FDC Residuals

The Story of Event 39

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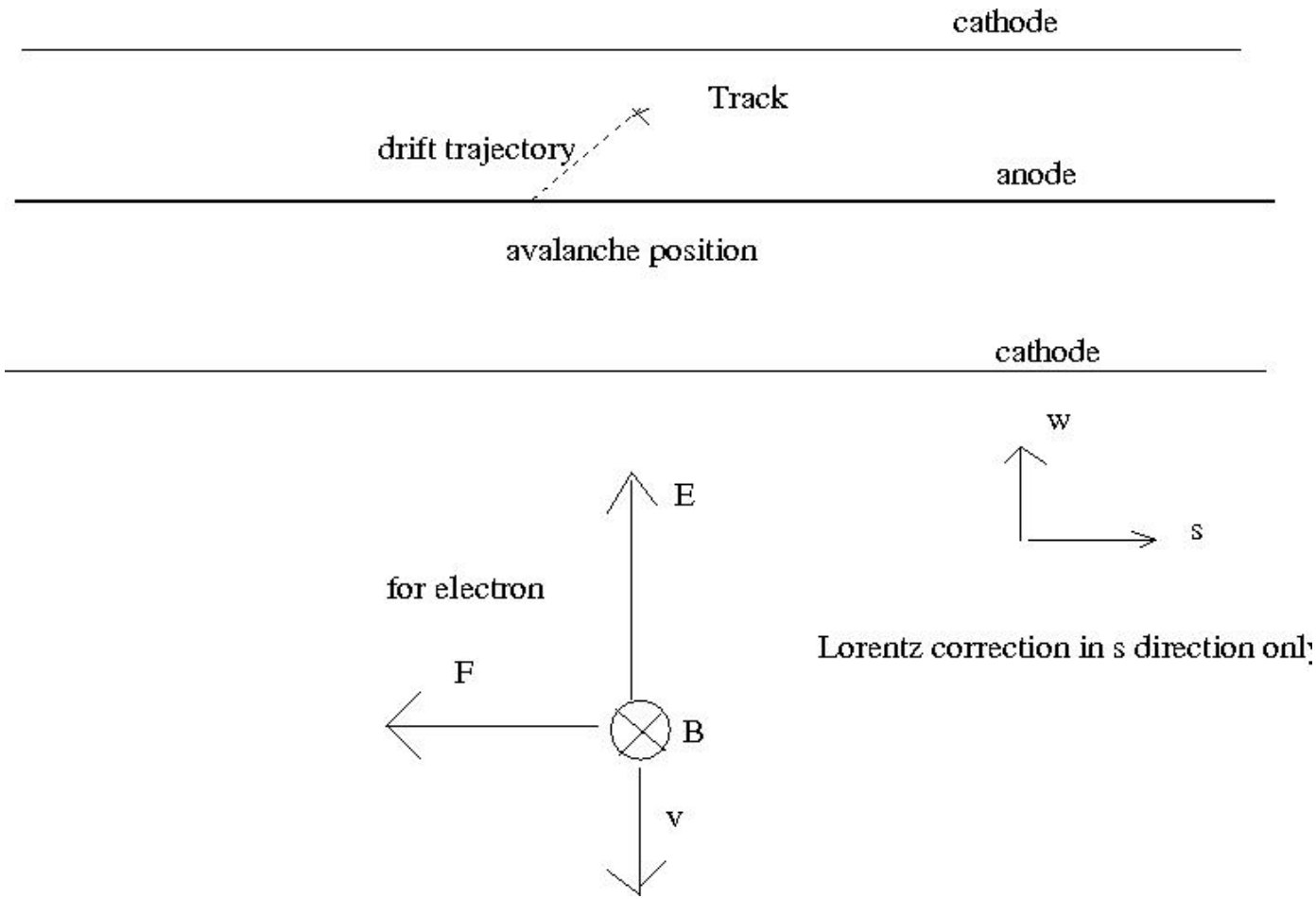
Lorentz Effect

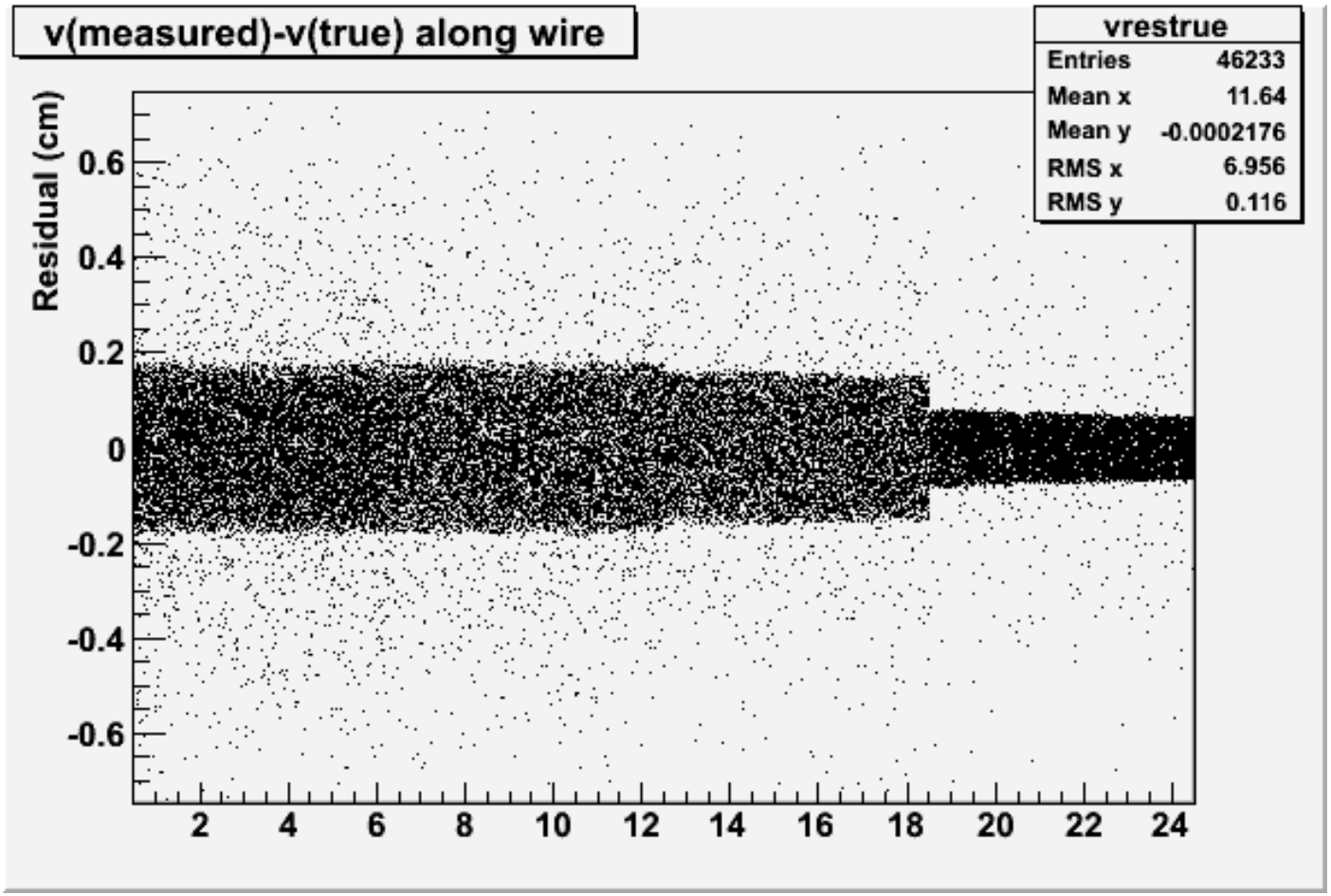


drift cell with B field normal to wire plane

Runnning Simon's Code

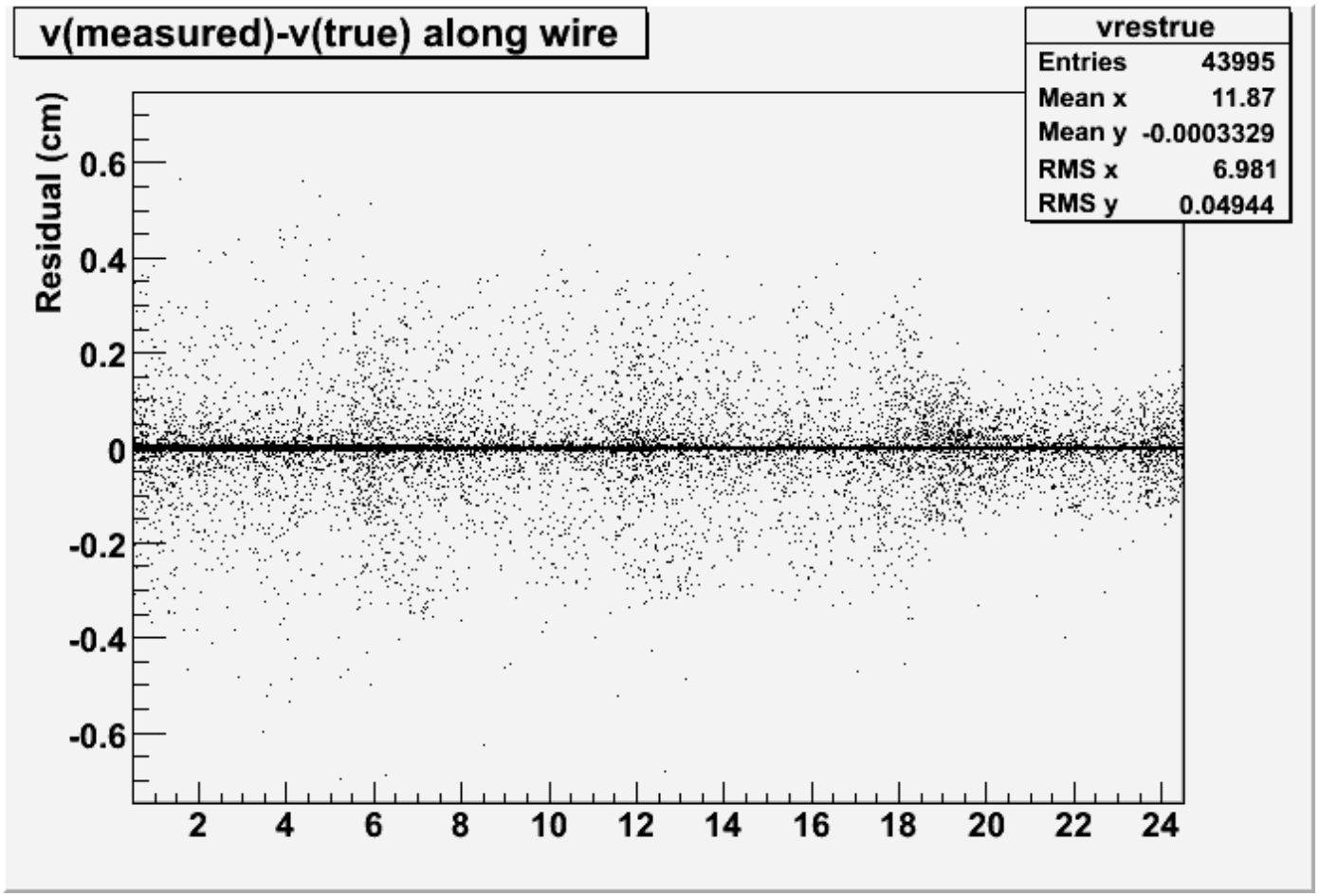
- run HDGEANT with Simon's configuration
  - one charged pion(?)
  - may or may not hit all layers of the FDC
- run S.'s reconstruction
  - helical Riemann fit
  - local L-R ambiguity resolution(?)
- make S.'s histograms

Residuals without Lorentz correction



residuals vs. FDC layer

Residuals with Lorentz correction

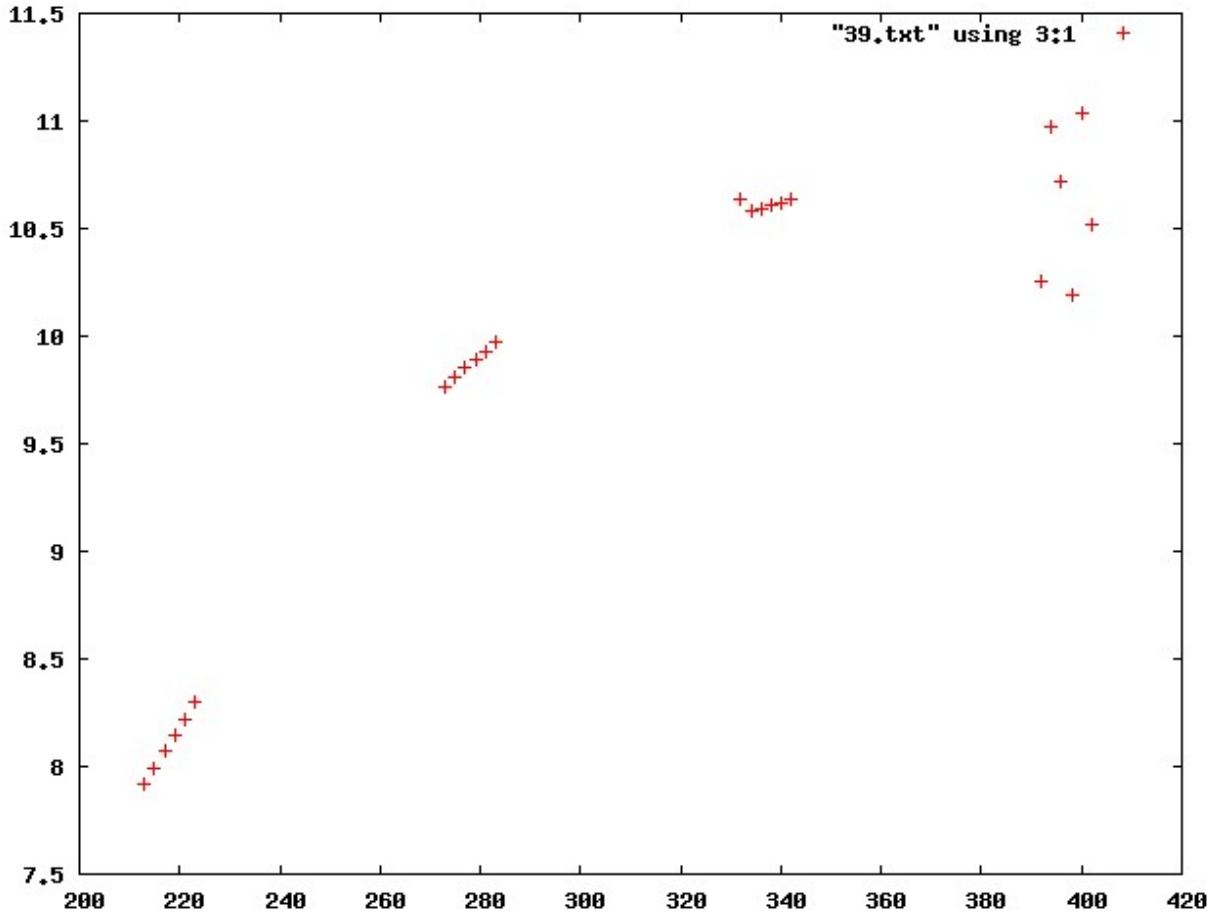


residuals vs. FDC layer

Single Event Display

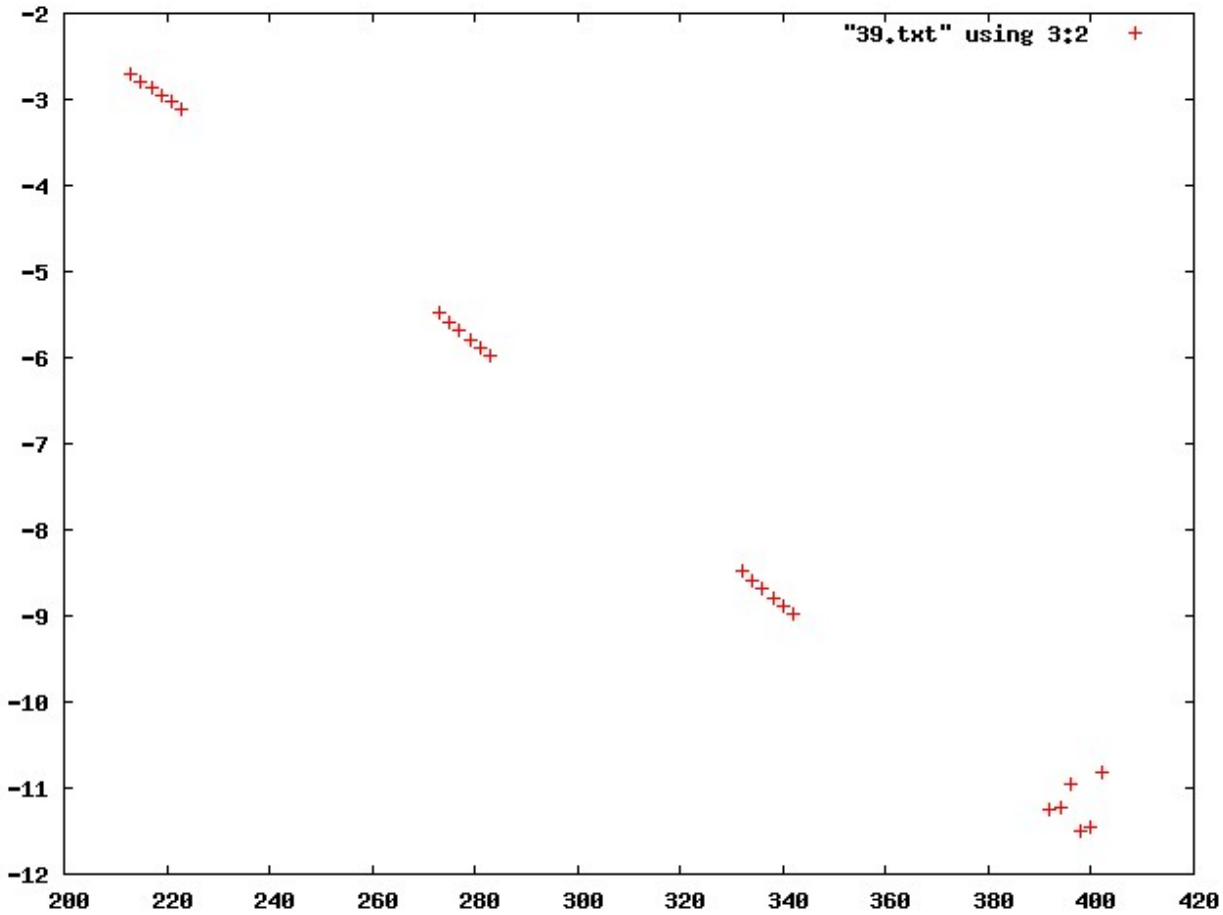
- FDC hits are rendered as 3-D space points
  - both cathode planes and anode wire combined into single point (aka psuedopoint)
  - drift time taken into account
  - Lorentz correction applied
  - both depend on L-R choice
- events with bad residuals easy to find
  - event 39 is an example

Event 39, with drift times and Lorentz correction



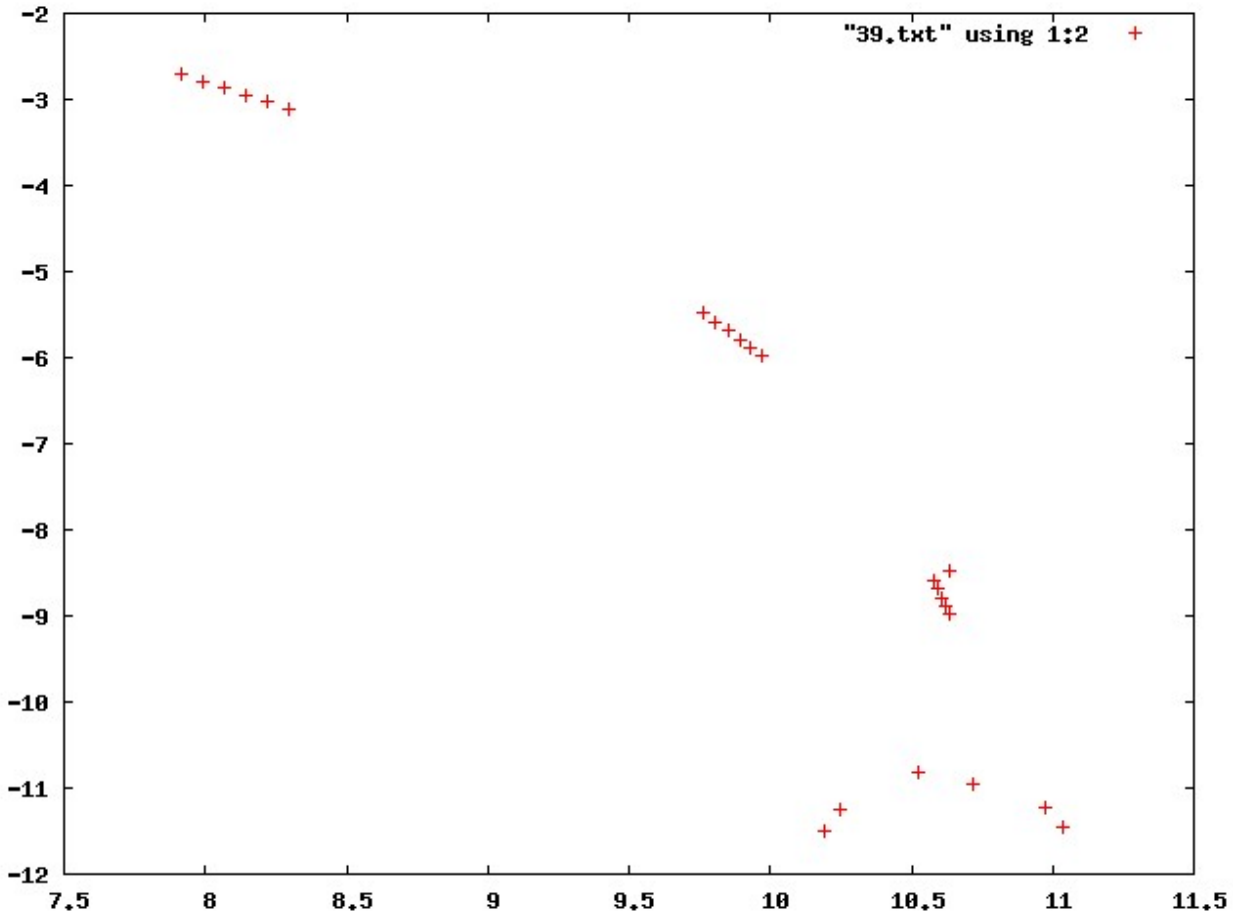
x vs. z (cm)

Event 39, with drift times and Lorentz correction



y vs. z (cm)

Event 39, with drift times and Lorentz correction

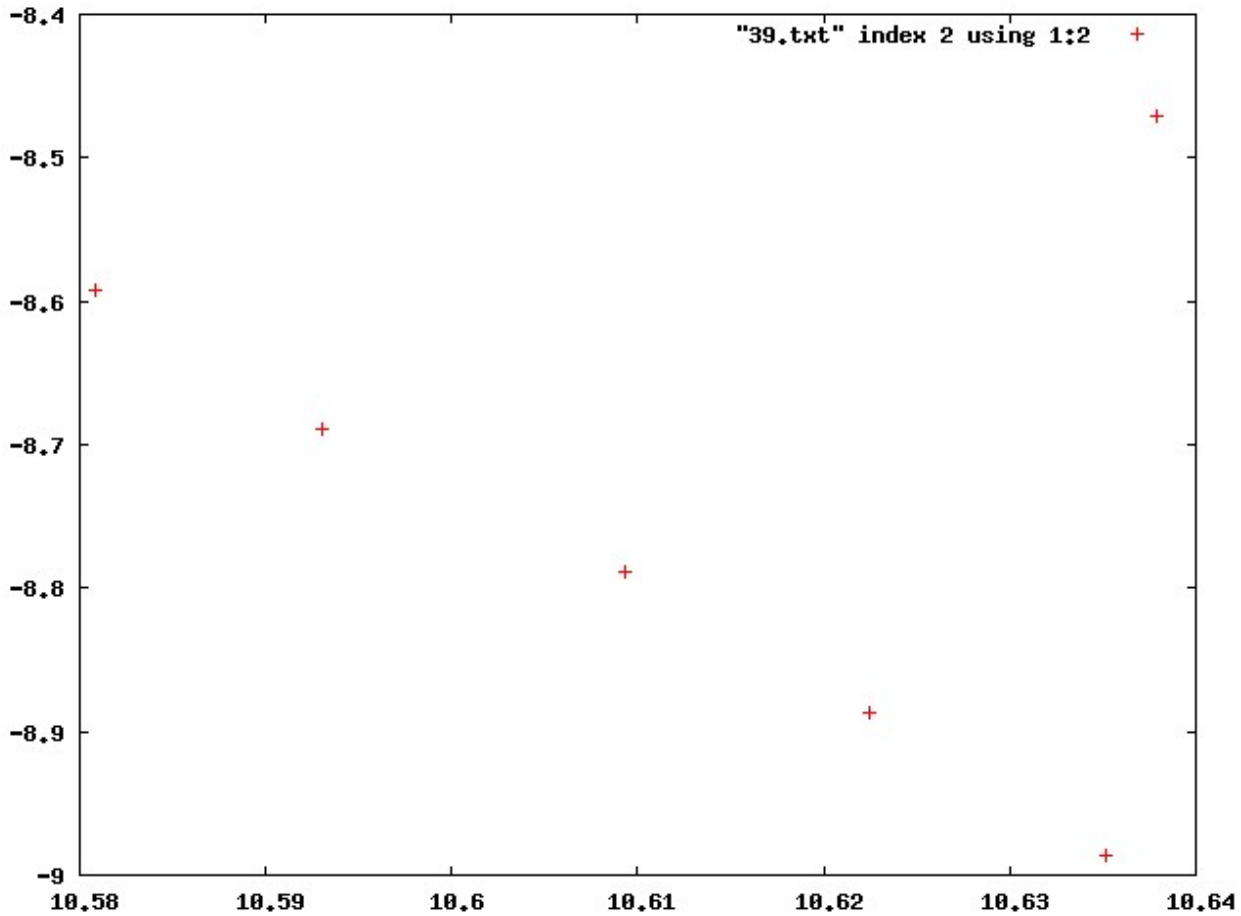


y vs. x (cm)

alternate hit positions

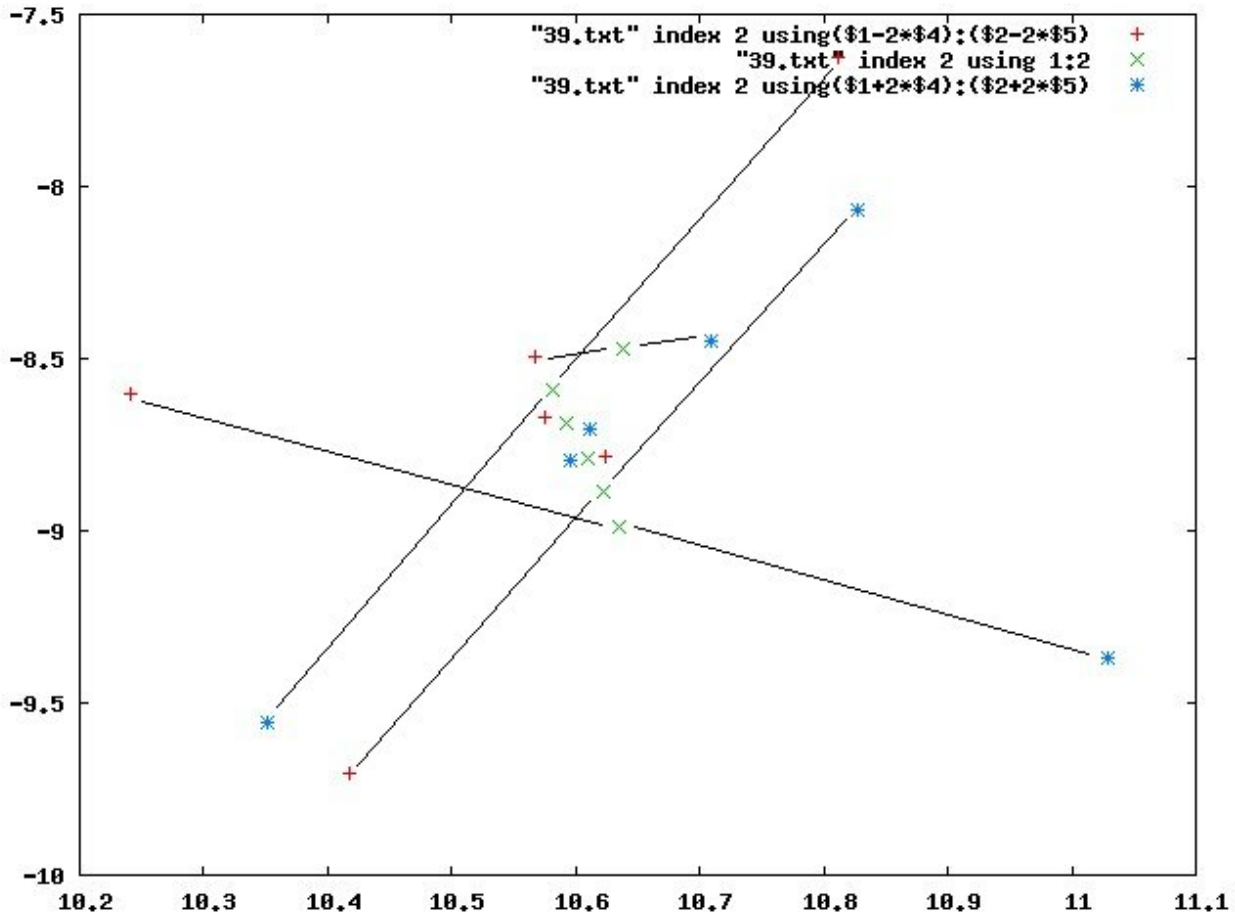
- apply drift time correction and Lorentz correction with opposite sign
- gives an apparent shift from original corrected point
- also try opposite shift (?!)

Event 39, package 3, close-up



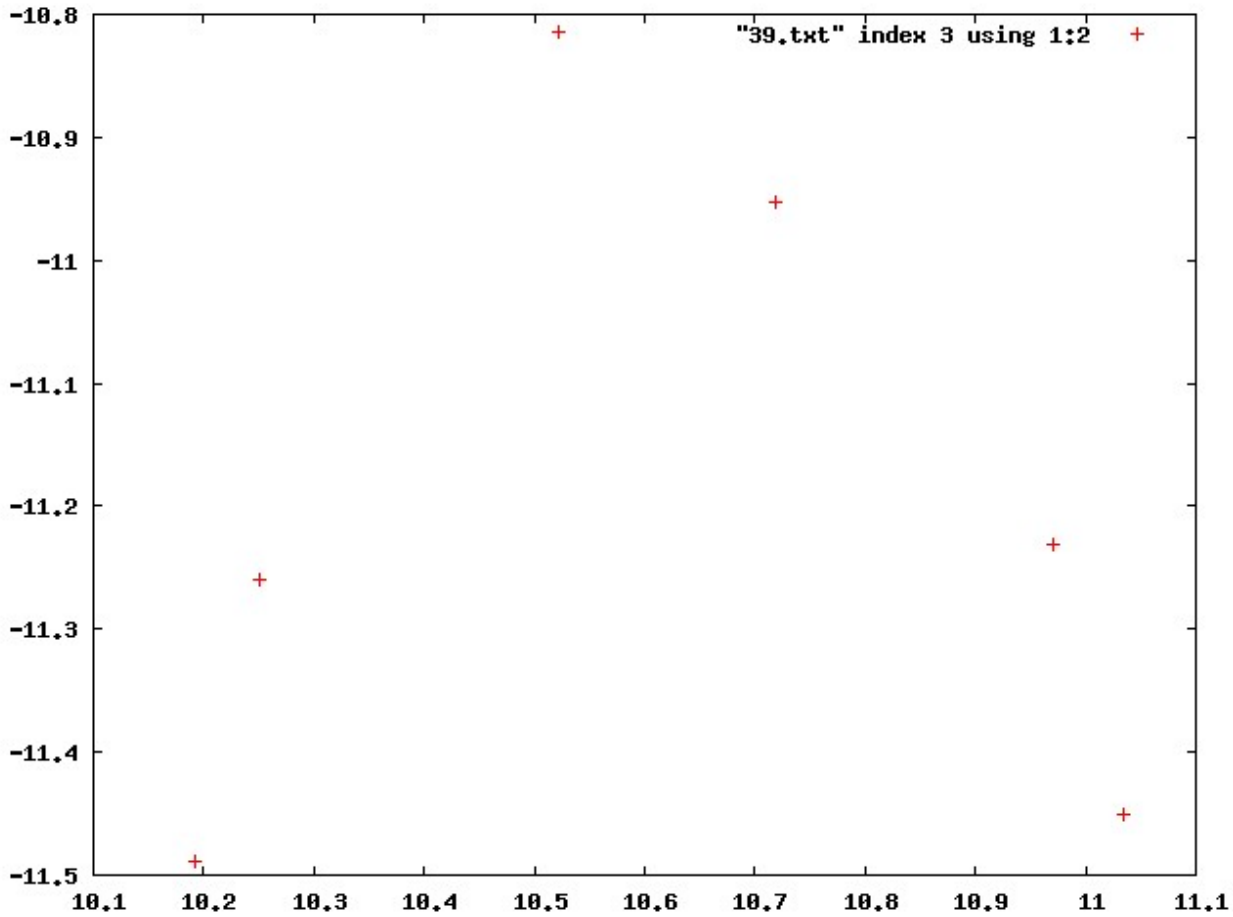
y vs. x (cm)

Event 39, package 3, alternate choices



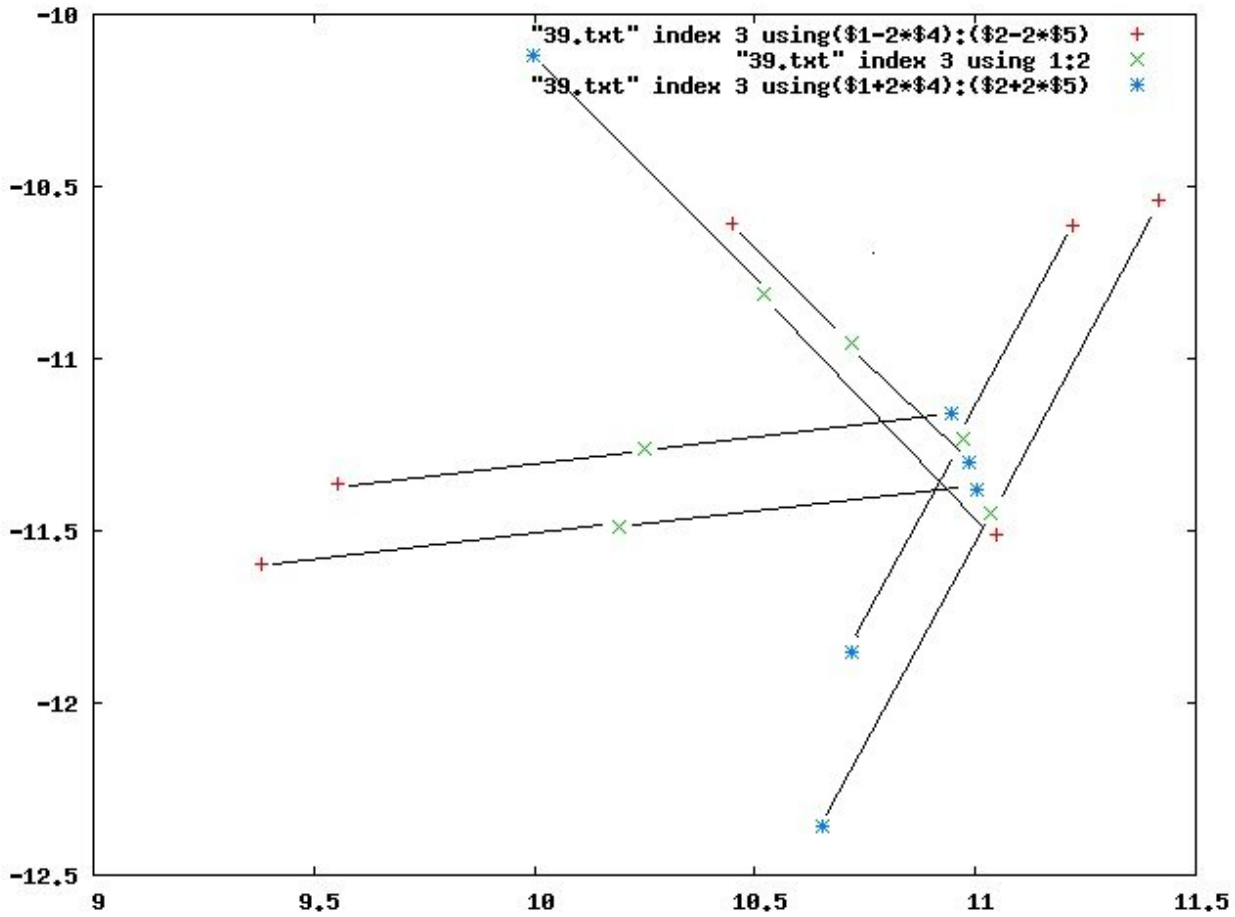
y vs. x (cm)

Event 39, package 4, close-up



y vs. x (cm)

Event 39, package 4, alternate choices



y vs. x (cm)

Conclusions thus far...

- wrong choice in resolving L-R ambiguity can lead to large residuals
- This can be corrected: not intrinsic flaw in chamber
- The above says nothing about material budget
- Mystery: alternate alternate choice
  - Should only be a two-fold ambiguity, not three-way
- More work needed
  - tweak Simon's?
  - different approach?