

CRT November Run Plans from the Software Side

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Introduction

- ① CRT basics and Goals for November Run
- ② CRT Coverage Issues and their “Solutions”
- ③ CTB Run Outlines

Who Uses the CRT

Analyses Using the CRT

- T0-tagging of tracks for SCE analyses (Mike and Hector)
- Use CRT tracks for SCE and TPC detector performance (Me)
- PDS attenuation studies (Bryan Ramson)
- T0-tagging for Michel Studies (Kyle Spurgeon)

What we Need in November

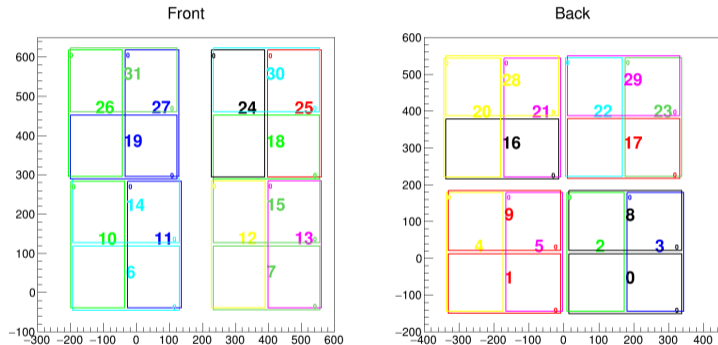
CRT triggers with TPC Data! More specifically we need more of two specific types of data.

- CRT data that covers the BR as much as possible:
- CTB triggers that gives through-going muons that travel as parallel as possible for electron lifetime and PDS attenuation analyses.

Note: As an unfortunate habit, when I say CTB study I mean a run targeting PDS attenuation studies and when I say CRT study I mean a general CRT run.

CRT Basics

- US modules on the LHS are 10 m in front of the TPC, the US RHS is 2 m in front, and all DS modules are 10 m from the front of the TPC.

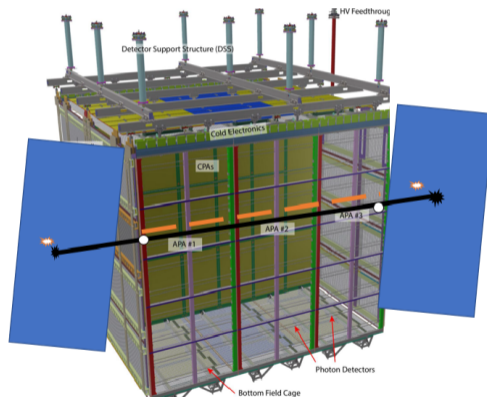


CRT Geo Channel Map Visualized (From Tingjun Yang)

Notice how poor coverage is BR ($x < 0$). Could use spares there.

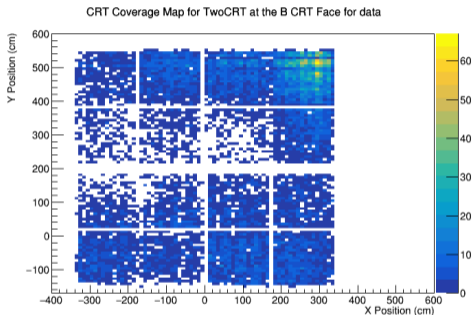
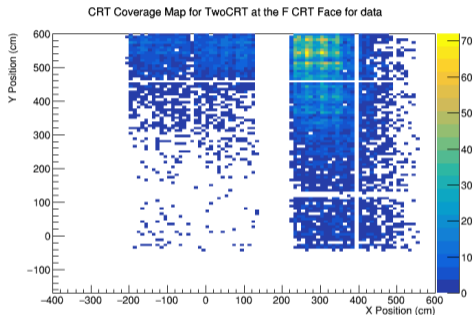
Matching Methodology

- Match using US OR DS (single CRT) or US AND DS (two CRT).
- Minimize Δx and Δy between TPC's predicted CRT hit and the reco CRT hit.



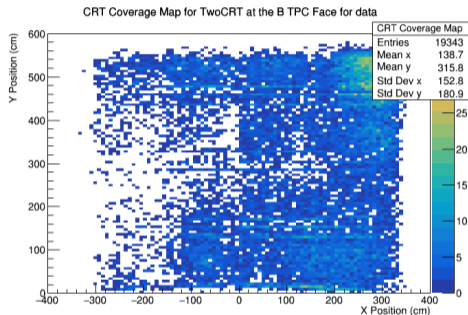
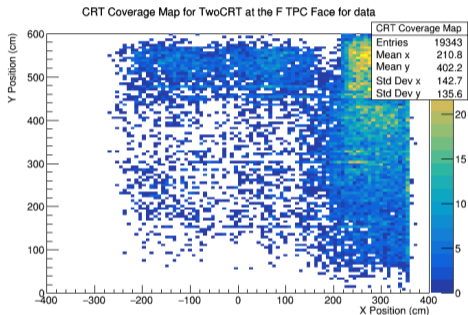
Example of CRT (black) and TPC (orange) track analysis. The white “hits” represent predictions we could make comparing the two tracks.

Coverage Maps during Beam Runs



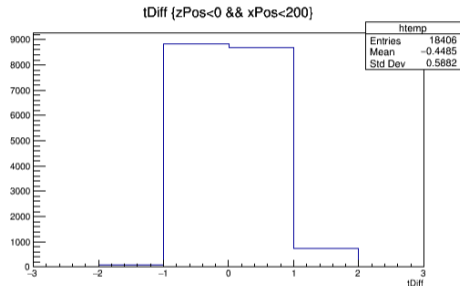
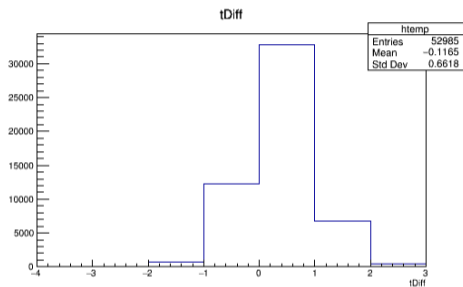
Coverage maps on the CRT faces from a collection of runs 58XX

Coverage Maps during Beam Runs



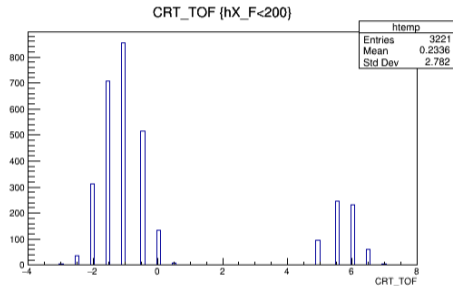
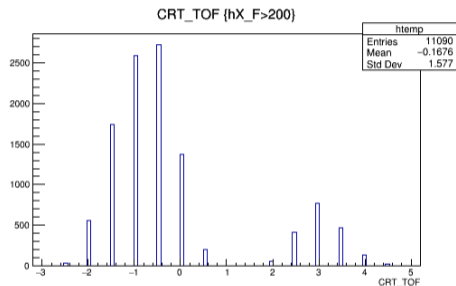
Coverage maps on the TPC faces from a collection of runs 58XX

Timing between X and Y Modules



Module timing differences between X and Y for all modules (left) and just BR US (right) from approx. 100 events in run 9772.

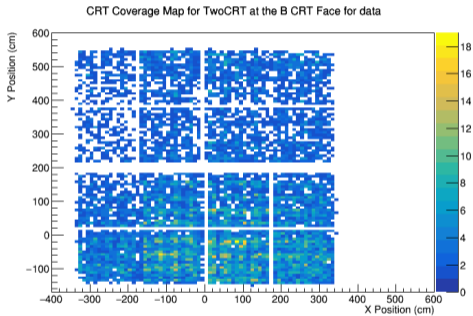
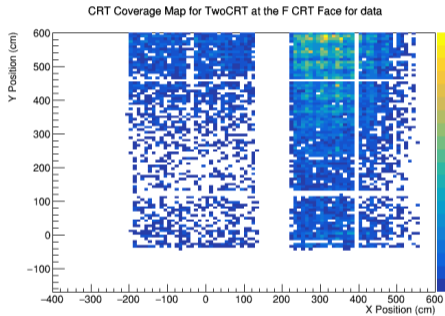
TOF for CRT



TOF from US to DS through the BL path (left) and the BR path (right) from run 9772.

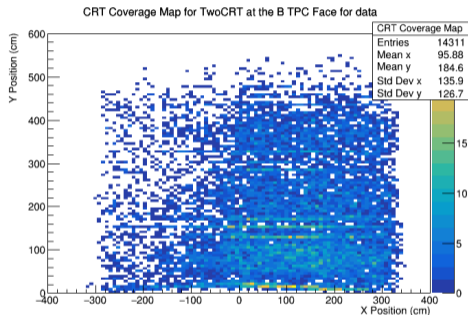
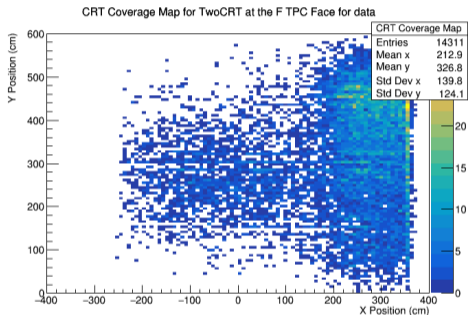
CRT Coverage Maps Post-Resuscitation

Change CTB TOF to 100 ns.



Coverage maps on the CRT faces for run 9772

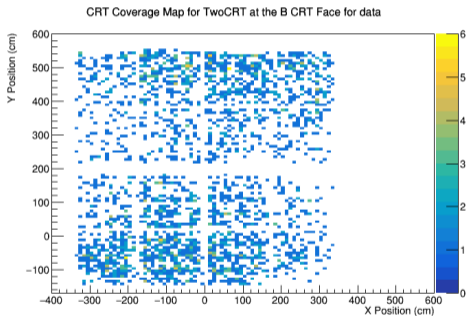
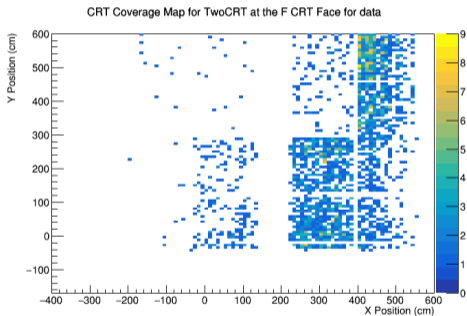
TPC Coverage Maps Post-Resuscitation



Coverage maps on the CRT faces for run 9772

Shielding BL Coverage Maps

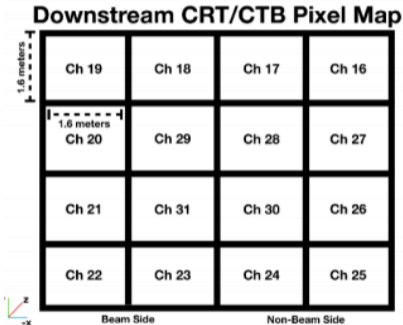
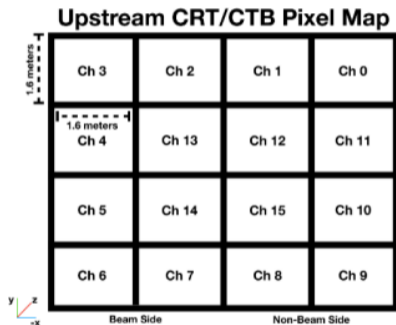
Maybe BL CTB triggers give too much noise. However, either setting not right or not high enough purity in CTB BR triggers.



Coverage maps on the CRT faces for run 9817

CTB Runs Next Week

After DAQ testing, will test CTB pixel combinations. Need to understand prescaling necessary to give enough straight tracks.



CTB Map (From Bryan Ramson). Remember the offsets.

Conclusion: Future Run Plans

- Need to run the CTB-PDS tests before we finalize what November should look like and figure out how to maximize BR coverage.
- Ideally, we would split runs between general CRT runs and these specialized CTB runs PDS needs with heavy preference for general runs.

Input welcomed! I asked around and this is what I could come up with.