Gem Tracking

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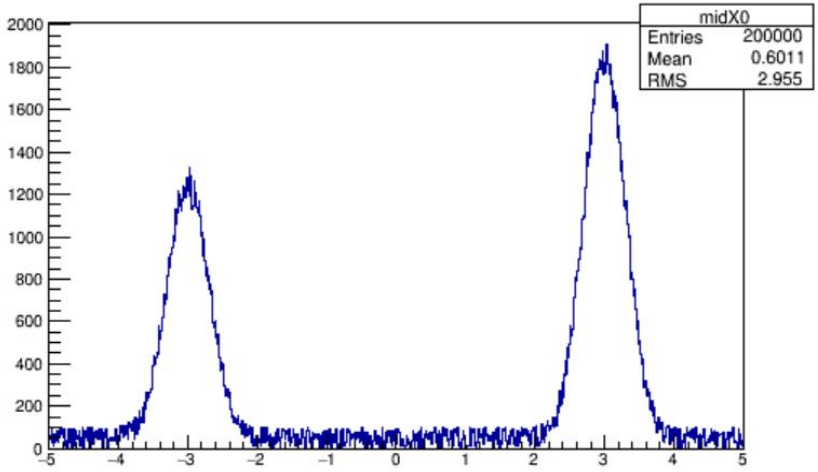
How does it work?

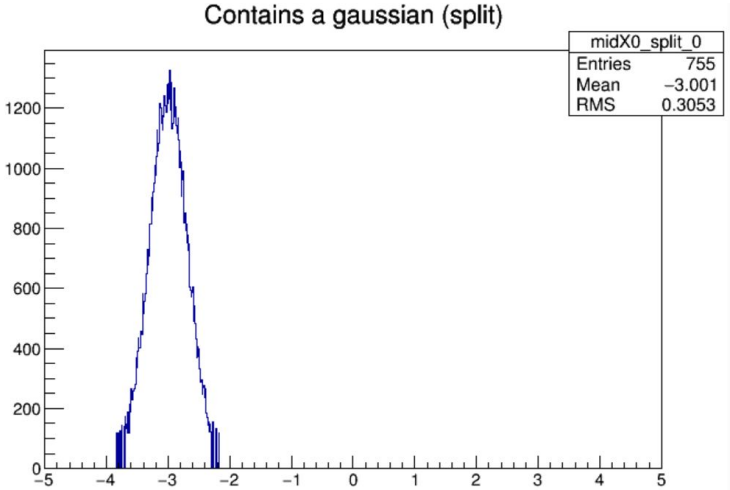
1. Find all hits in gem x and y
2. Correlate gem x and y into points
    a. Peak height is used to distinguish multiple simultaneous hits
3. Apply offsets to the points
    a. These are read from file
    b. Can be turned off if offsets are unknown (as offsets require tracks to calculate)
4. Rebuild points into physically possible tracks
    a. Can be turned off if offsets are unknown (as tracks aren’t expected to be straight lines)

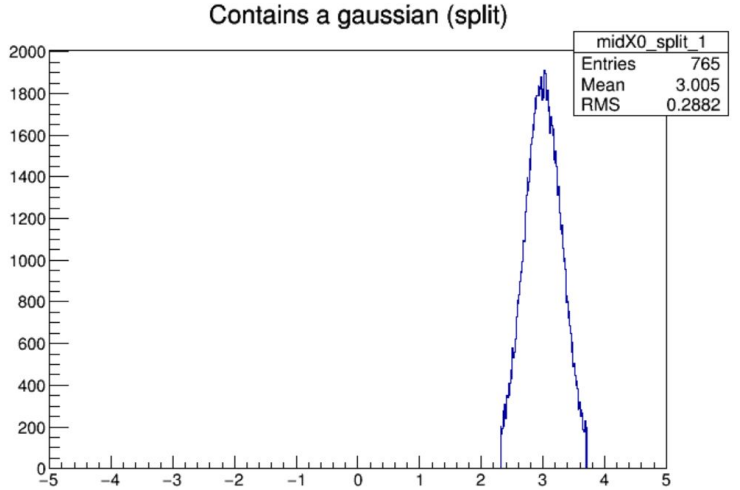
Finding peaks

Histograms are split between peaks

This creates 6 histograms per track







Track Reconstruction

- Peaks are converted into xy coordinates via a weighted integral
- Tracks are then reconstructed based on strict physical constraints
- If the peaks were too close in amplitude or an unexpected number of tracks are physically possible the data is discarded.
    - This prevents impossible or incorrect tracks but generates slightly
- Code has only been tested on simulated data

Track Visualization

- This visualization is from running the program on 12 histograms of data
- The blue line is from 6 histograms with 1 gaussian each
- The other two lines are from 6 histograms with 2 gaussians each