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## Effective Velocities and Curvature Using Simulation Data

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## The Steps:

- Plot the z-coordinate of the points in the cluster versus the z-coordinates of the matched track for every channel and apply a **linear** fit on the outcome:

$$z_{point} = p_0 + p_1 \cdot z_{track} \quad (1)$$

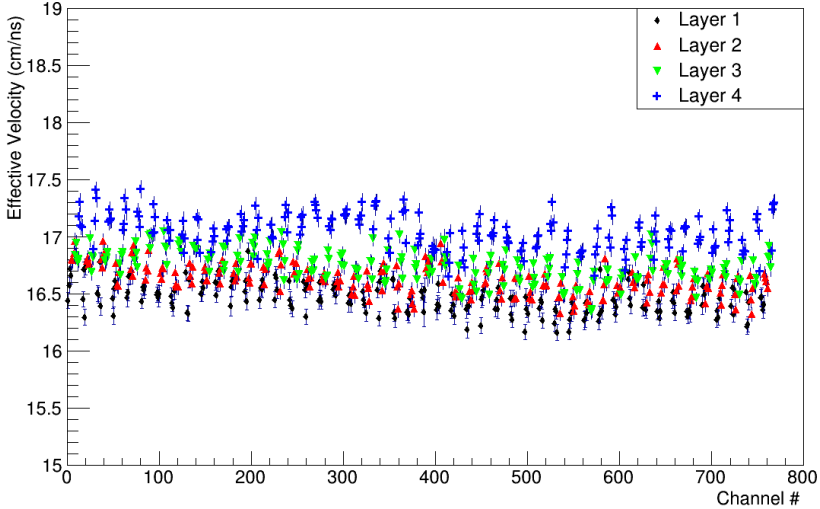
- Do the same, only this time apply a **quadratic** fit on the outcome:

$$z_{point} = p_0 + p_1 \cdot z_{track} + p_2 \cdot (z_{track})^2 \quad (2)$$

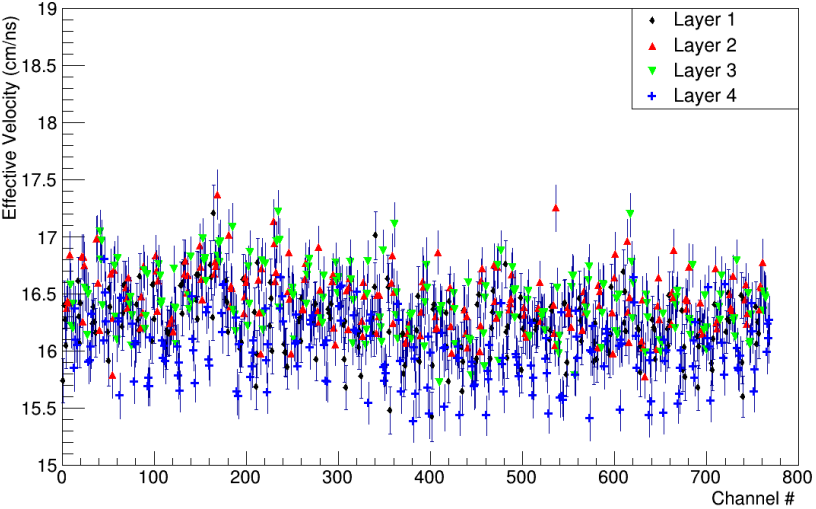
- Plot the  $p_2$  parameter of the fit versus the channel number to check for curvature and its layer dependence
- I have included the relevant histograms from Spring 2016 Production Runs (pages 9, 10)
- You can also see four examples of the quadratic fit on the last page, one for each Layer

# Muons - Linear vs Quadratic Fit

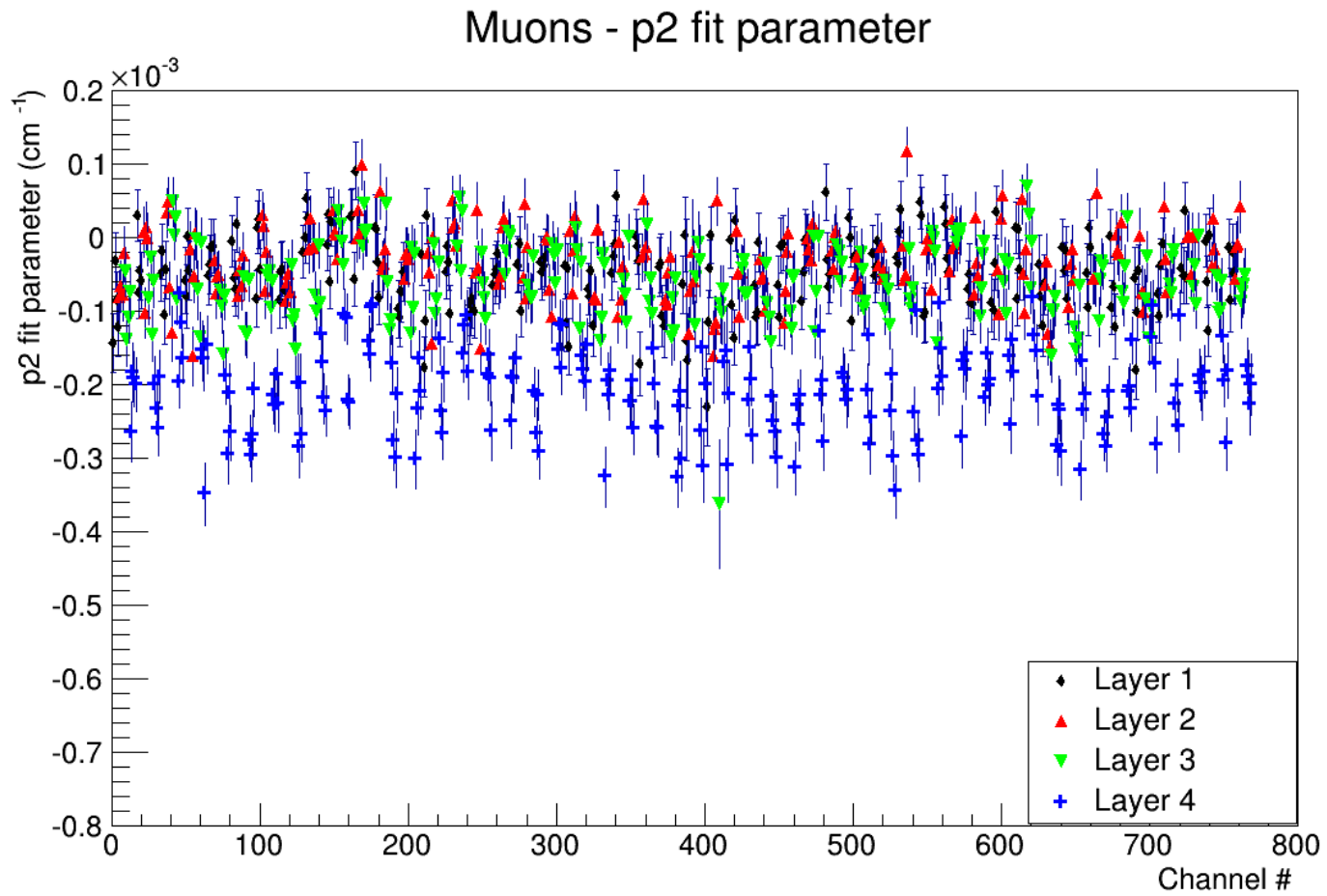
Muons - Linear Fit



Muons - Quadratic Fit

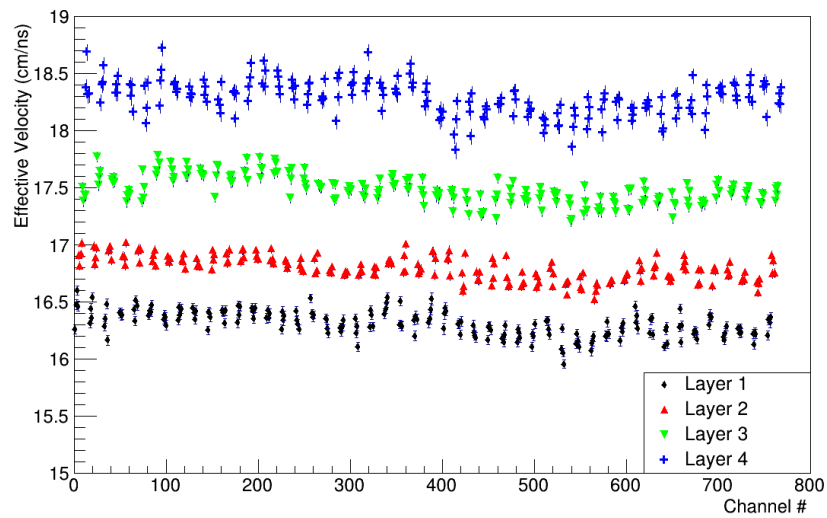


# Muons - p2 fit parameter

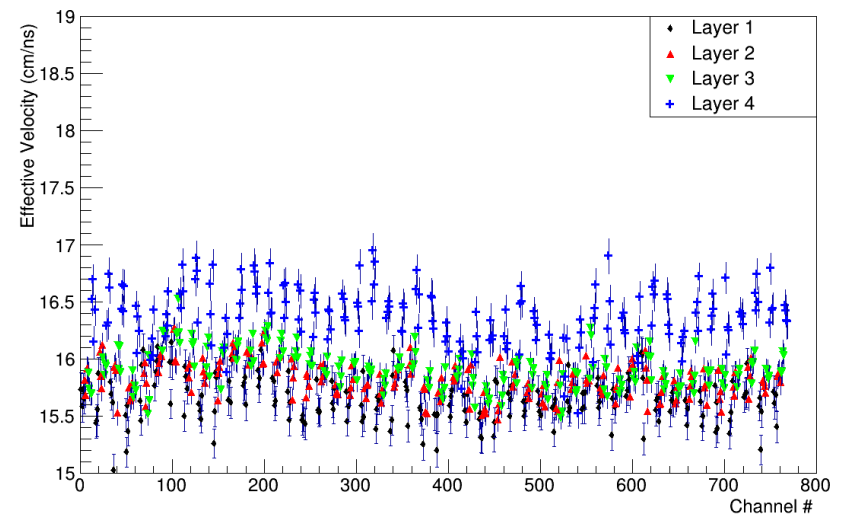


# Electrons - Linear vs Quadratic Fit

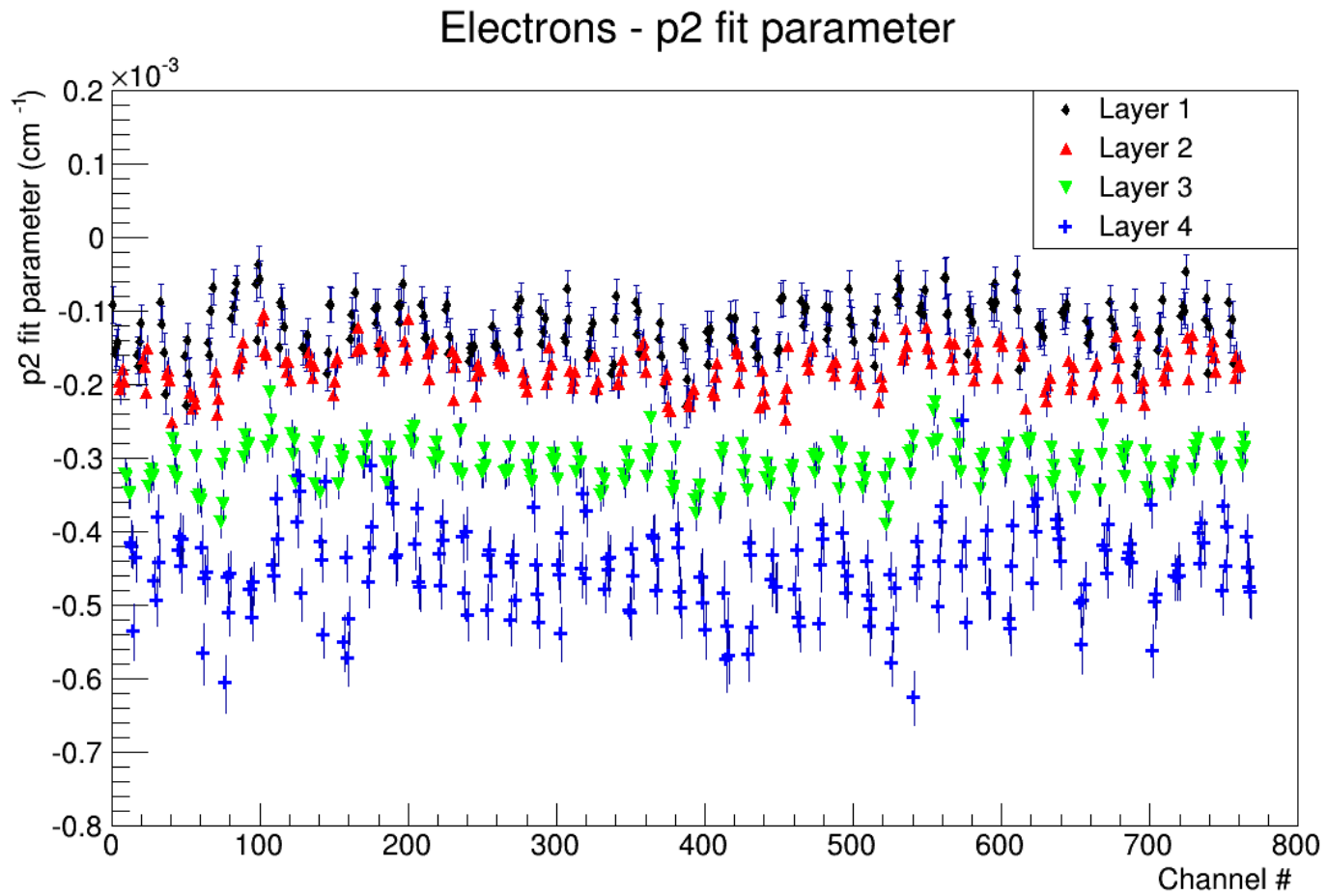
Electrons - Linear Fit



Electrons - Quadratic Fit

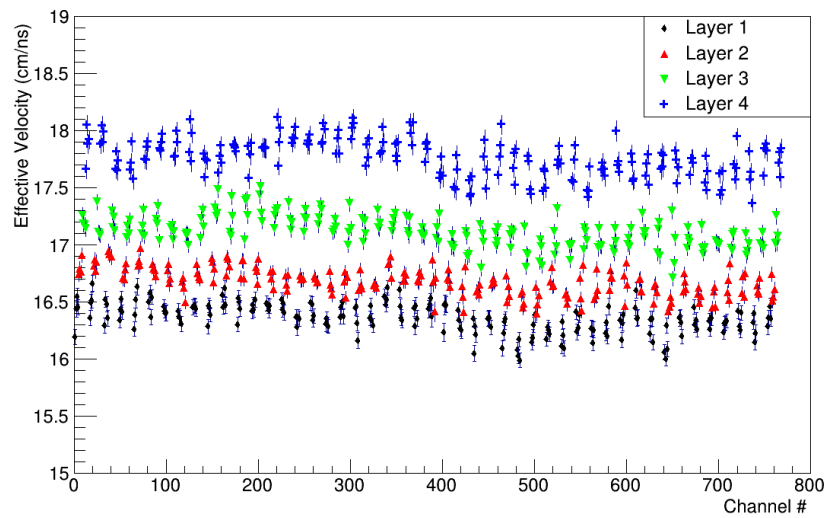


# Electrons - p2 fit parameter

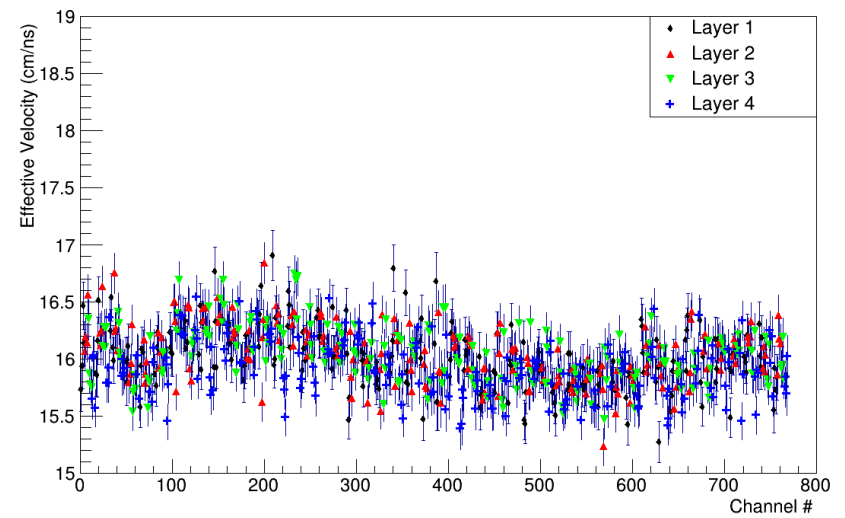


# Pions - Linear vs Quadratic Fit

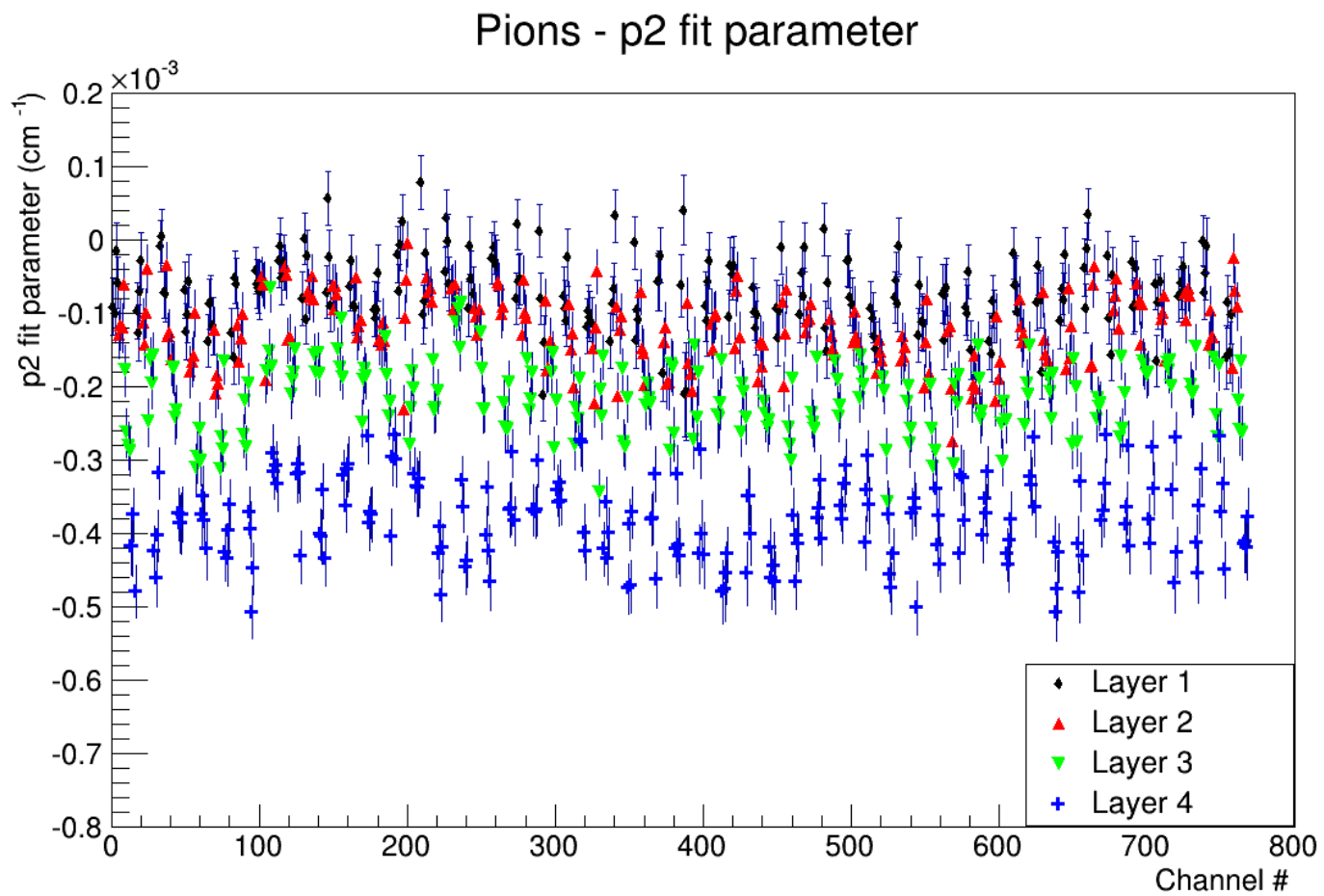
Pions - Linear Fit



Pions - Quadratic Fit



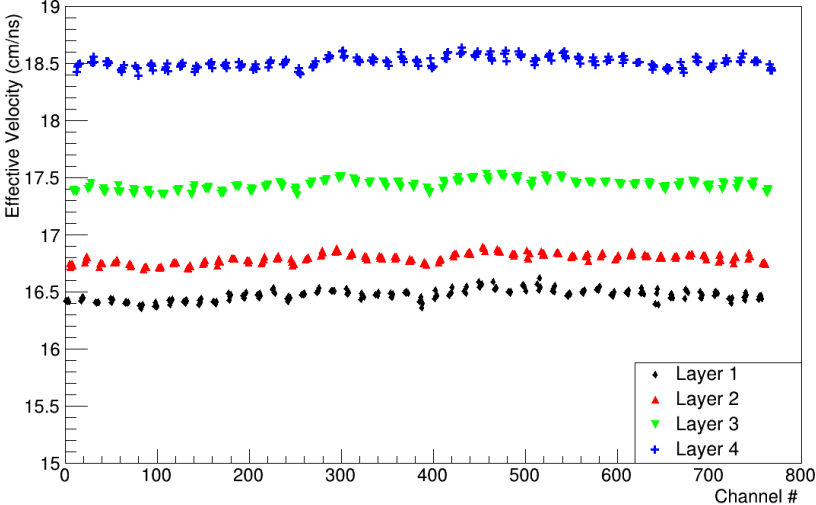
# Pions - p2 fit parameter



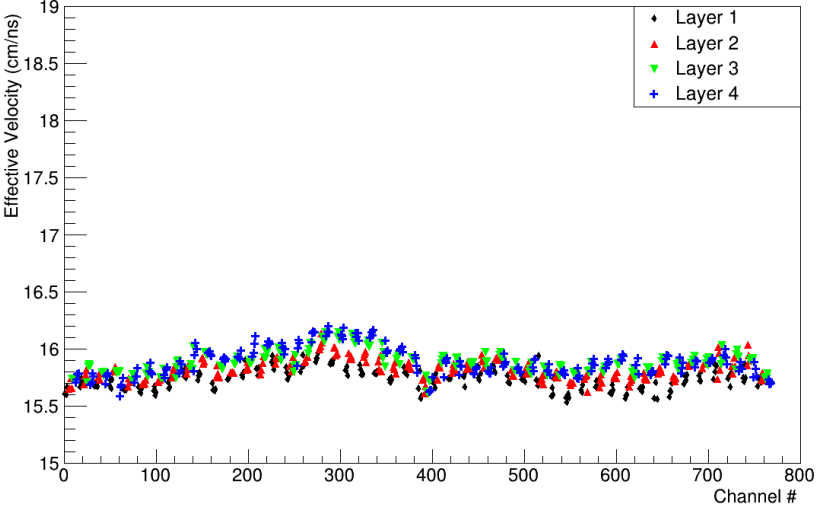


# Production Runs - Linear vs Quadratic Fit

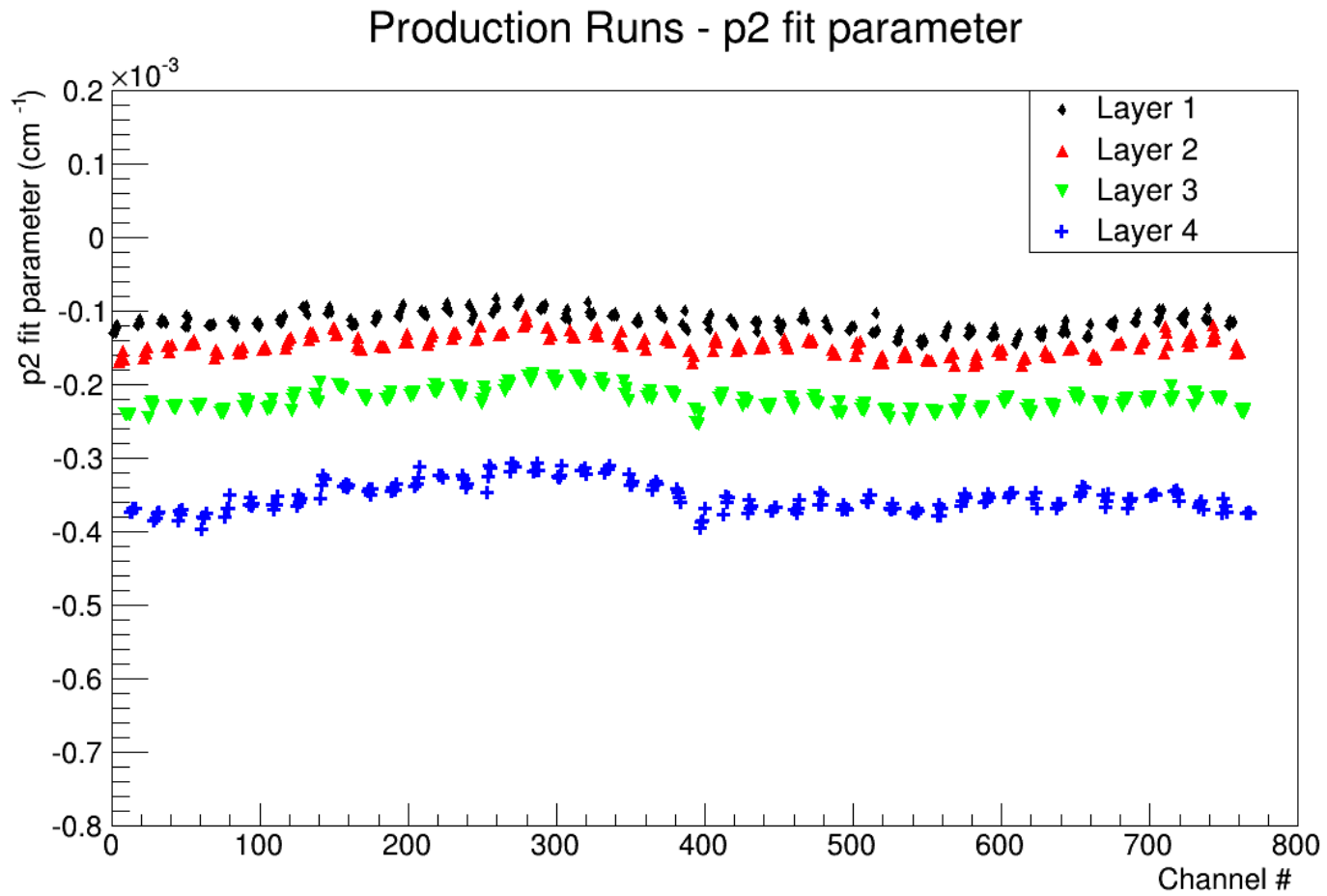
Production Runs - Linear Fit



Production Runs - Quadratic Fit

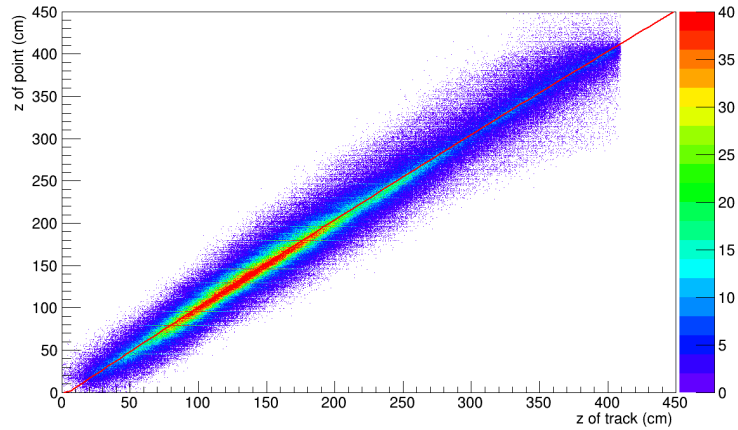


# Production Runs - p2 fit parameter

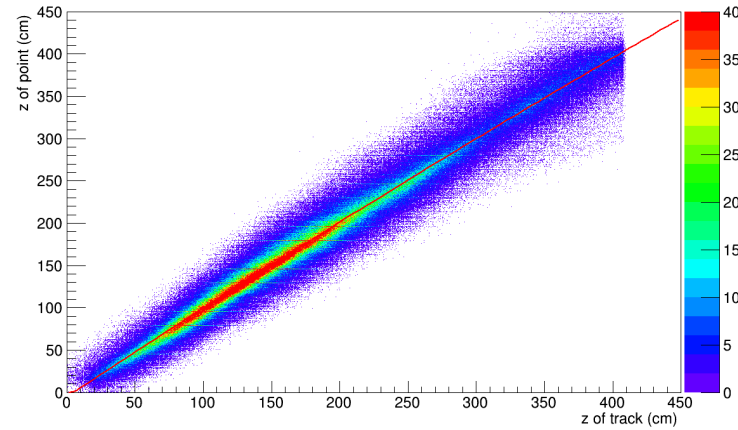


# Examples of the Quadratic Fit

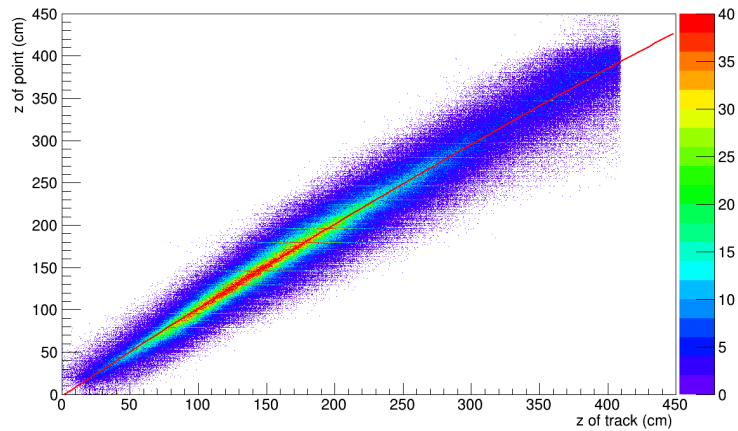
Quadratic Fit Example - Layer 1



Quadratic Fit Example - Layer 2



Quadratic Fit Example - Layer 3



Quadratic Fit Example - Layer 4

