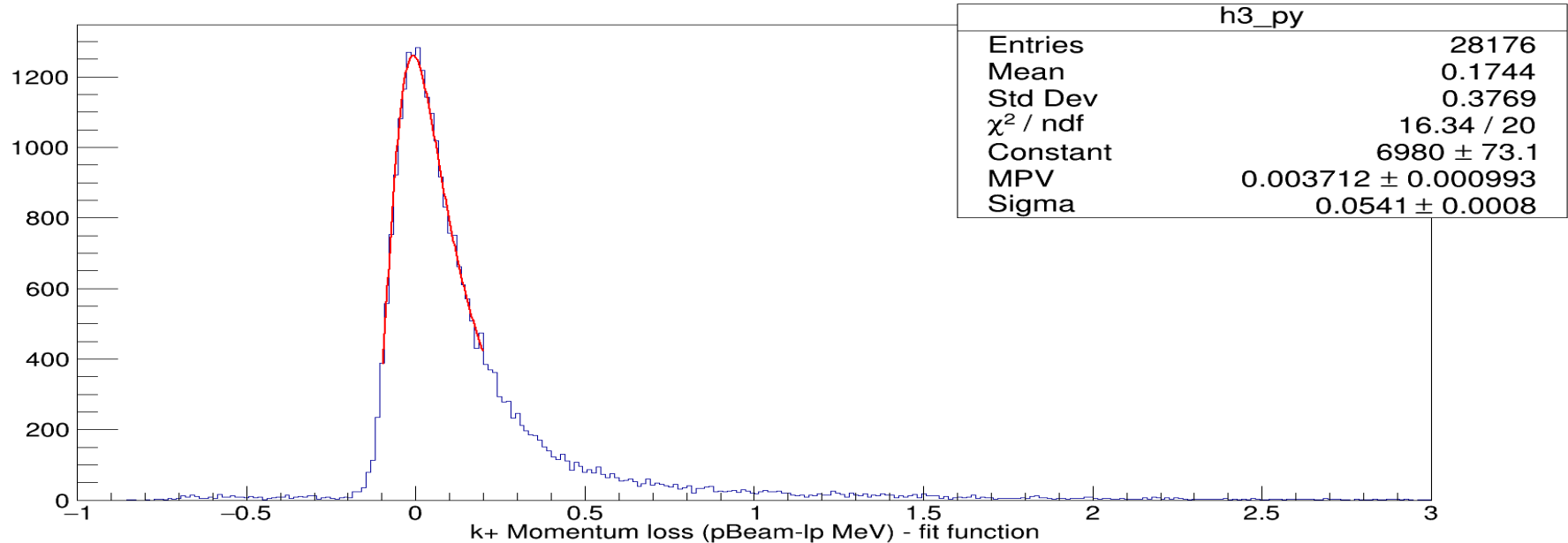


Fit function: $2.57 + 10.95 * x' + 5.45 * x'^2 - 65.66 * x'^3 - 66.45 * x'^4 + 108.3 * x'^5$

Tritium kaon correction cut zBeam < 9.6

9.6

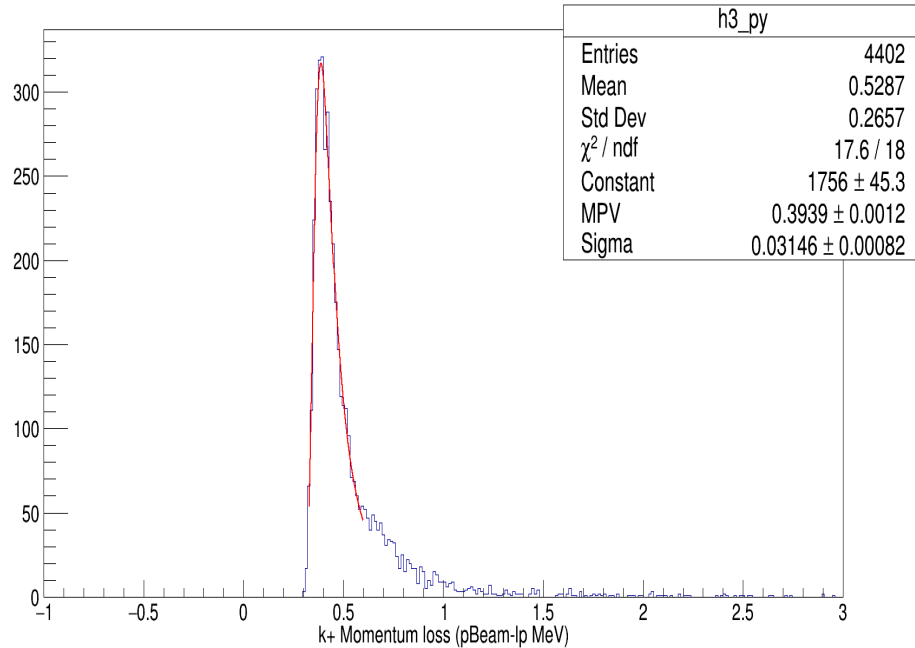
Kaon momentum loss - fit function vs x', Cut zBeam < 9.6



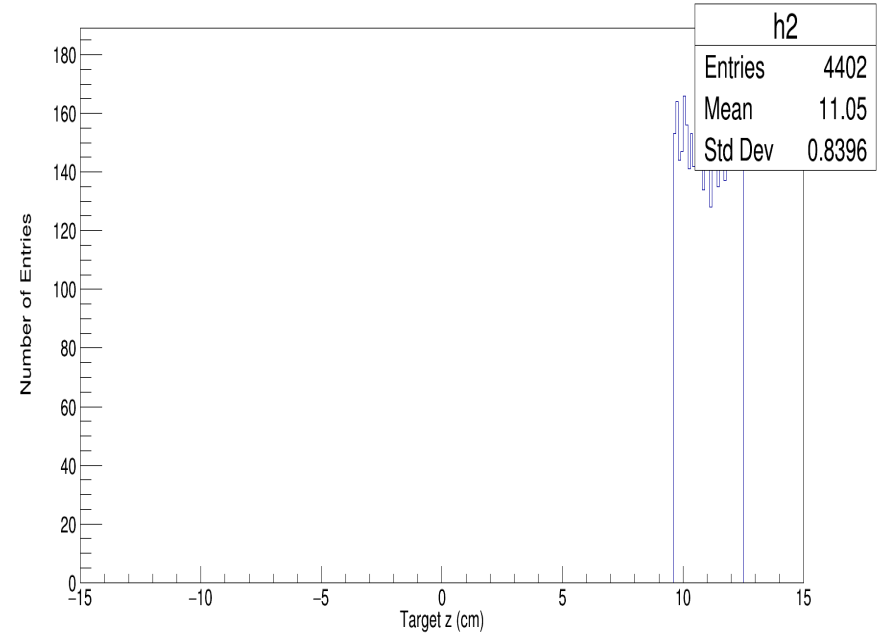
Fit function: $2.57 + 10.95 * x' + 5.45 * x'^2 - 65.66 * x'^3 - 66.45 * x'^4 + 108.3 * x'^5$

Tritium kaon cut $z_{\text{Beam}} > 9.6$

Kaon momentum loss vs x' , Cut $z_{\text{Beam}} > 9.6$



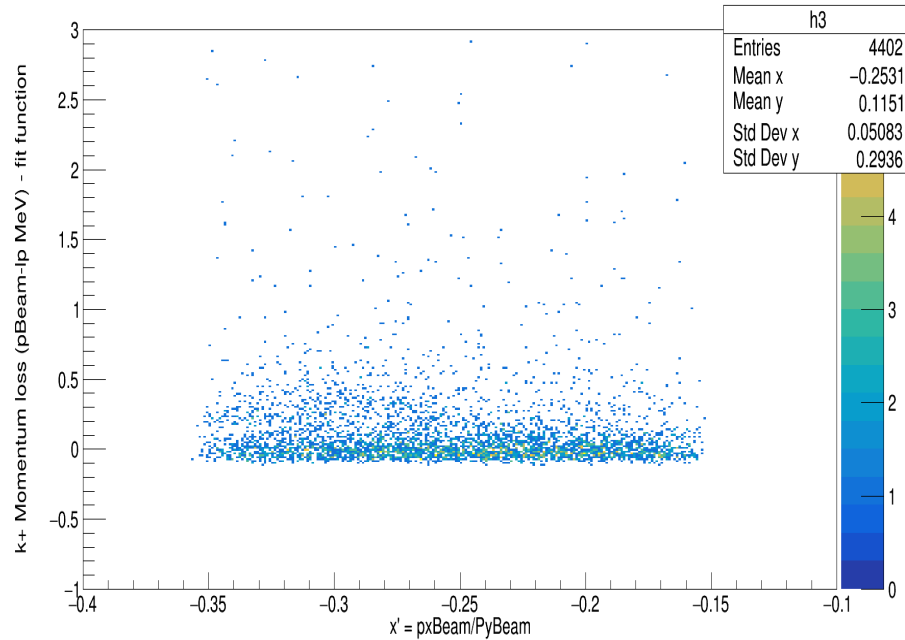
Kaon z, Cut $z_{\text{Beam}} > 9.6$



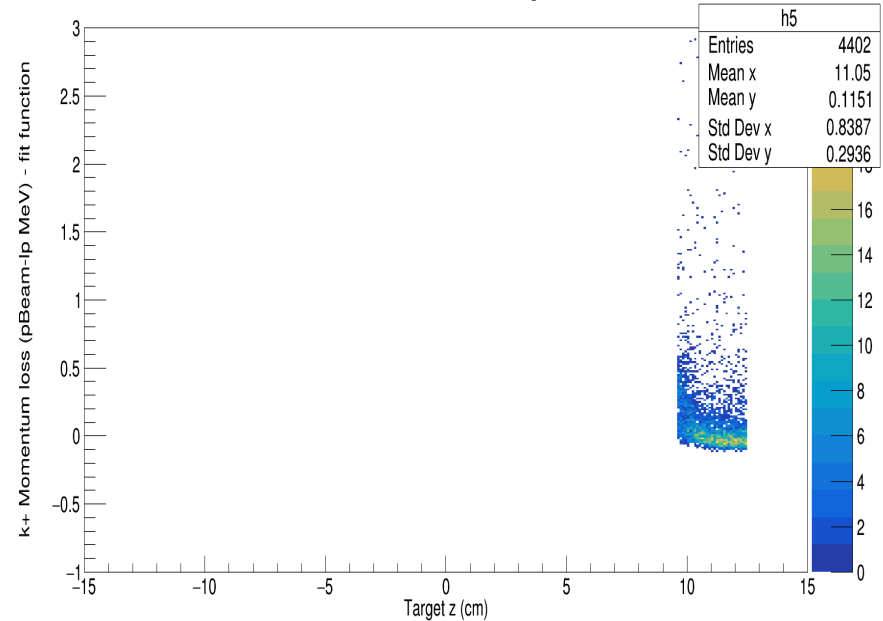
Tritium kaon correction cut zBeam > 9.6

9.6

Kaon momentum loss - fit function vs x', Cut zBeam > 9.6



Kaon momentum loss - fit function vs Target z, Cut zBeam > 9.6

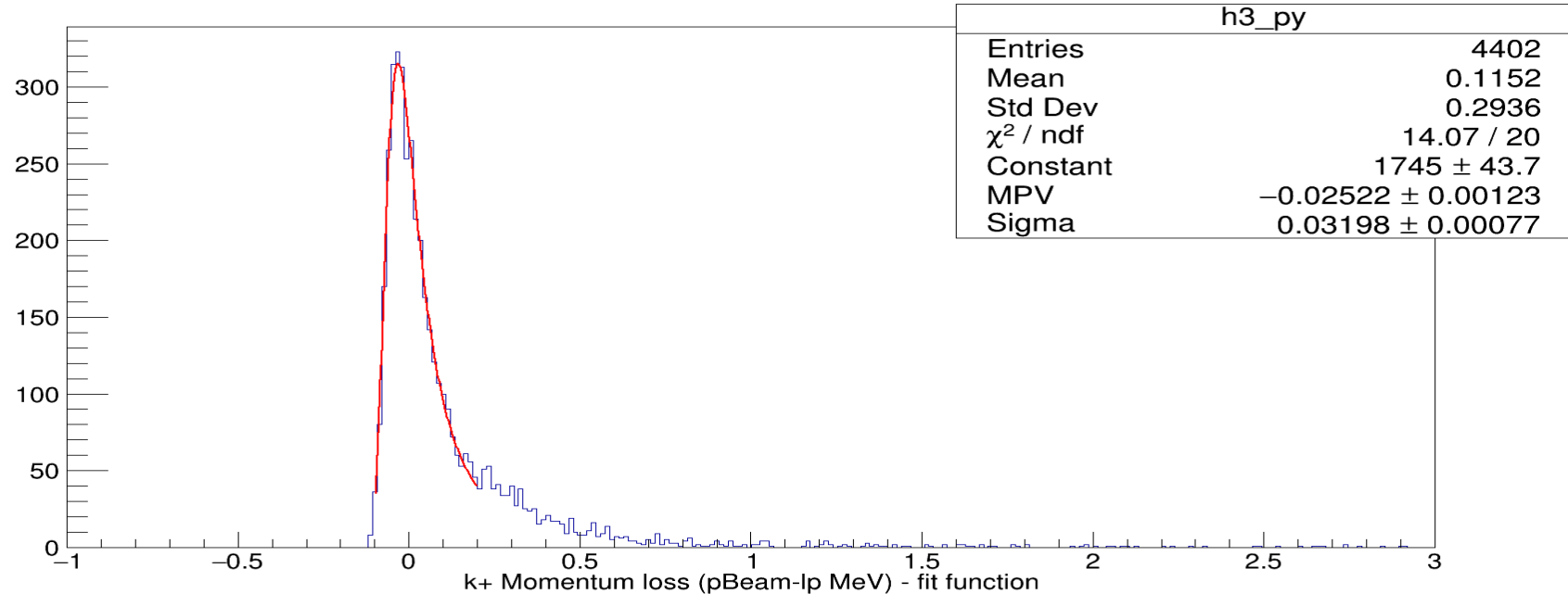


Fit function: $0.4082 + 0.04469 * x'$

Tritium kaon correction cut $z\text{Beam} > 9.6$

9.6

Kaon momentum loss - fit function vs x' , Cut $z\text{Beam} > 9.6$



Fit function: $0.4082 + 0.04469 * x'$

Summary

- The corrections seem to cut sigma by about half for the zBeam < 9.6 cm region (~ 0.1 MeV \rightarrow ~ 0.05 MeV).
- The corrections do not do much to sigma for the zBeam > 9.6 cm region (~ 0.3 MeV \rightarrow ~ 0.3 MeV).
- The corrections does move the peak mean to zero for each region.