Update on LHRS Pion Rejector Calibration

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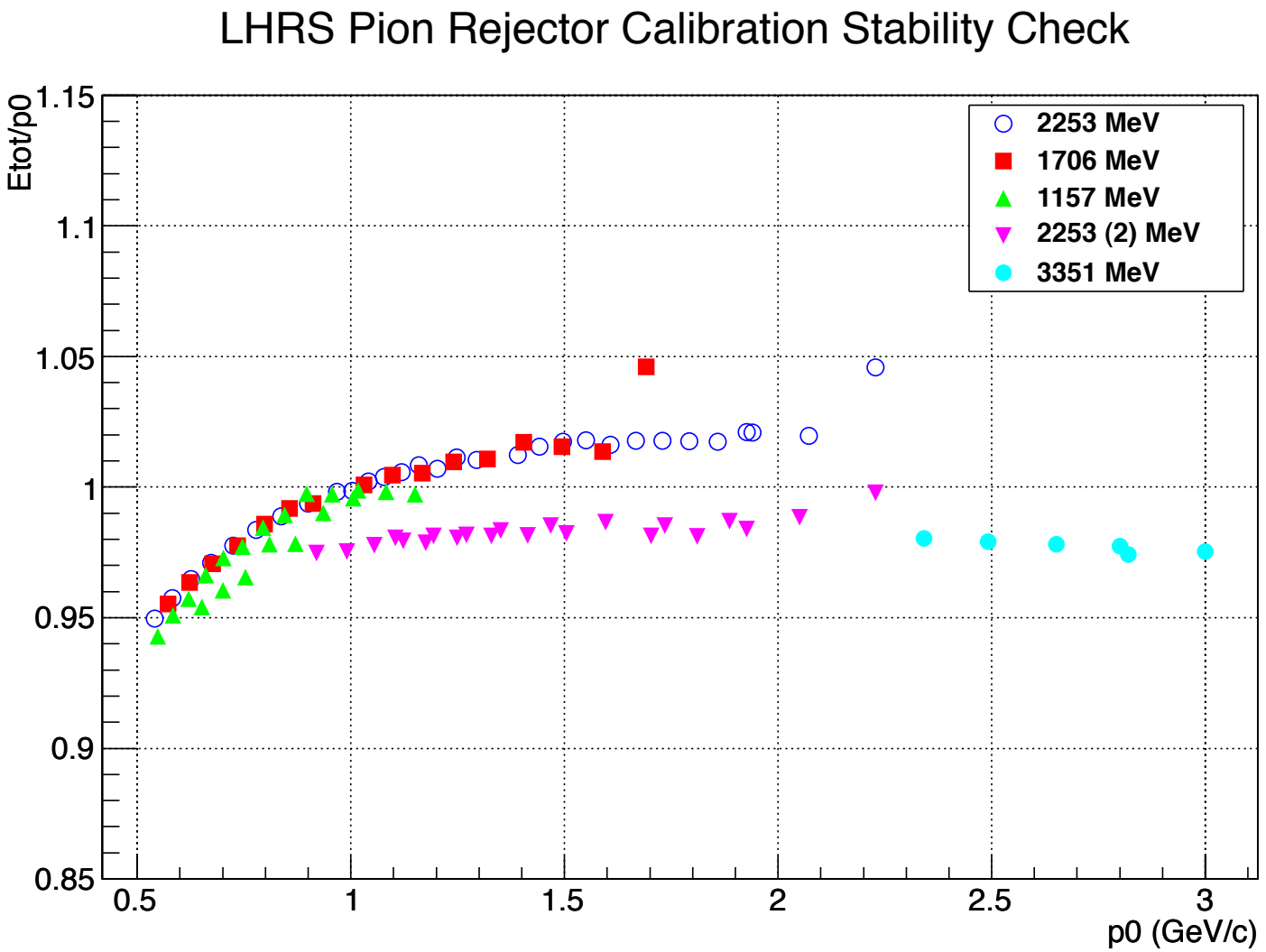
10/23/12

Method 1: 90/10 Split

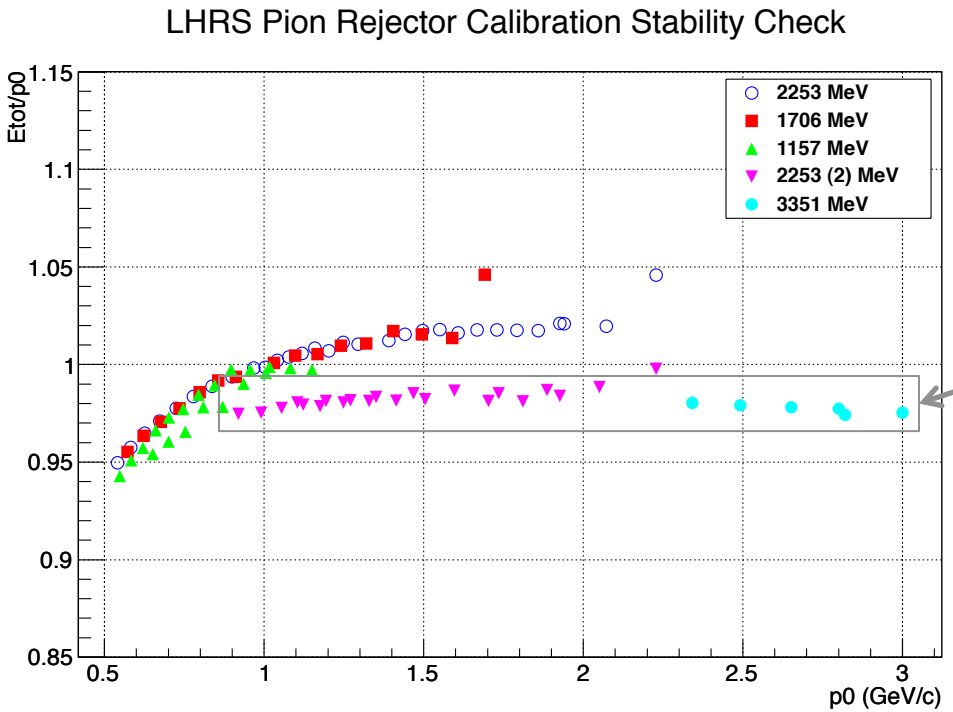
- Align peaks in layer 1 (2) so that 90% (10%) of total energy is deposited in that layer

- ~1 GeV run used to optimize calibration coefficients
  - assume full energy deposition

Method 1: 90/10 Split



Questions

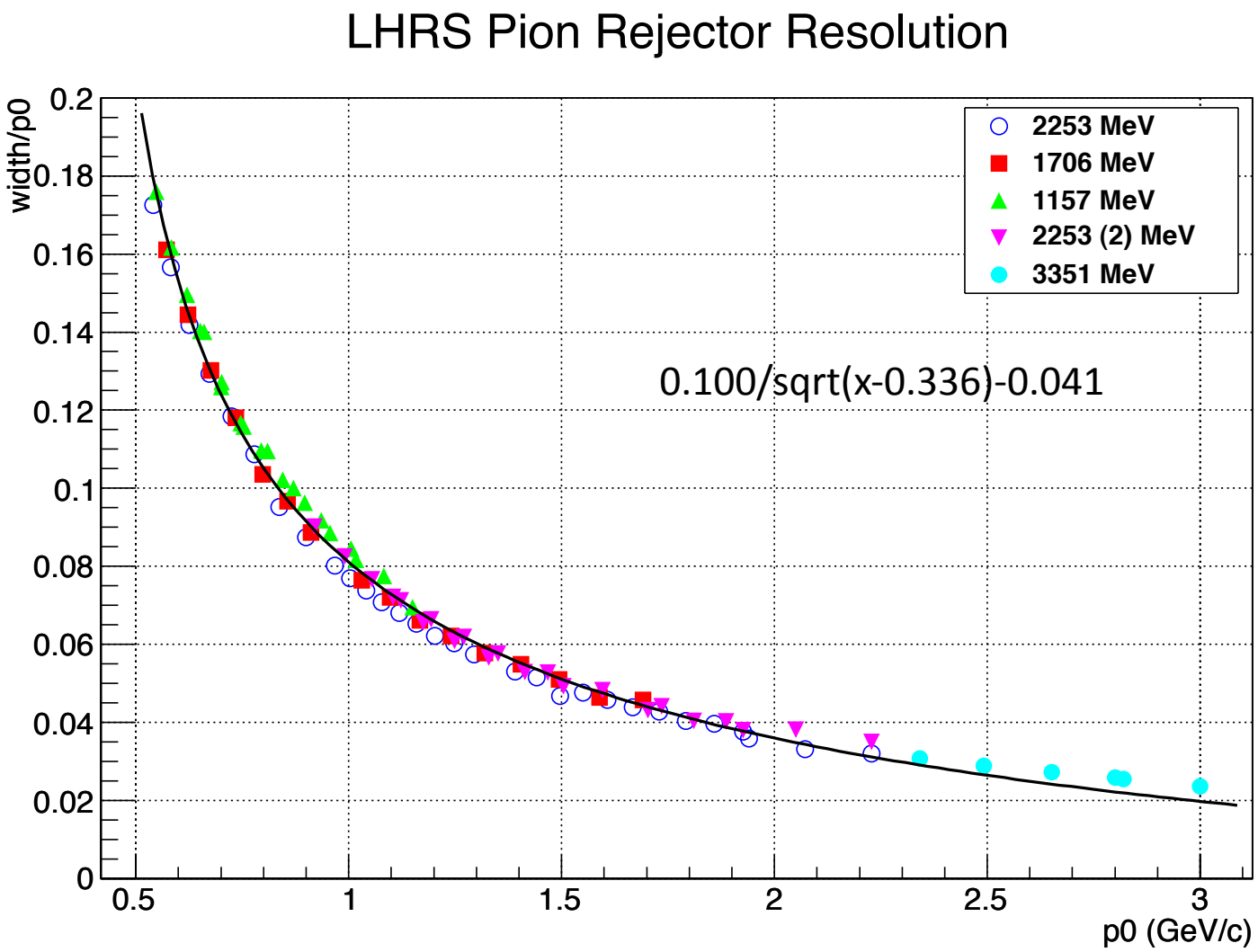


90/10 split

Why is calibration not consistent for 2.2 (2) and 3.3 GeV?

Check tracking variables?

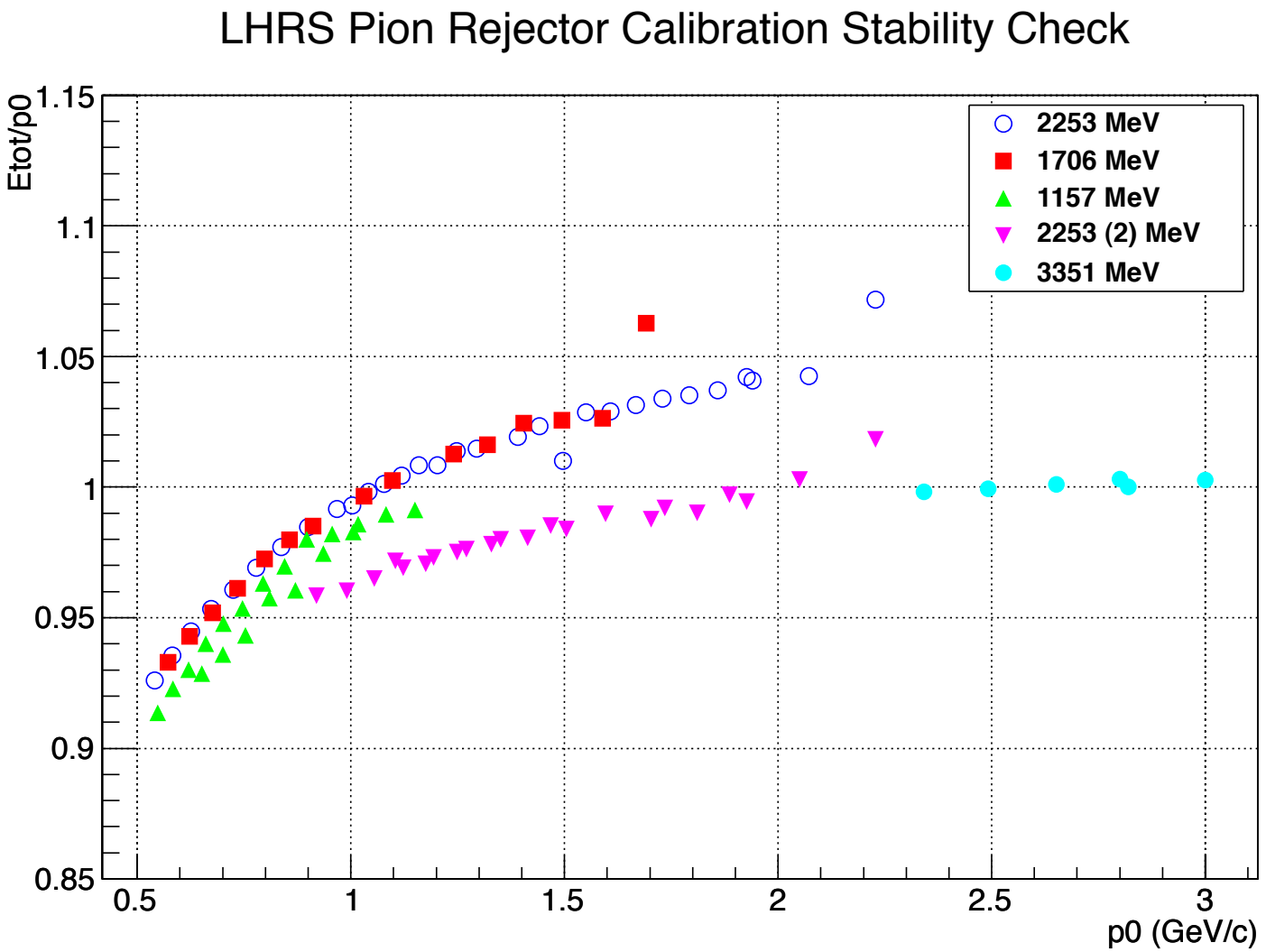
Method 1: 90/10 Split



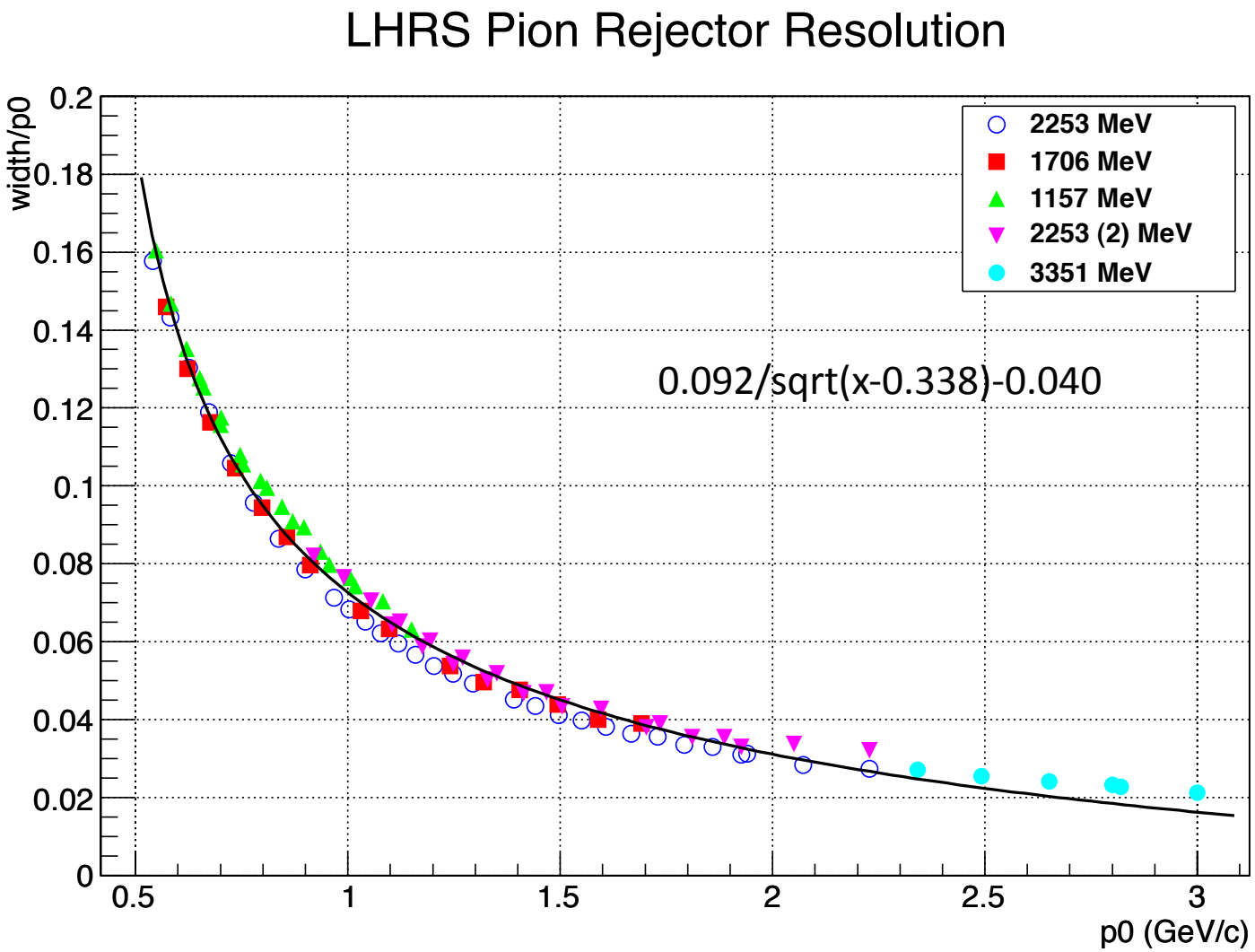
Method 2: 80/20 Split

- Align peaks in layer 1 (2) so that 80% (20%) of energy is deposited in that layer

Method 2: 80/20 Split



Method 2: 80/20 Split



Method 3

- Use two runs to determine the relative coefficients between the two layers

$$aA_1 + bA_2 + E_{loss} = E_{tot}$$

A_1 = Amplitude of First Layer (L.prl1.e)
A_2 = Amplitude of Second Layer (L.prl2.e)
E_{loss} = Energy lost
E_{tot} = Total Particle Energy (p0)
a, b = Calibration Coefficients

Method 3

$$aA_1^{(1)} + bA_2^{(1)} + E_{loss}^{(1)} = E_{tot}^{(1)}$$

$$aA_1^{(2)} + bA_2^{(2)} + E_{loss}^{(2)} = E_{tot}^{(2)}$$

Assume full energy deposition for runs ~1 GeV or less

$$b = \frac{1}{(A^{(1)} - A^{(2)})}\left(\frac{E_{tot}^{(1)}}{A_1^{(1)}} - \frac{E_{tot}^{(2)}}{A_1^{(2)}}\right)$$

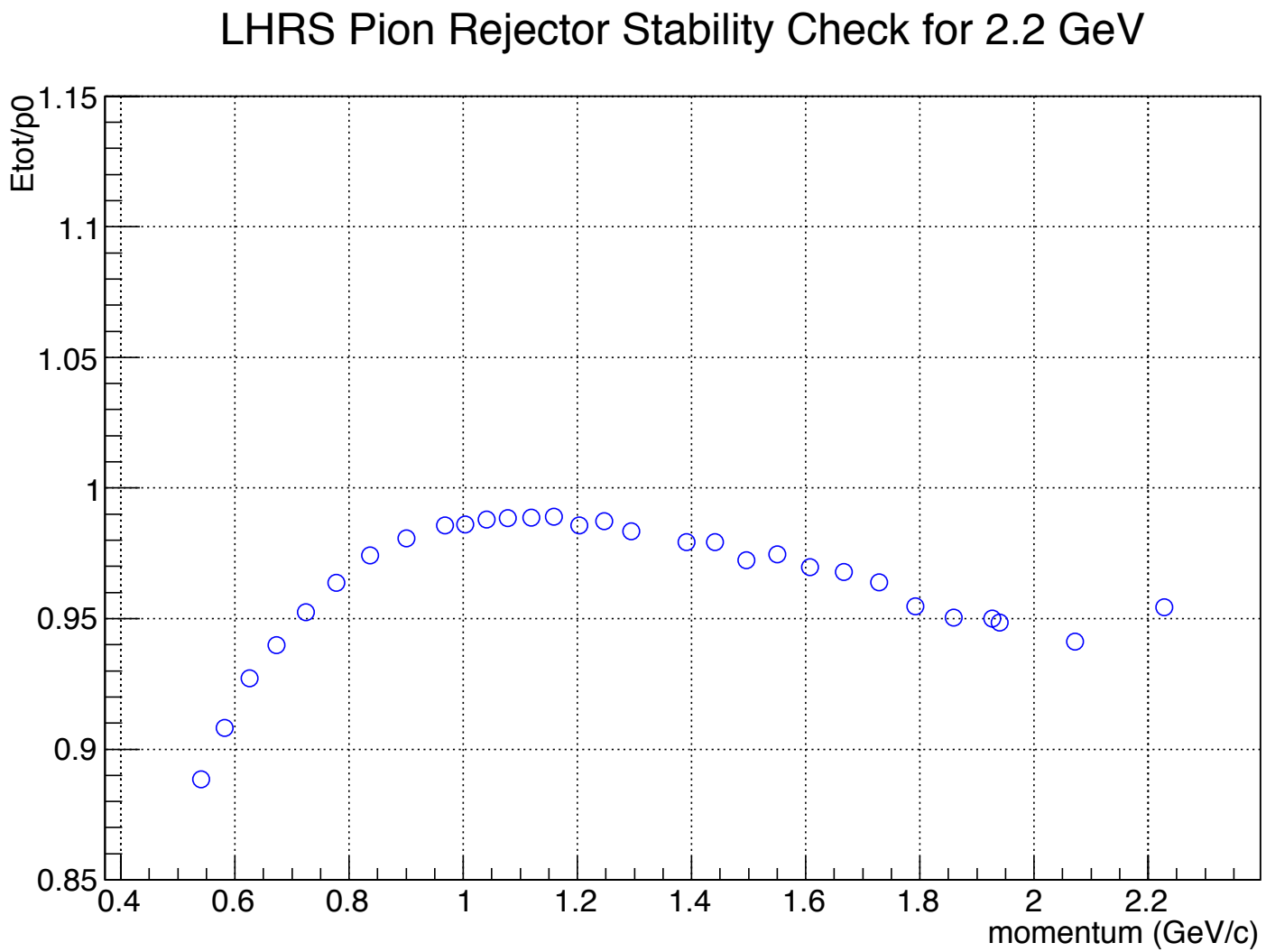
where: $A^{(1)} = \frac{A_2^{(1)}}{A_1^{(1)}}$, $A^{(2)} = \frac{A_2^{(2)}}{A_1^{(2)}}$

$$a = \frac{E_{tot}^{(1)}}{A_1^{(1)}} - bA^{(1)}$$

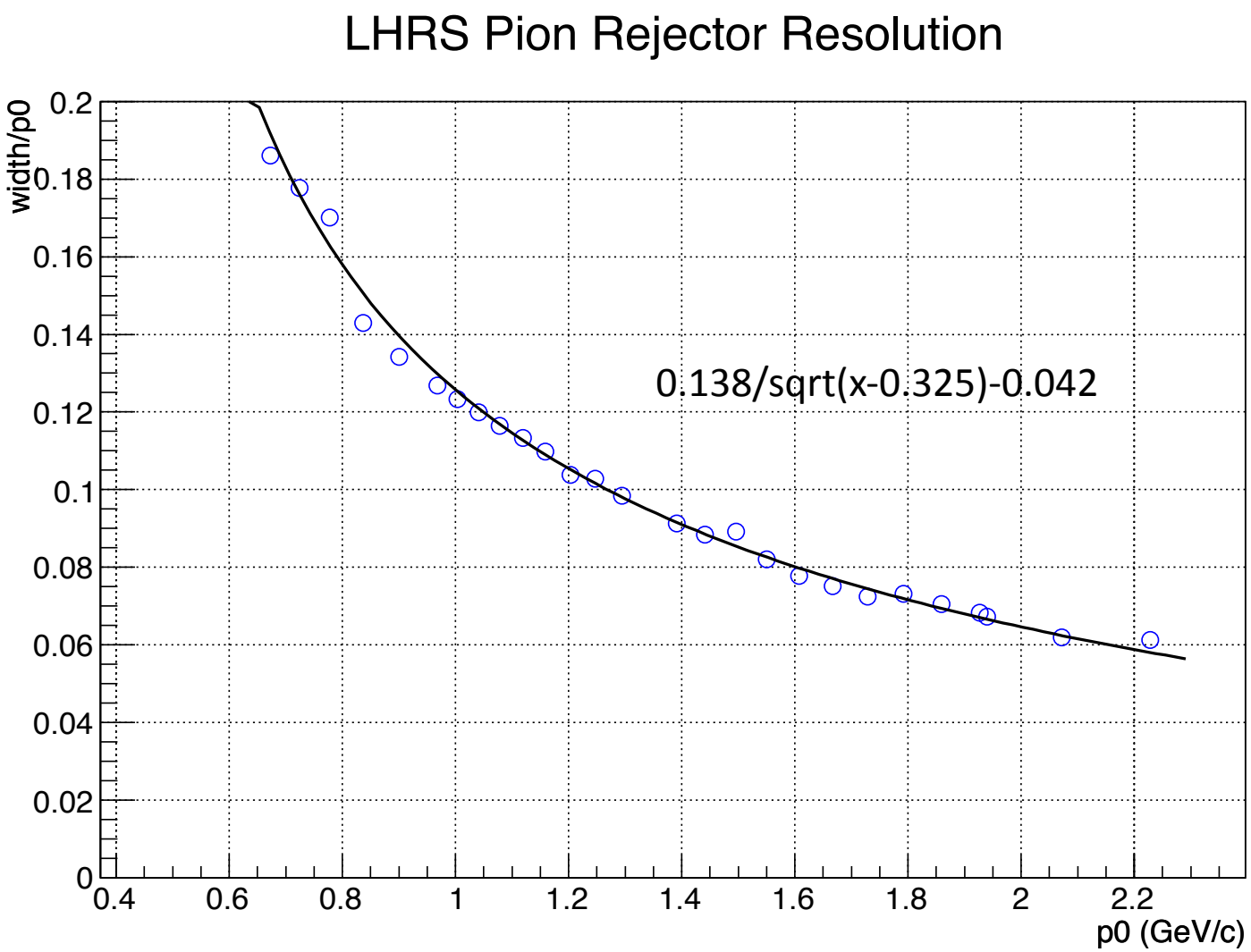
p0 (MeV) : E_{tot}	L.prl1.e : A_1	L.prl2.e : A_2
724	281.18	33.22
1078	415.03	72.29

$$a = 2.527$$
$$b = 0.402$$

Method 3:

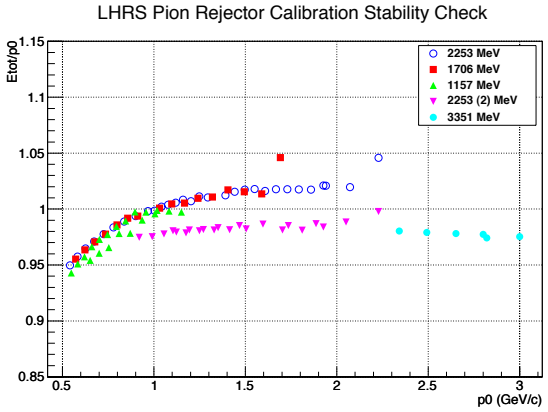

LHRS Pion Rejector Stability Check for 2.2 GeV
Etot/p0
1.15
1.1
1.05
1
0.95
0.9
0.85
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
momentum (GeV/c)

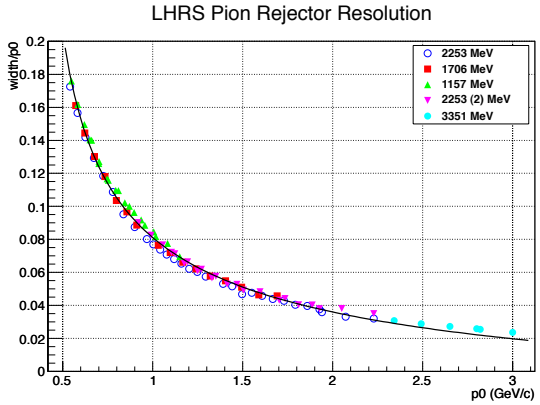
Method 3


LHRS Pion Rejector Resolution
width/p0
0.2
0.18
0.16
0.14
0.12
0.1
0.08
0.06
0.04
0.02
0
0.138/sqrt(x-0.325)-0.042
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
p0 (GeV/c)

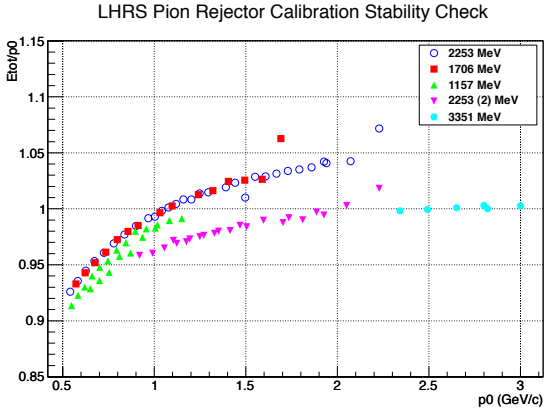
Comparison

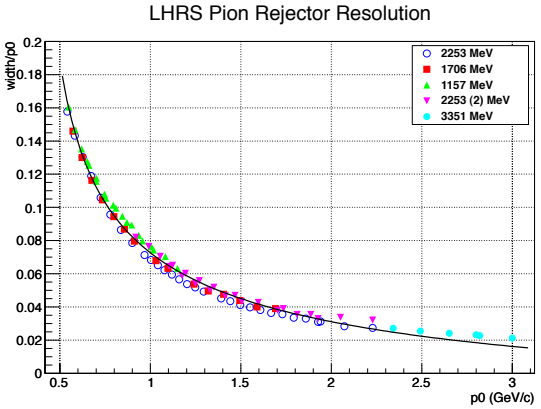
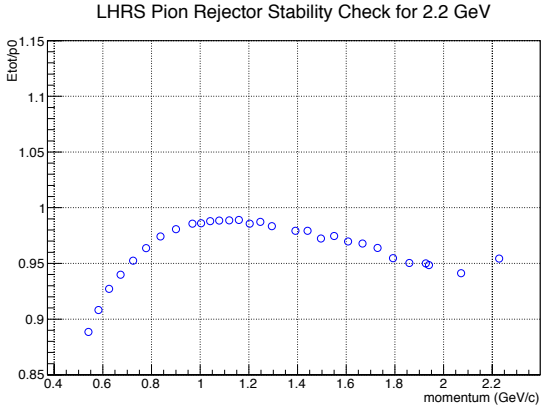
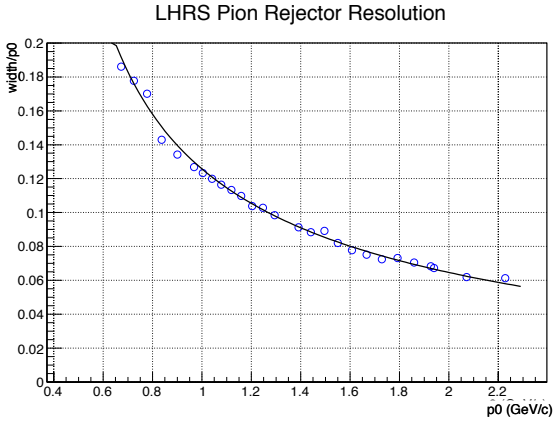
Method 1
90/10





Method 2
80/20





Method 3