



CRT Reco

CRT Reco

CRT Track-TPC
Matching

CRT Reco and Halo Matching Update

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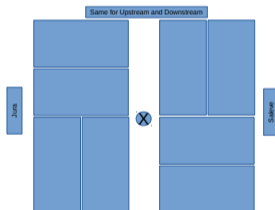
Methodology

CRT Reco

- Collect hits above threshold
- Create 3D hits matching X modules and Y modules using the averaged z-coordinate
- Match with TPC tracks, CRT hits, or MCC11 tracks.

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Thanks to Andrew for doing all of the simulation, geomtry work, and this diagram.



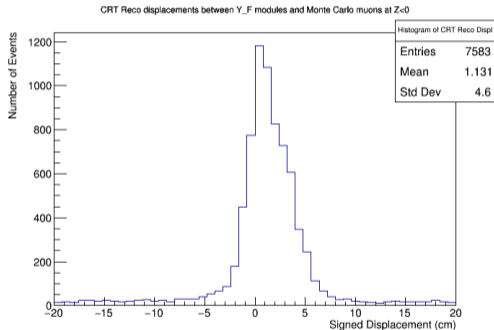
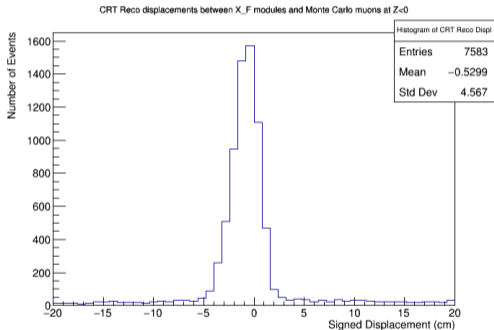
CRT Reco Update

CRT Reco

Ed Tyley is doing strip validation so improvements would come from either more statistics strip placement errors.

CRT Reco

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Displacement between MCC11 and 3D hits in X and Y for the Front

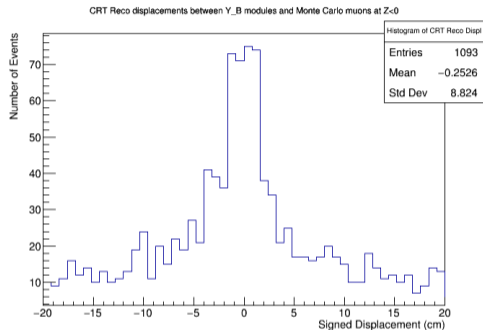
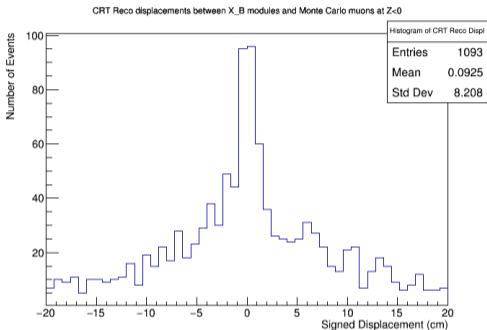


CRT Reco Update

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Displacement between MCC11 and 3D hits in X and Y for the Back using Halos

The back module hits were smeared by drawing the line from the MCC11 track BEFORE it hits the detector (it will obviously scatter a little bit)



Started with Two CRT hit-TPC matching using Arbin's framework.

- ① Take hits from the front modules and create tracks by combining them with back modules.
- ② Compare the CRT tracks to TPC tracks that traverse at least 5 meters in the detector.
- ③ Use some metric of angular or spatial displacement to select the best CRT track to match to the TPC track.



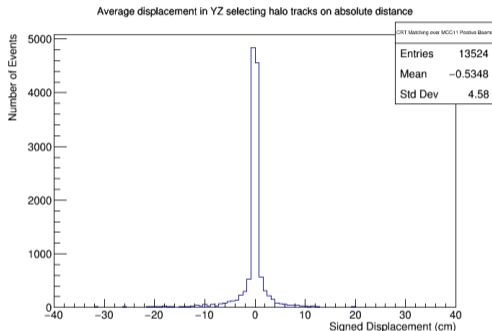
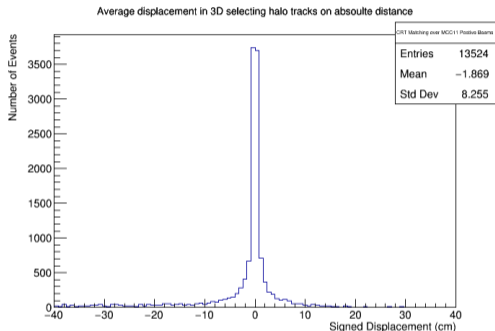
Two CRT Hit-TPC Matching

CRT Reco

Dataset was 7GeV beam with space charge effect and fluid flow on.

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Displacement between reco tracks and CRT tracks using Halos

Used distance from a point to a line to find displacement

(https://en.wikipedia.org/wiki/Distance_from_a_point_to_a_line)



Comparison to MCC10

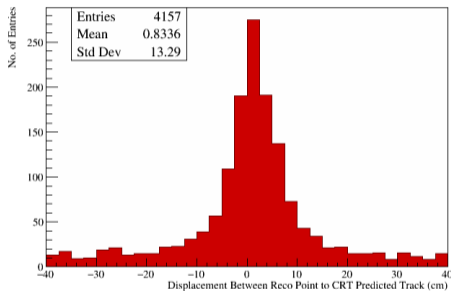
CRT Reco

Dataset is space charge effect on, fluid flow off.

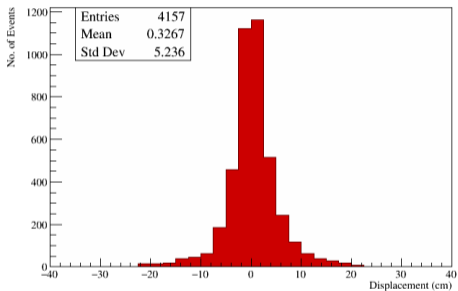
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Average Displacement Between Reco Track and EMT Prediction



Average Distance Between Reco Track and EMT Prediction in YZ Plane (Median of Absolute Value:2.275066)



Displacements with a toy model using MCC10

Differences in bias and standard deviation are currently being investigated.



Validation

CRT Reco

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Matching

Did validation on multiple sorting algorithms.

- Magnitude in displacement in YZ and XZ
- Displacement in YZ (TPC crossing method)
- Predicted hits in X compared to CRT hits (Arbin's)



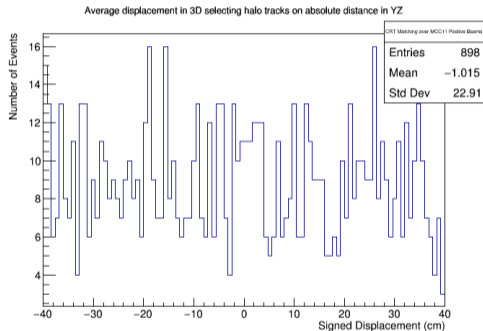
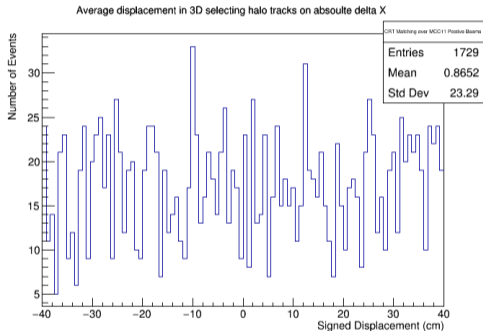
Validation

CRT Reco

Magnitude metrics: Avg -1.9 Std. 8.255

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Displacement between reco tracks and CRT tracks using Halos



Moving Forward

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- Run over all MCC11 datasets and "Good Run" datasets compiled by Francesca and Stefania.
- Publish CRT Reco Validation and Two CRT Matching modules.
- If there are any mistakes, please email me ASAP.