Update on the SpacePoint/TrueHit Issue and Planned Next Steps

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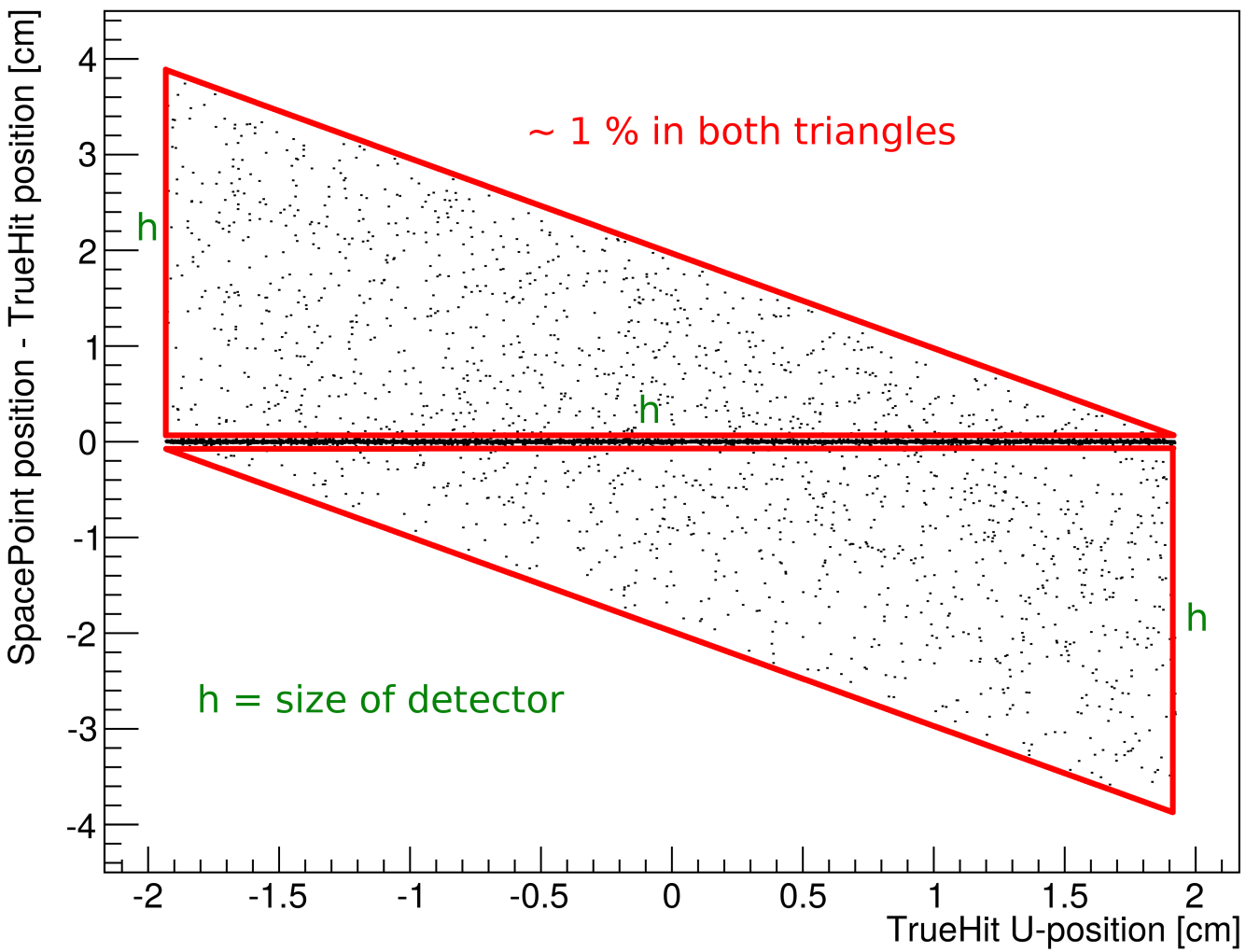
Issue presented at F2F in Prague

Position residuals vs. TrueHit position, with 'issue cases':

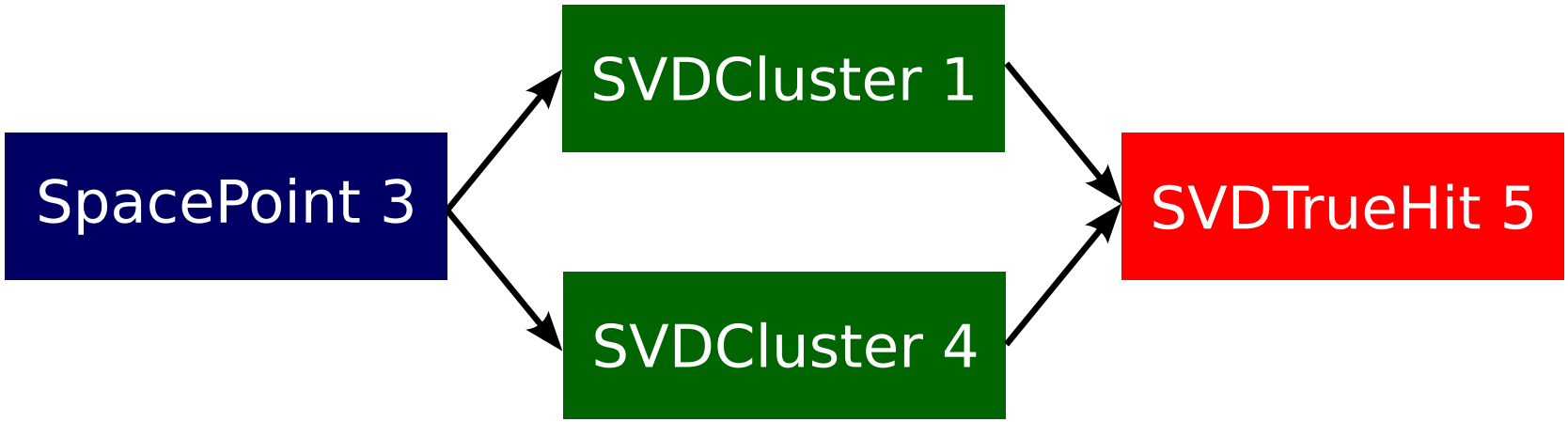


What happened since then (last 2 months)

- disentangling of modules (alongside some refactoring work) $\rightarrow$ relating TrueHits and SpacePoints now in SpacePoint2TrueHitConnector
- implementation of algorithm for finding the related TrueHits to a SpacePoint now with multimap (previously done with vectors)
- finding the 'right' TrueHit is still not straight-forward! (and there may be new issues!)
- However the issue presented in Prague could be tracked down to stem from Ghosthits!

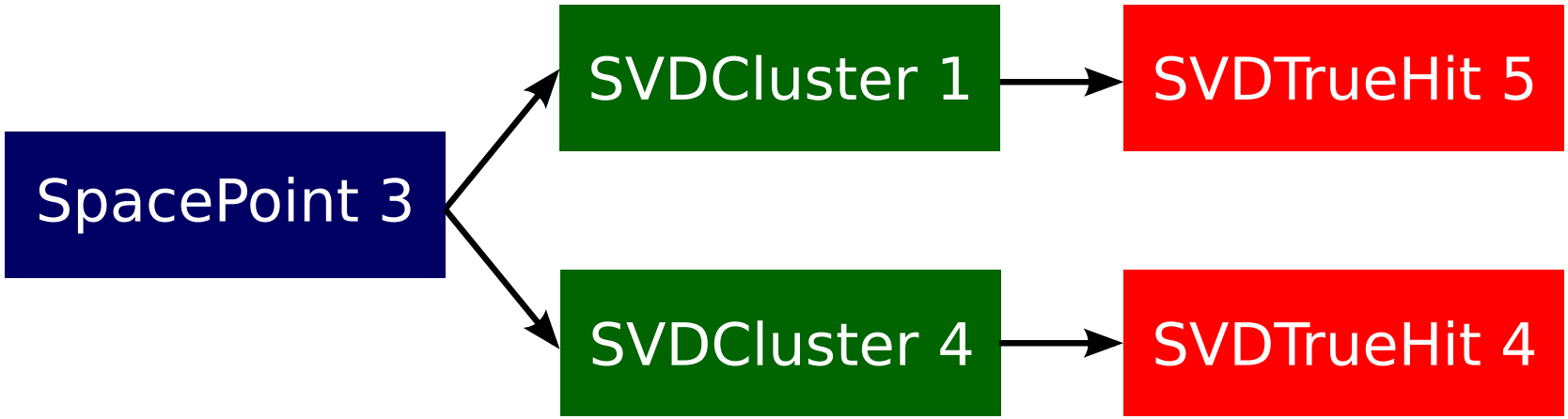
Relating TrueHits and SpacePoints

'Ideal' case: clear hit ($\rightarrow$ relating is straight forward)



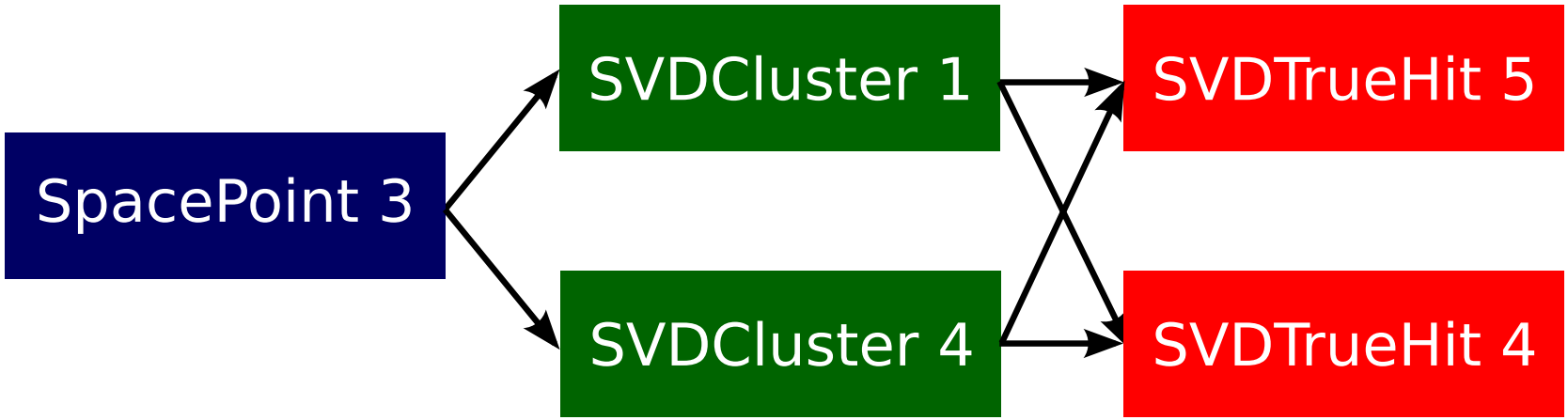
Relating TrueHits and SpacePoints

'Non-Ideal' case: Ghosthit ($\rightarrow$ decision not to relate is straight forward)



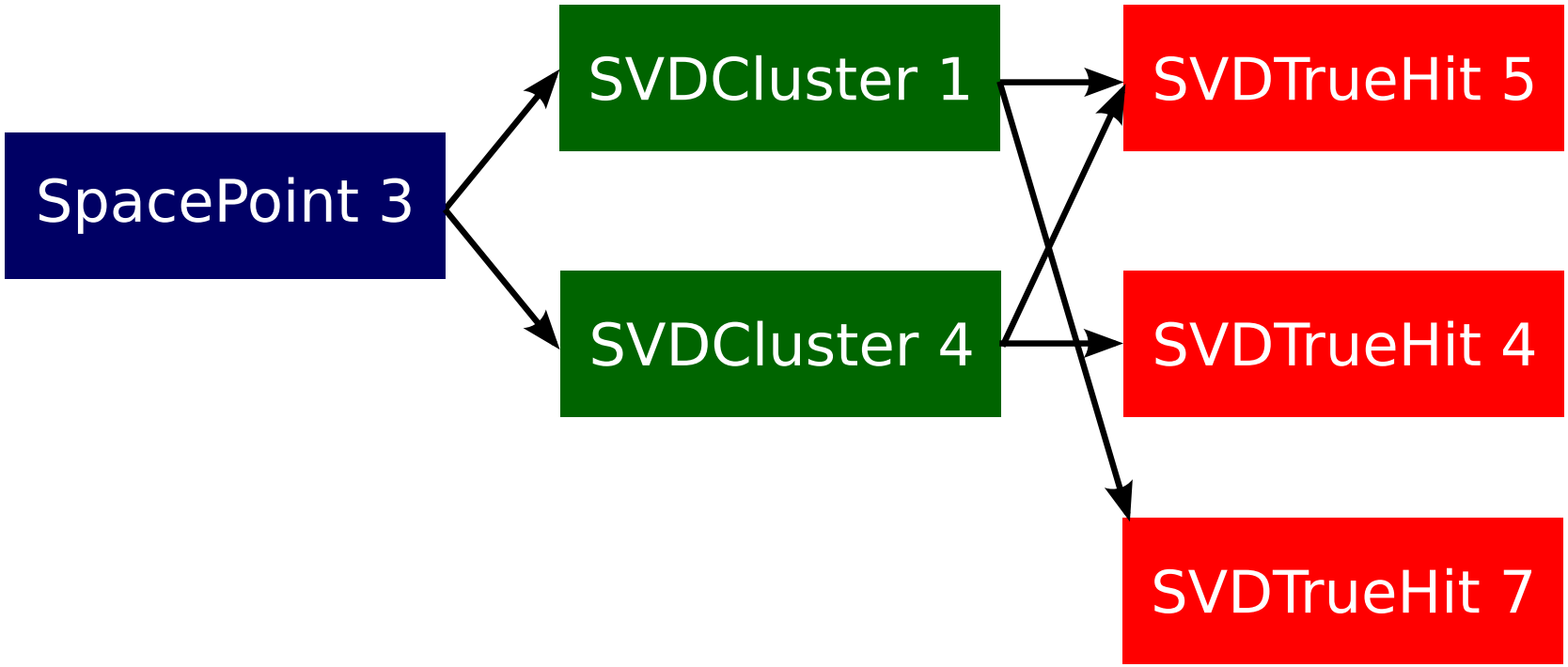
Relating TrueHits and SpacePoints

'Non-Ideal' case: Shared TrueHit ($\rightarrow$ decision which one to choose is not straight forward!)



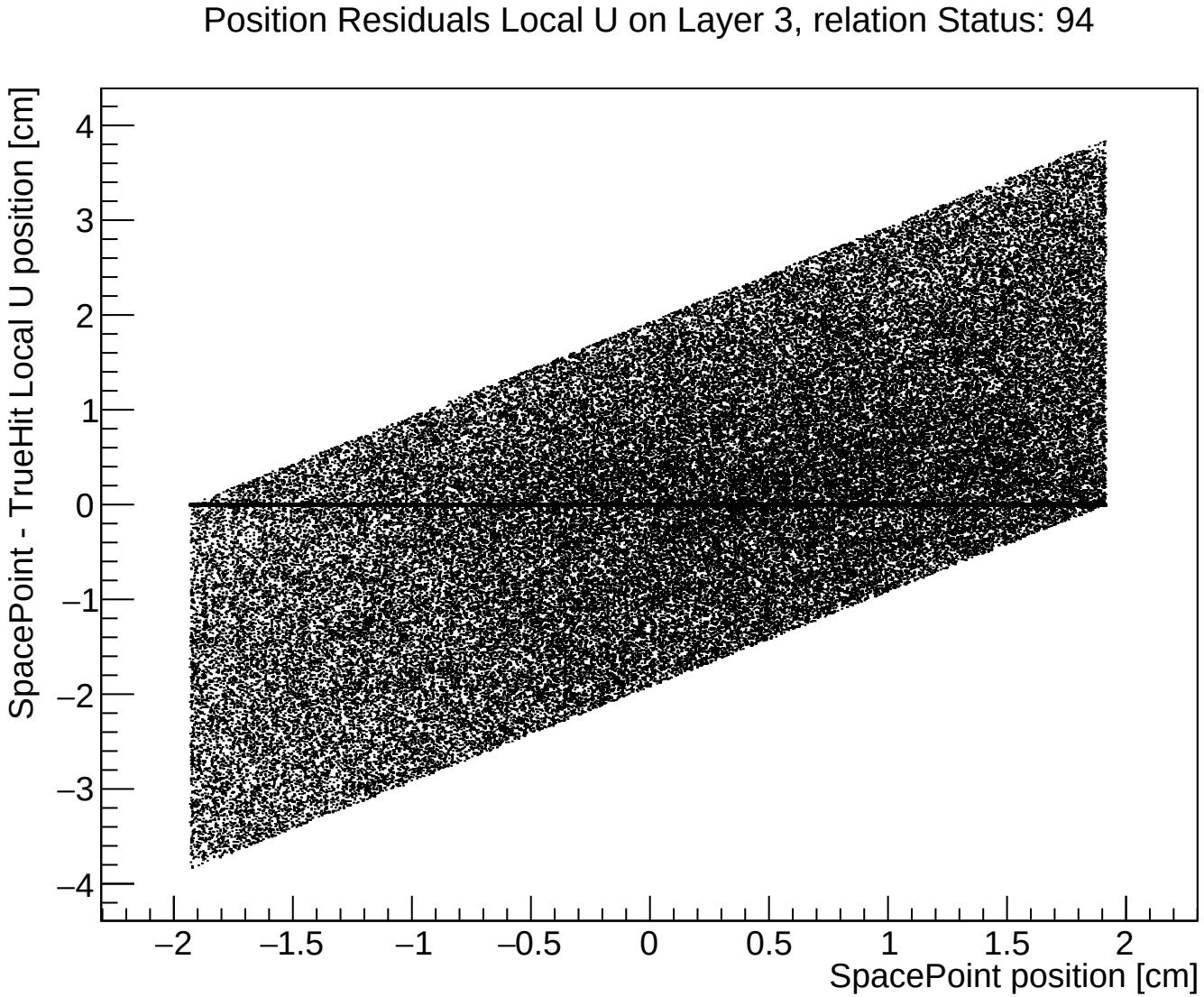
Relating TrueHits and SpacePoints

'Non-Ideal' case: generic case ($\rightarrow$ decision which one to choose is not straight forward!)



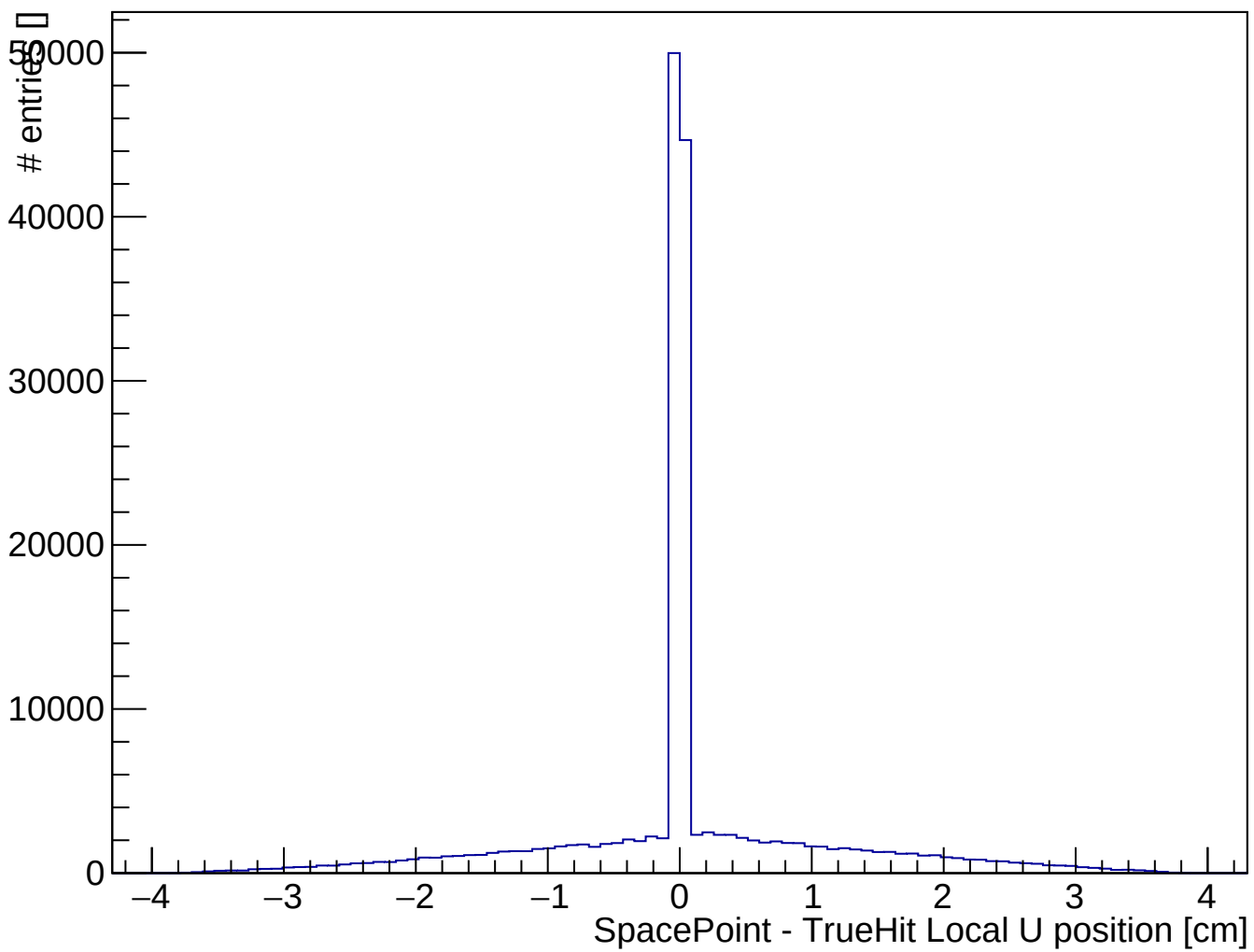
Position residuals between SpacePoints and TrueHits (ghost hits only)

Scatter plot: position residuals vs. SpacePoint position



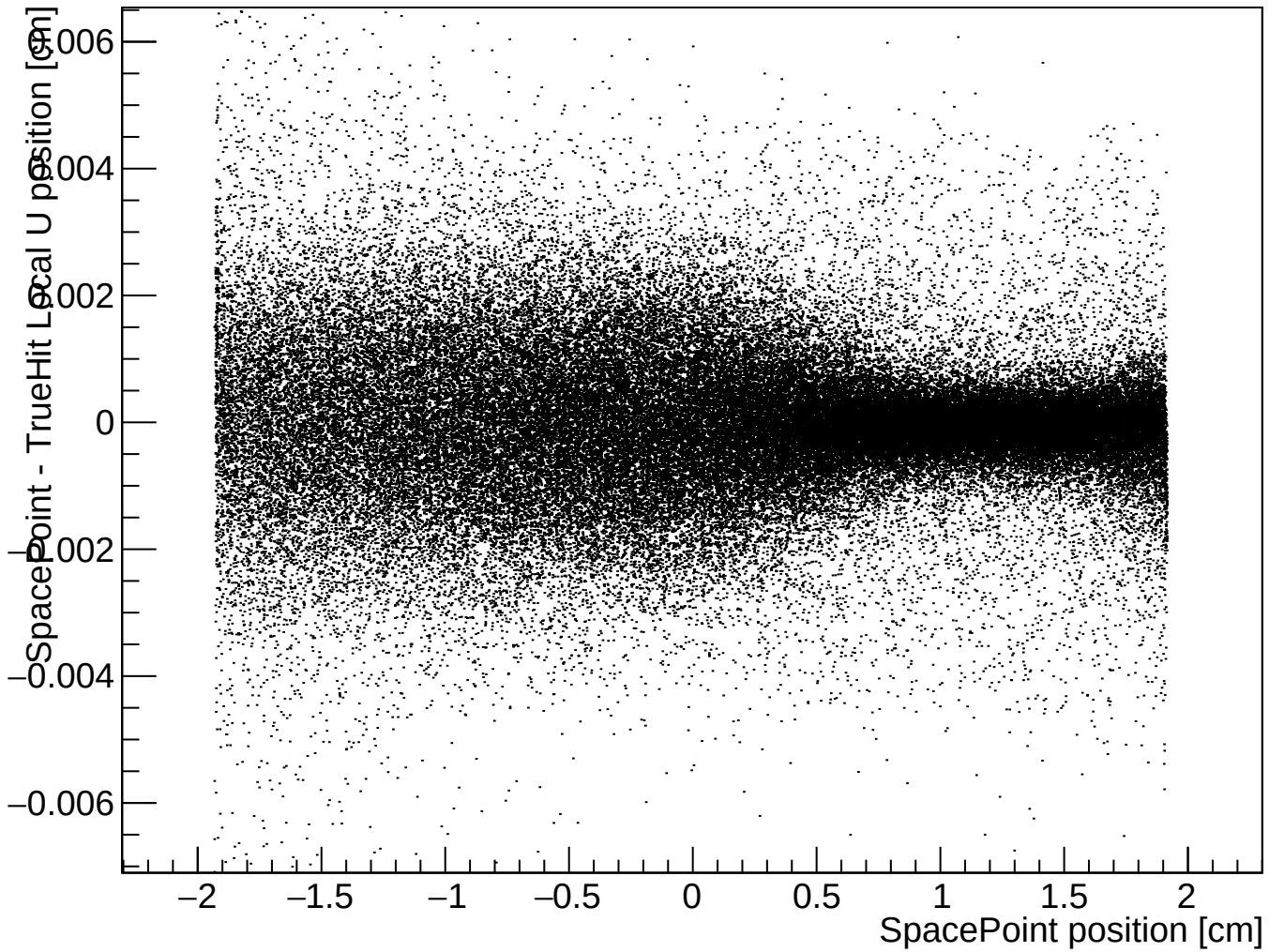
Position residuals between SpacePoints and TrueHits (ghost hits only)

Projection in Y-direction (histogram of position residuals



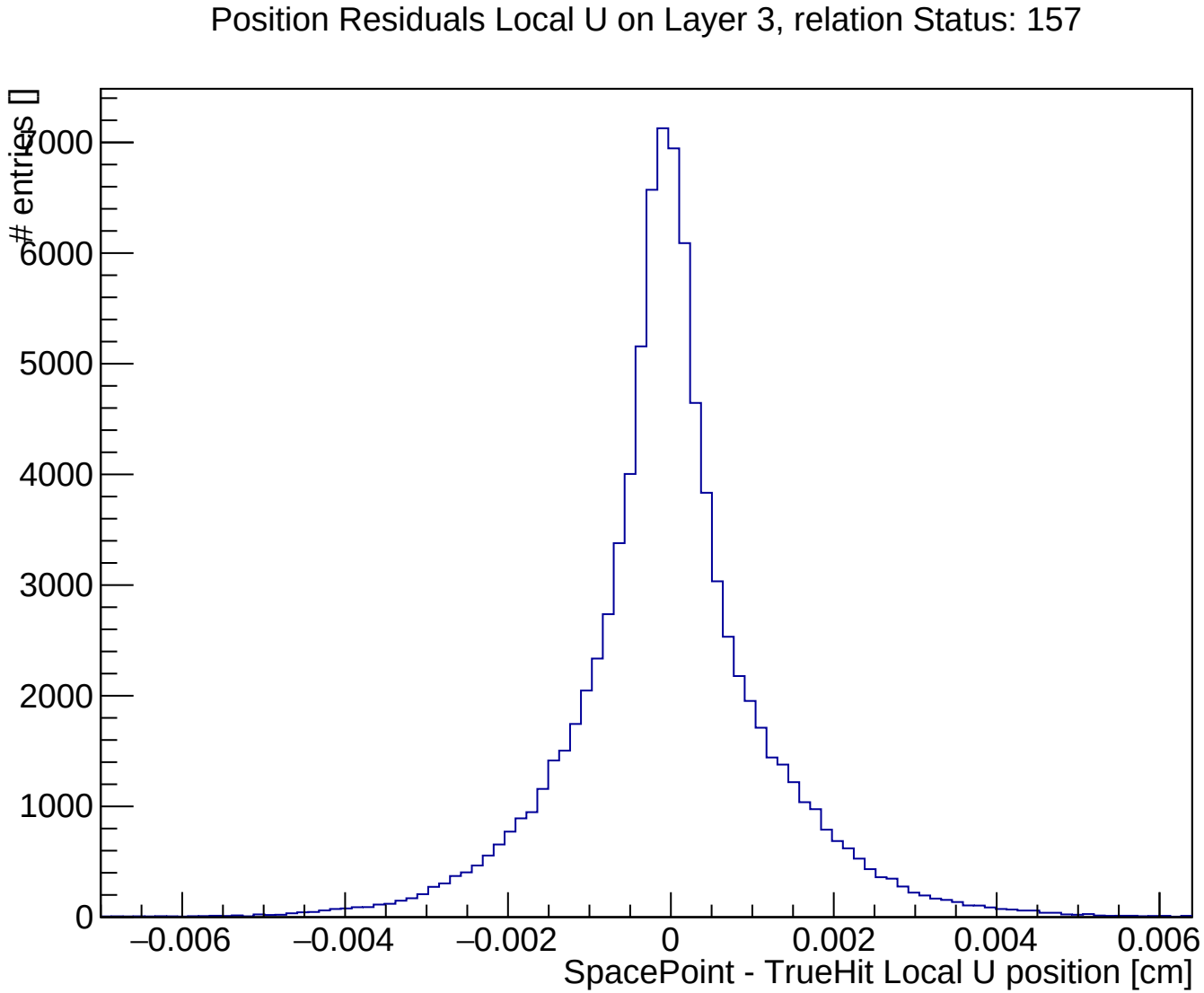
Position residuals between SpacePoints and TrueHits (clean hits only)

Scatter plot: position residuals vs. SpacePoint position



Position residuals between SpacePoints and TrueHits (clean hits only)

Projection in Y-direction (histogram of position residuals



Summary and remaining questions

- Appearance of 'triangles' due to Ghosthits
- Filtering out Ghosthits and/or unclean hits yields reasonable results
- Resolution seems to be dependent on position for U clusters, Explanation?
- How to choose the 'right' TrueHit?

What is next?

- Short-term: Finishing a very basic phase-space analysis:
  - comparing information from MCParticles related to GFTCs from MCTrackFinder and SPTCs from GFTC2SPTCConverter
  - aim: ensure converter does not systematically exclude some part of the phase-space
- Long(er)-term: Testing different approaches on how to employ neural networks to generate information usable by a SectorMap