

Parameterization

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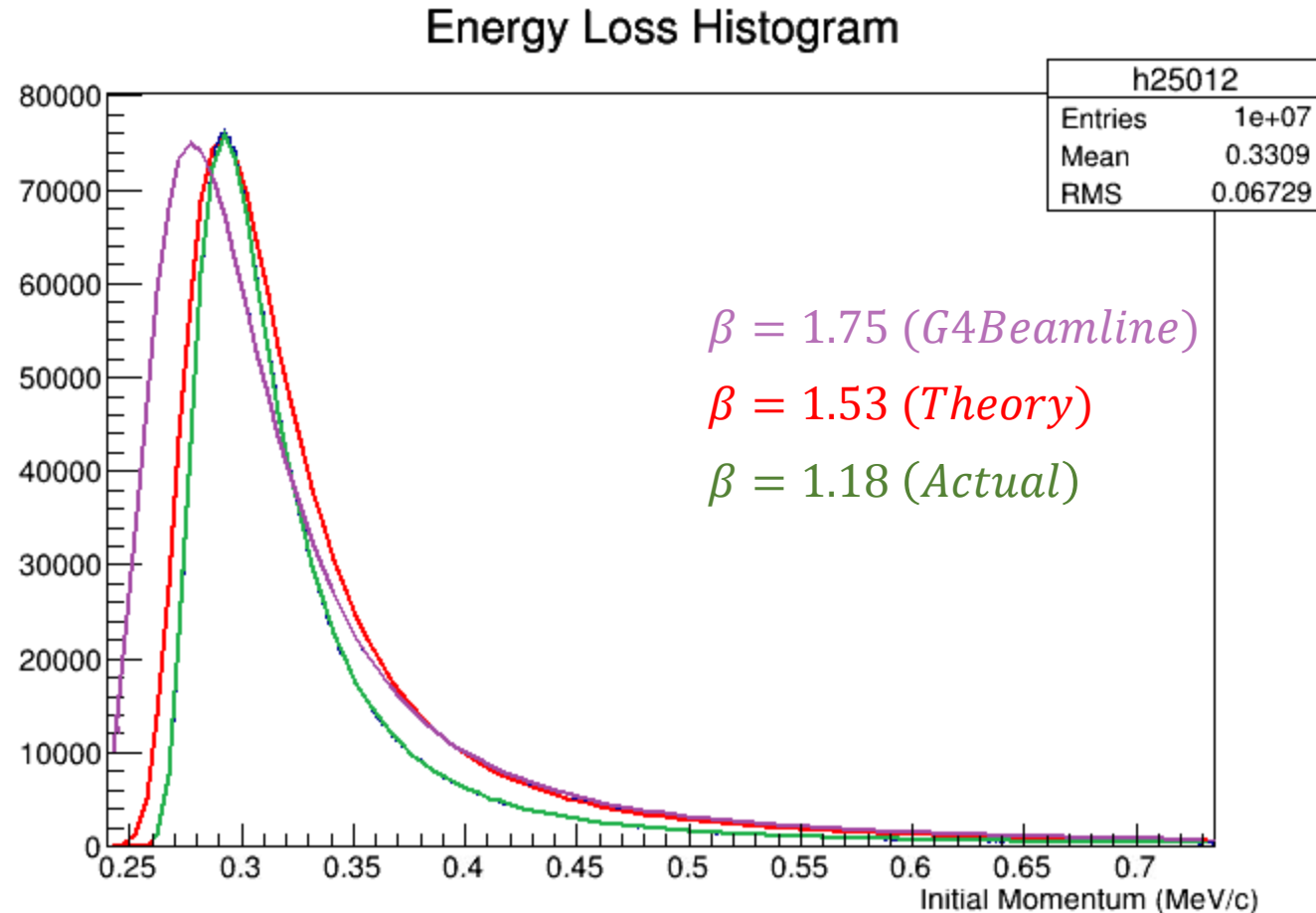
Last Time...

- G4Beamline's disagreement likely due to precision error.

- EX: $(P_x, P_y, P_z)_{final} =$
- 0.521128, 0.427832, 249.573
 $\Delta E = 0.392426$

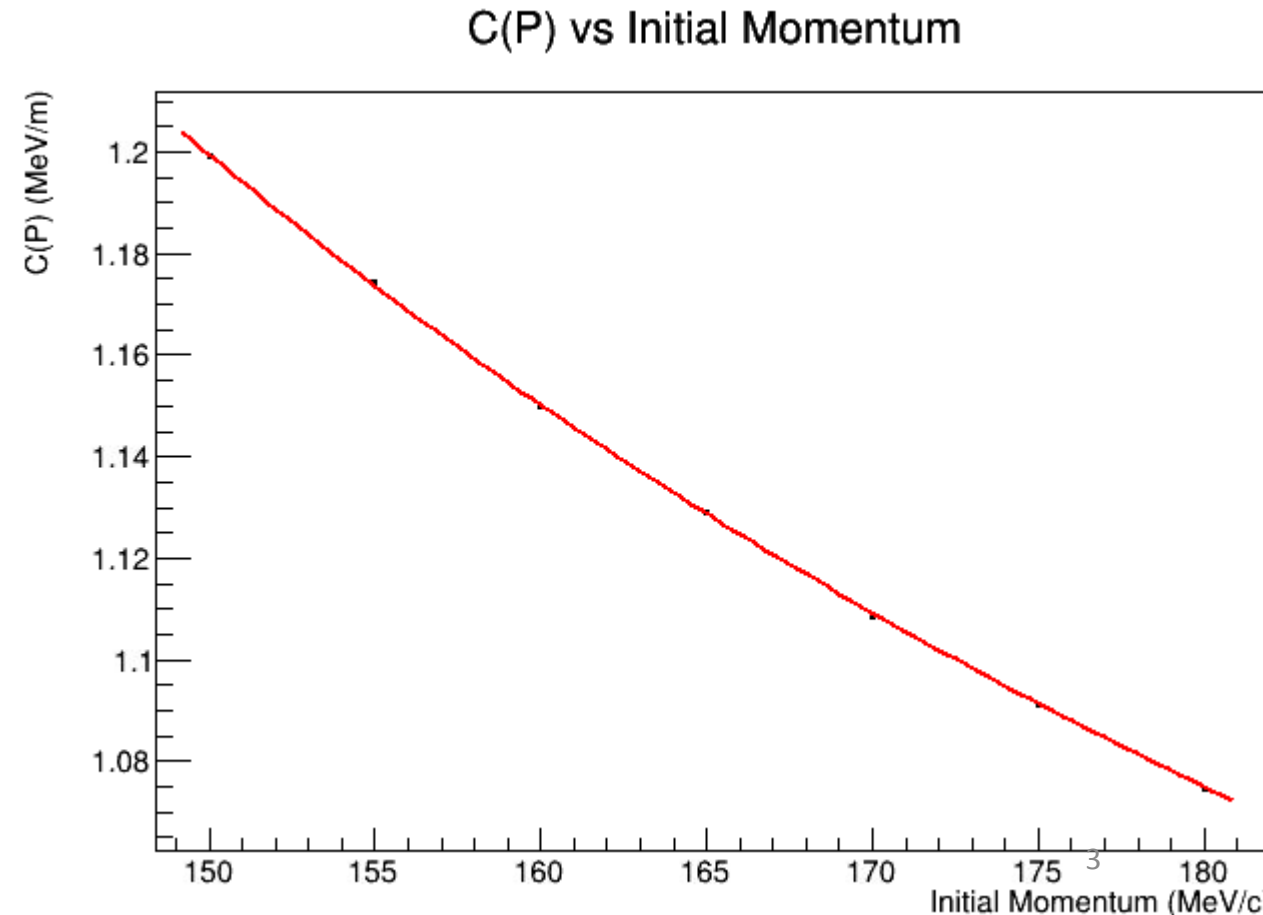
- EX: $(P_x, P_y, P_z)_{final} =$
-0.521127, 0.427831, 249.572
 $\Delta E = 0.393347$

- Histogram bin width is 0.00225.



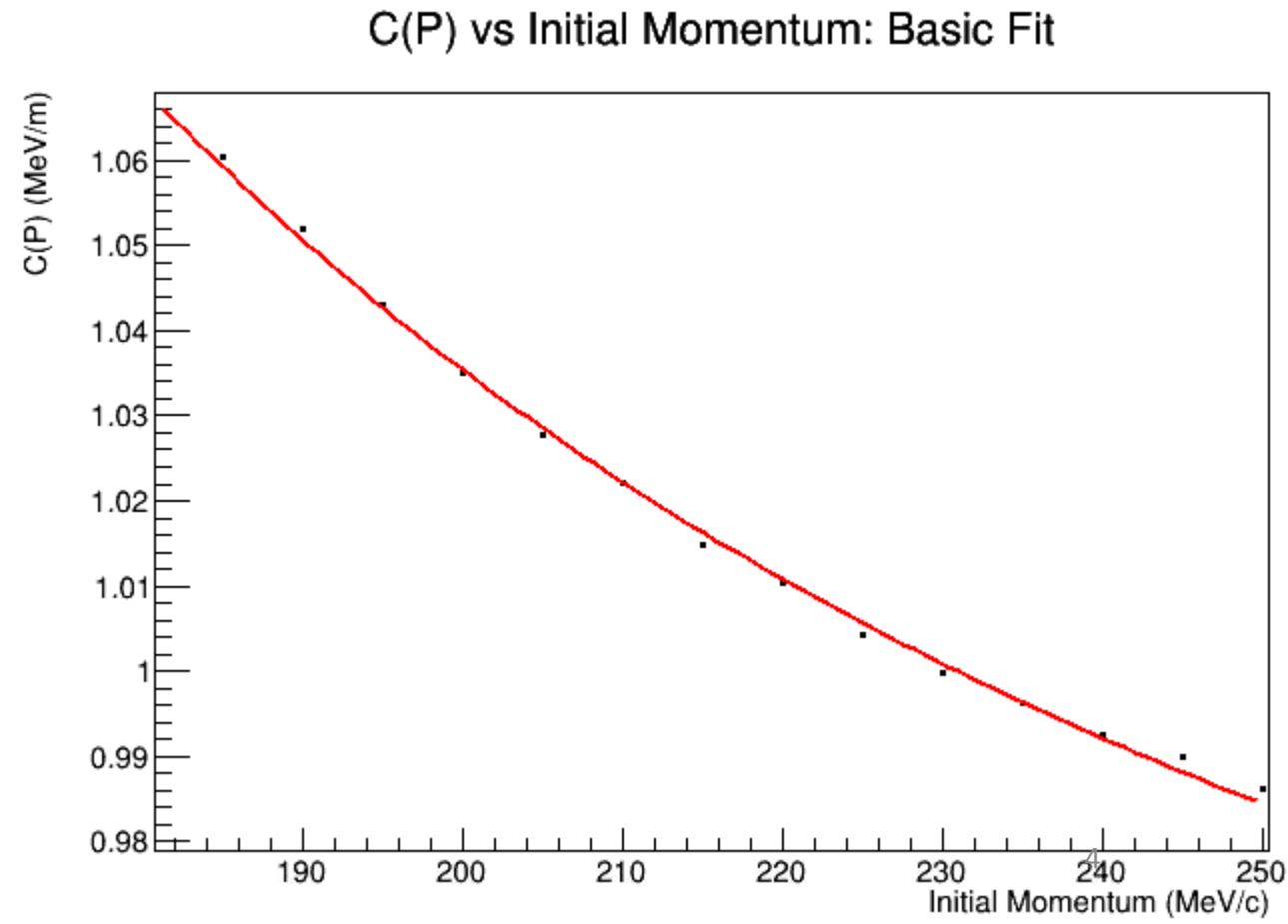
Vavilov Region: $P \in (150, 180)$

- Recall $\beta = C(P) * L$
- $C(P) = [0] * \left(\frac{[1]}{P^2} + 1 \right)$
- $\chi^2 = 1.29E-6$



Landau Region: $P \in (181, 250)$ (Basic)

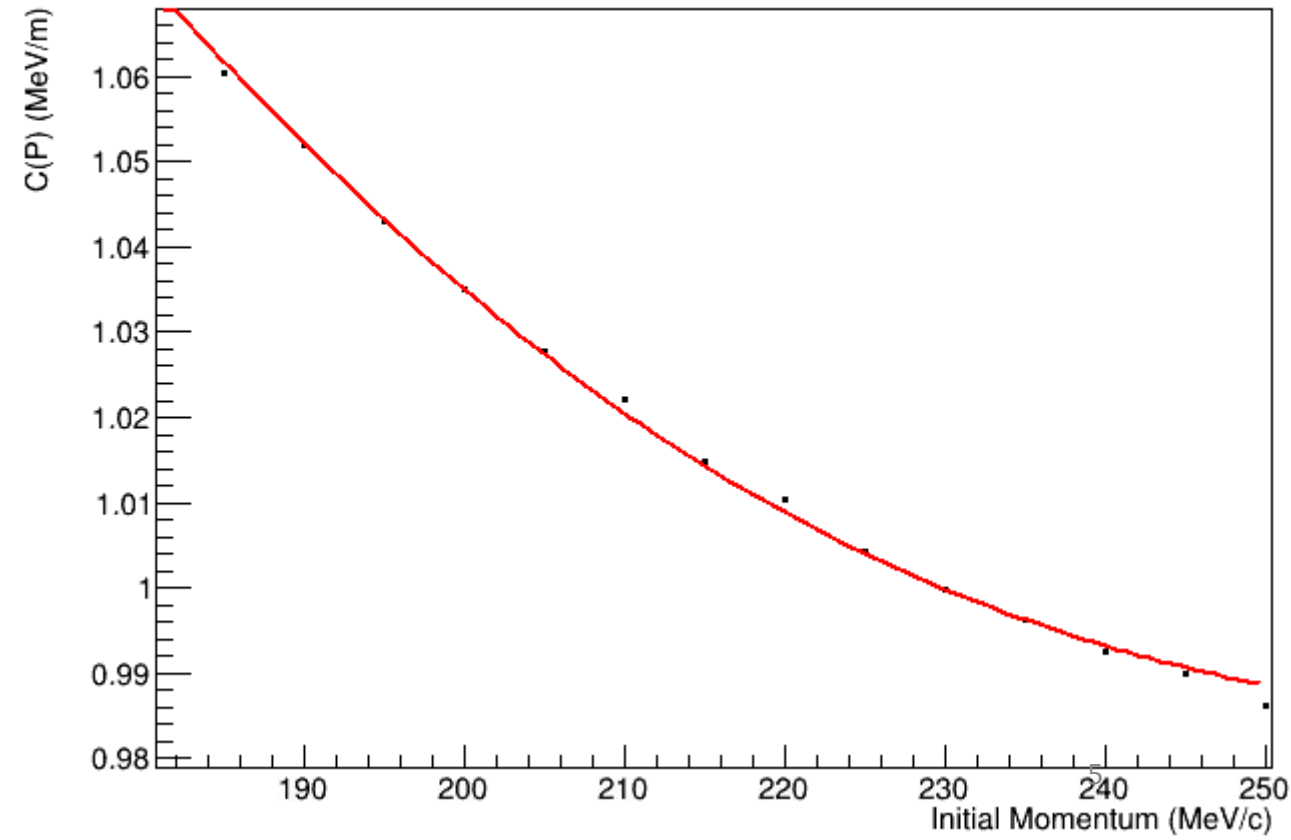
- $C(P) = [0] * \left(\frac{[1]}{P^2} + 1 \right)$
- $\chi^2 = 1.62E-5$



Landau Region: $P \in (181, 250)$ (Enge)

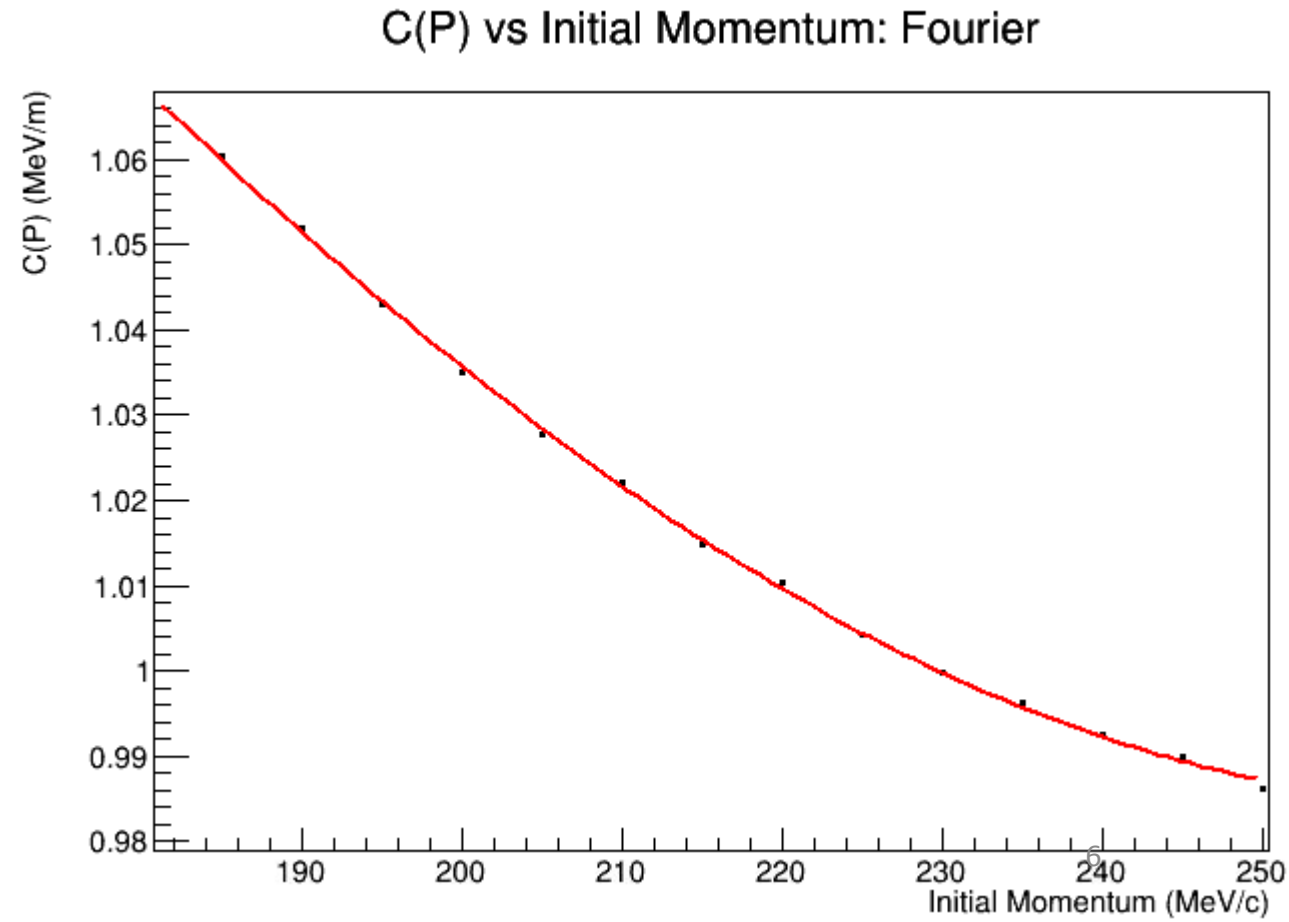
- $C(P) = [0]/(1 + \text{Exp}([1] + [2]u + [3]u^2)) + [5]$
- $u = x - [4]$
- $\chi^2 = 1.37E-5$

C(P) vs Initial Momentum: Enge



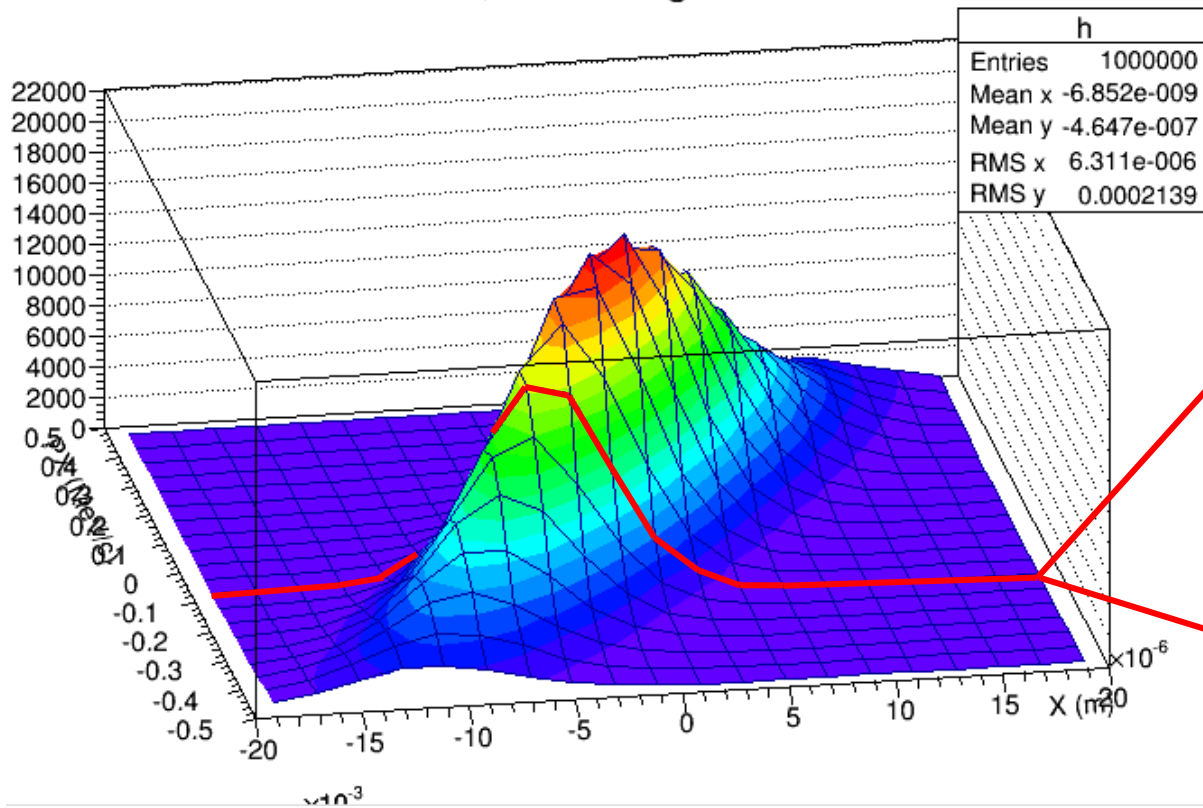
Landau Region: $P \in (181, 250)$ (Fourier)

- $C(P) = [0]([1] \sin(\nu) + [2] \sin(2\nu) + [3] \sin(3\nu))$
- $\nu = \frac{x - [4]}{[5]}$
- $\chi^2 = 4.68E-6$

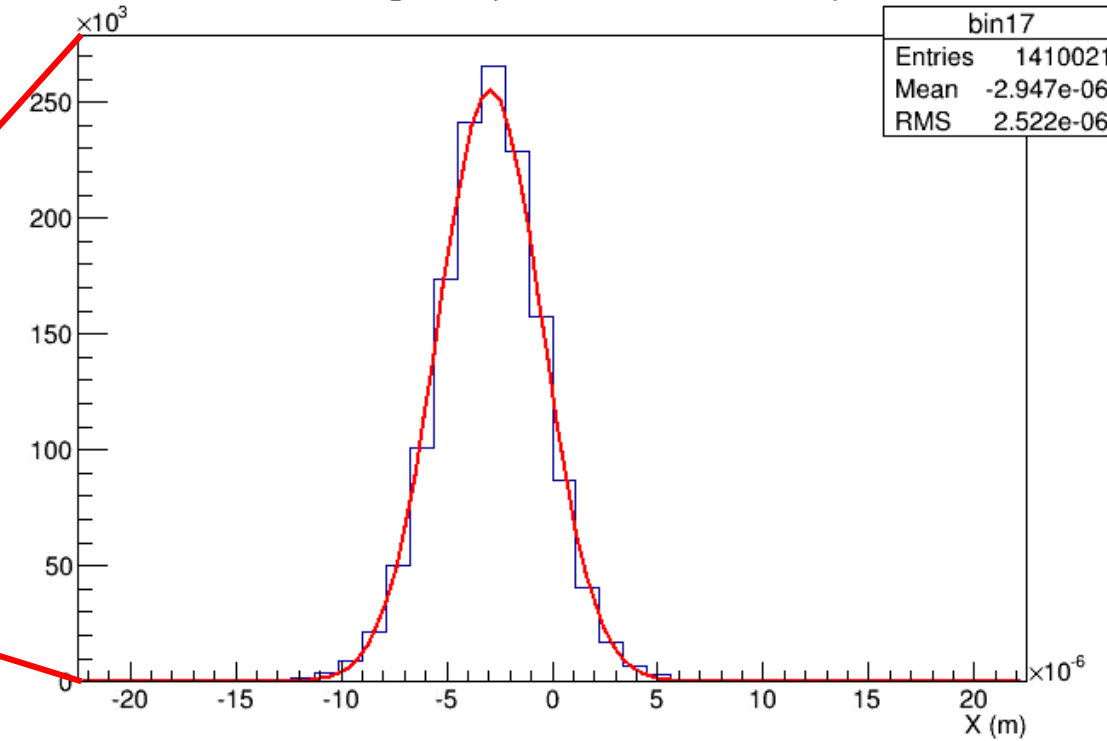


X, PX Coupling

X, PX Histogram



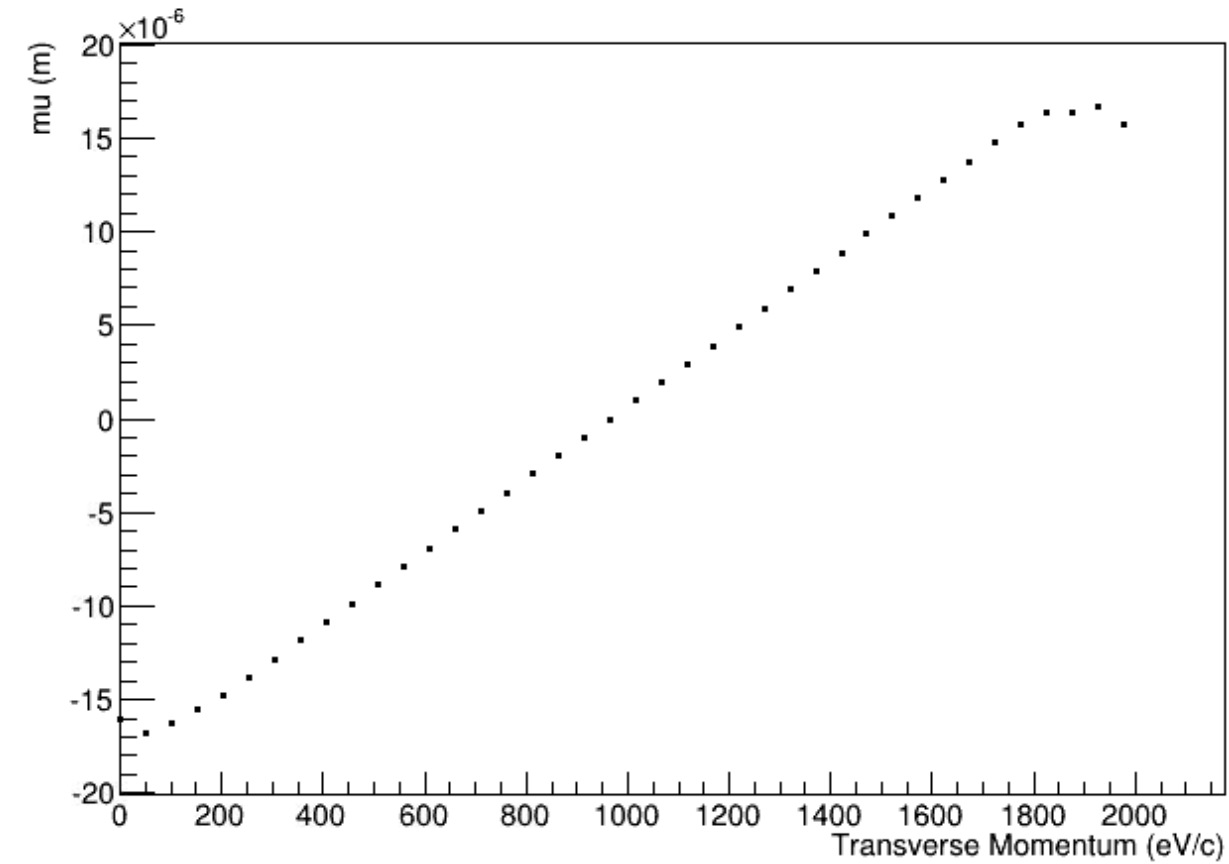
X Histogram (PX = 811 +/- 25 eV)



Simulation used 10M particles with $P_{zi} = 200 \text{ MeV}/c$ through $L = 8 \text{ mm}$ LH2.

X, PX Coupling

Gaussian mu vs Transverse Momentum



Gaussian sigma vs Transverse Momentum

