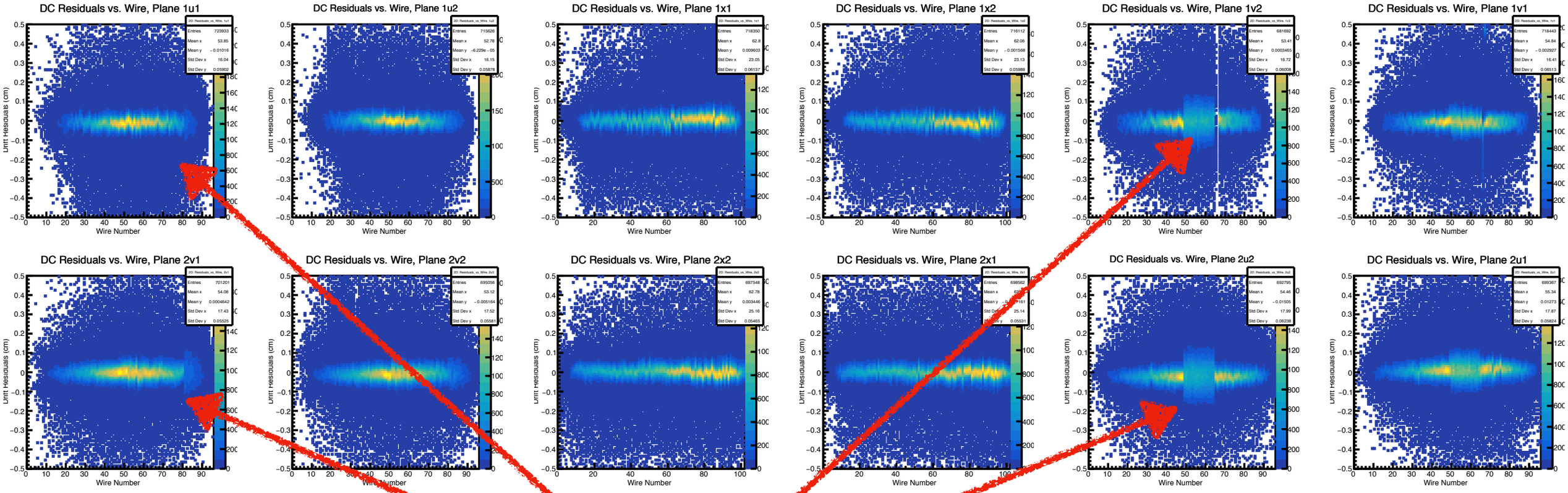
HMS DC Calibration: Oddities Observed in Residuals

Carlos Yero
July 3, 2018

1 PASS (2.2 GeV Beam):
HMS RUN 1267

DC RESIDUALS

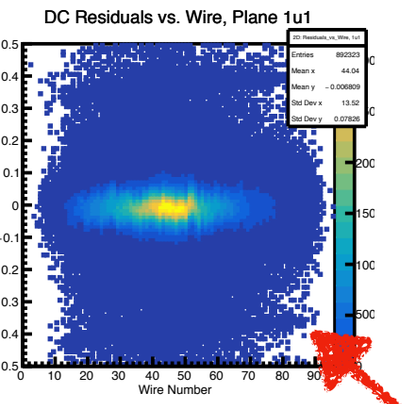


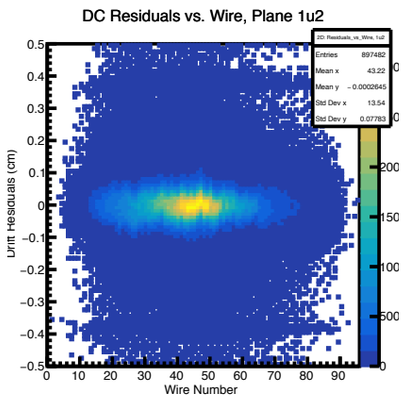
Observed Bad Residuals Corresponding to group of Wires. ALL in TDC Slot 2

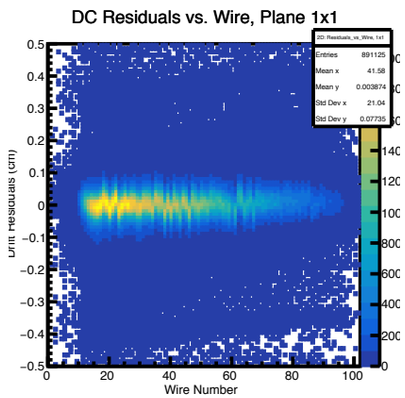
HMS Hut Crate, TDC SLOT2
Plane 1u1 (81-96)
Plane 1v2 (49-64)
Plane 2v1 (81-96)
Plane 2u2 (49-64)

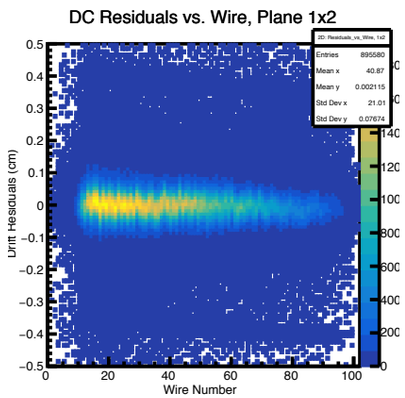
5 PASS (10.59 GeV Beam):
HMS RUN 1856

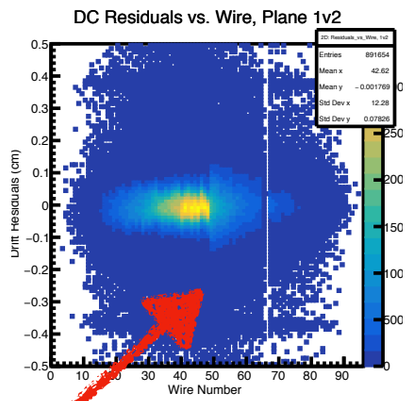
DC RESIDUALS

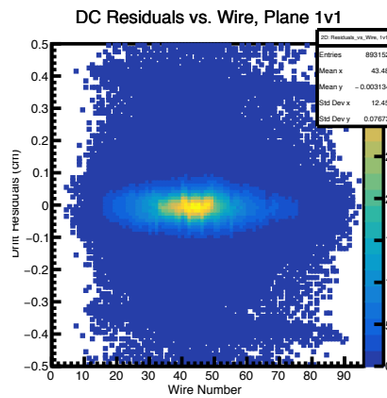


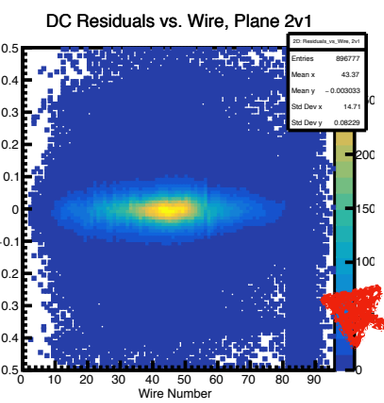


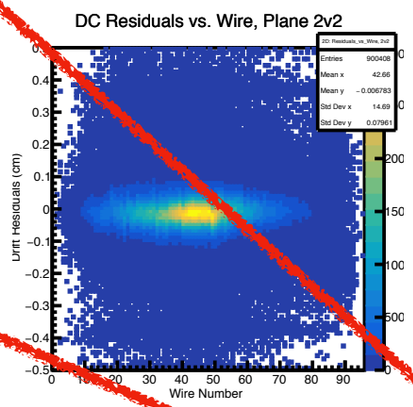


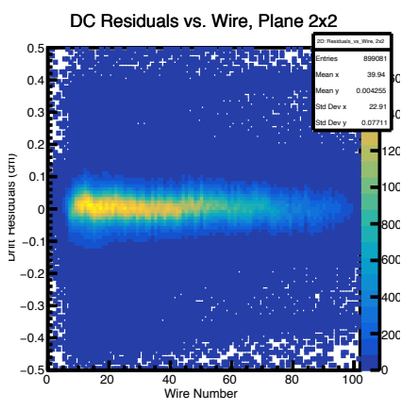


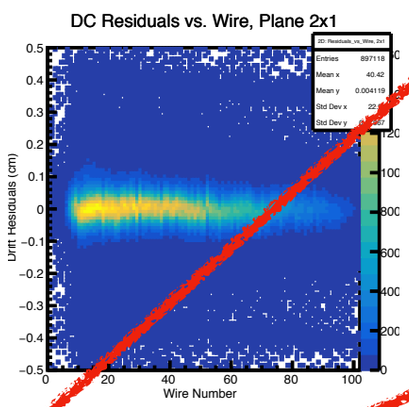


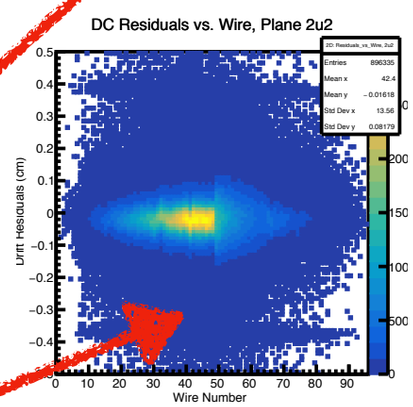


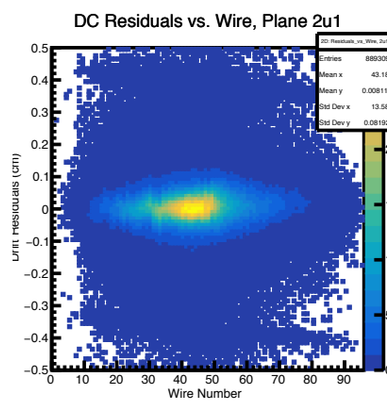










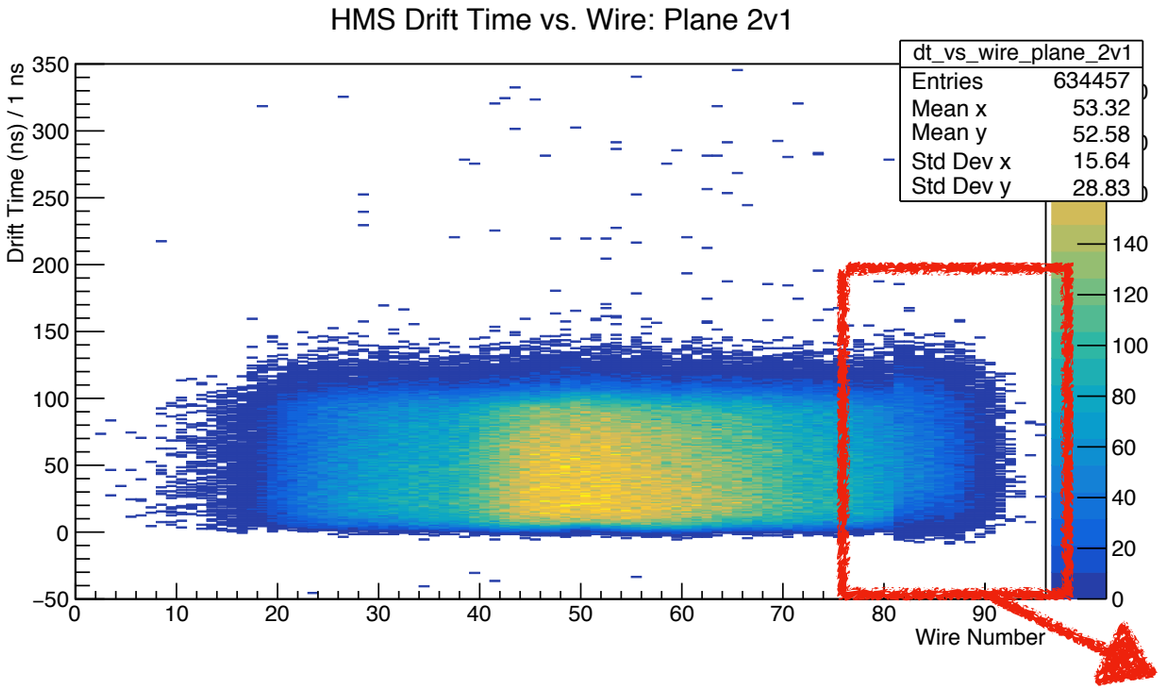


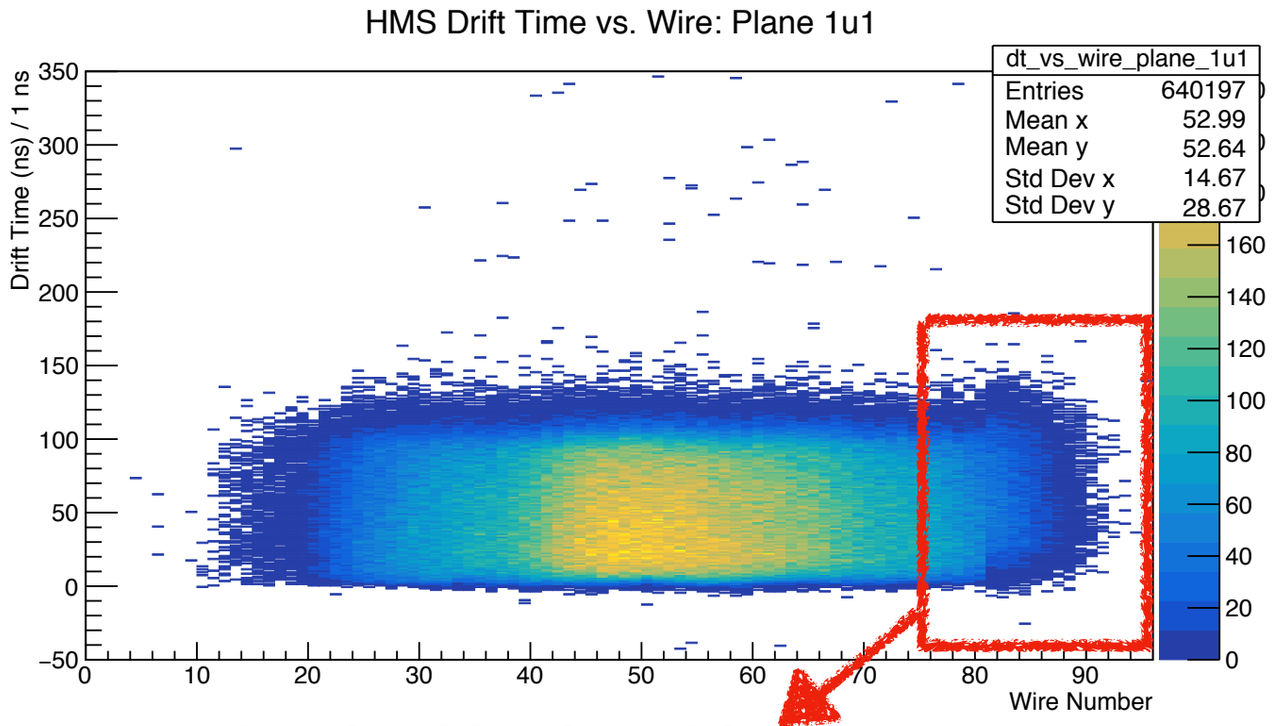
Observed Bad Residuals Corresponding to group of Wires. ALL in TDC Slot 2 (Edge wires are less obvious)

HMS Hut Crate, TDC SLOT2
Plane 1u1 (81-96)
Plane 1v2 (49-64)
Plane 2v1 (81-96)
Plane 2u2 (49-64)

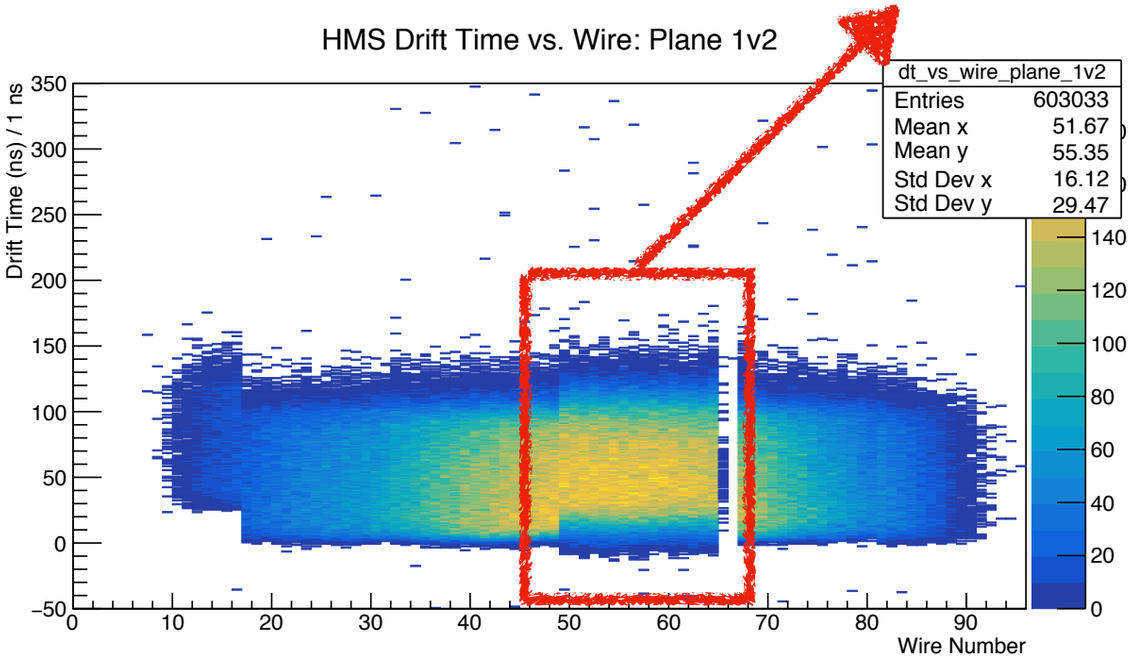
1 PASS (2.2 GeV Beam):
HMS RUN 1267

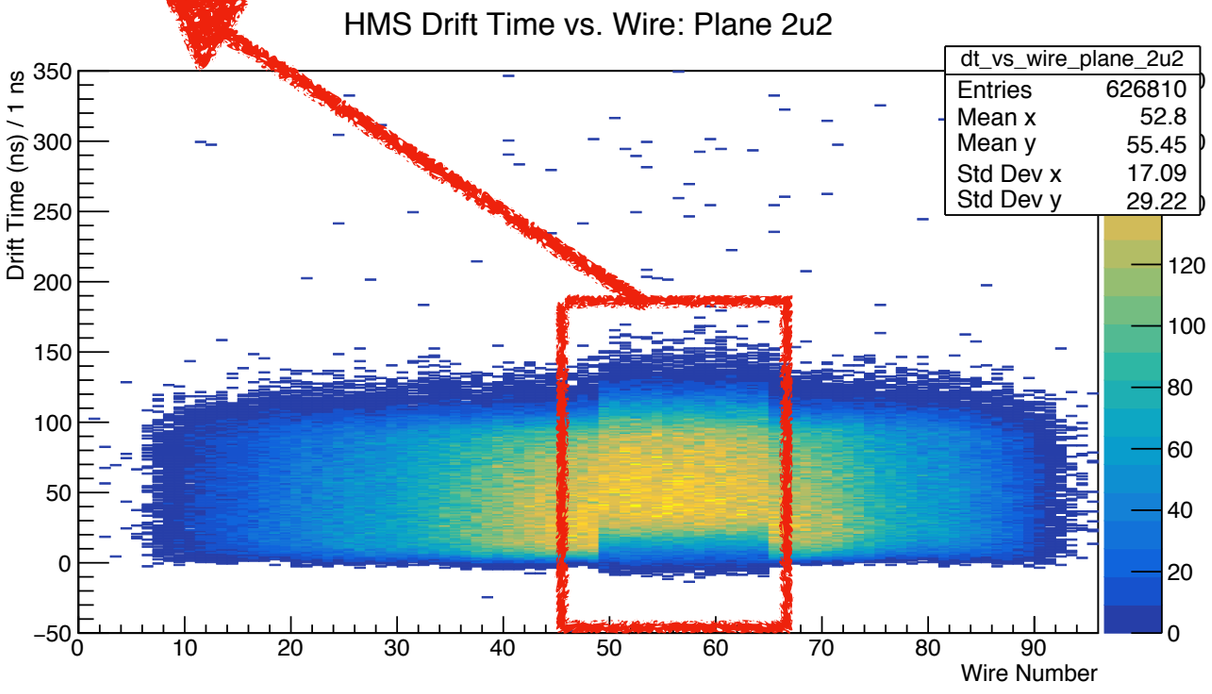
DC Drift Times vs. Wire



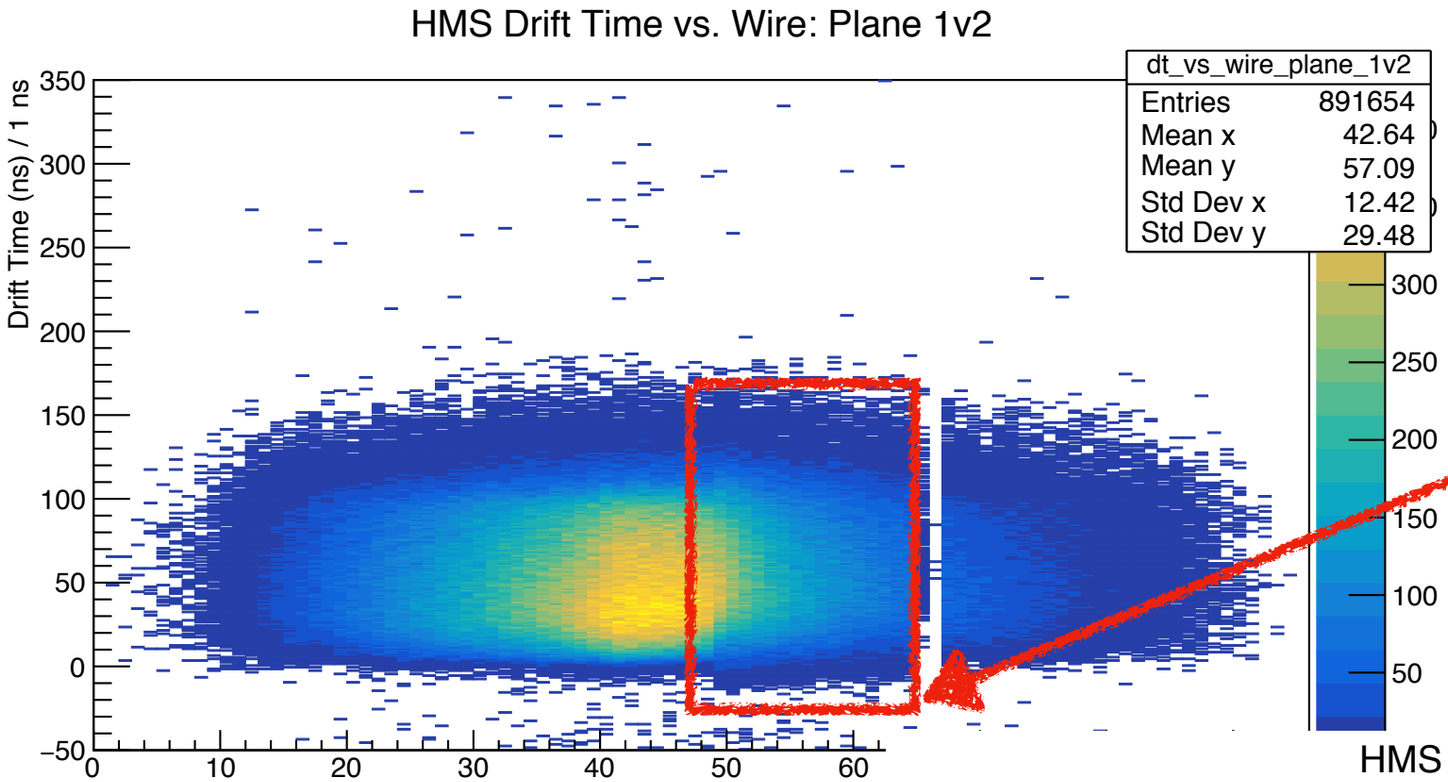


Odd Drift Times for the same groups that had bad residuals





5 PASS (10.59 GeV Beam):
HMS RUN 1856



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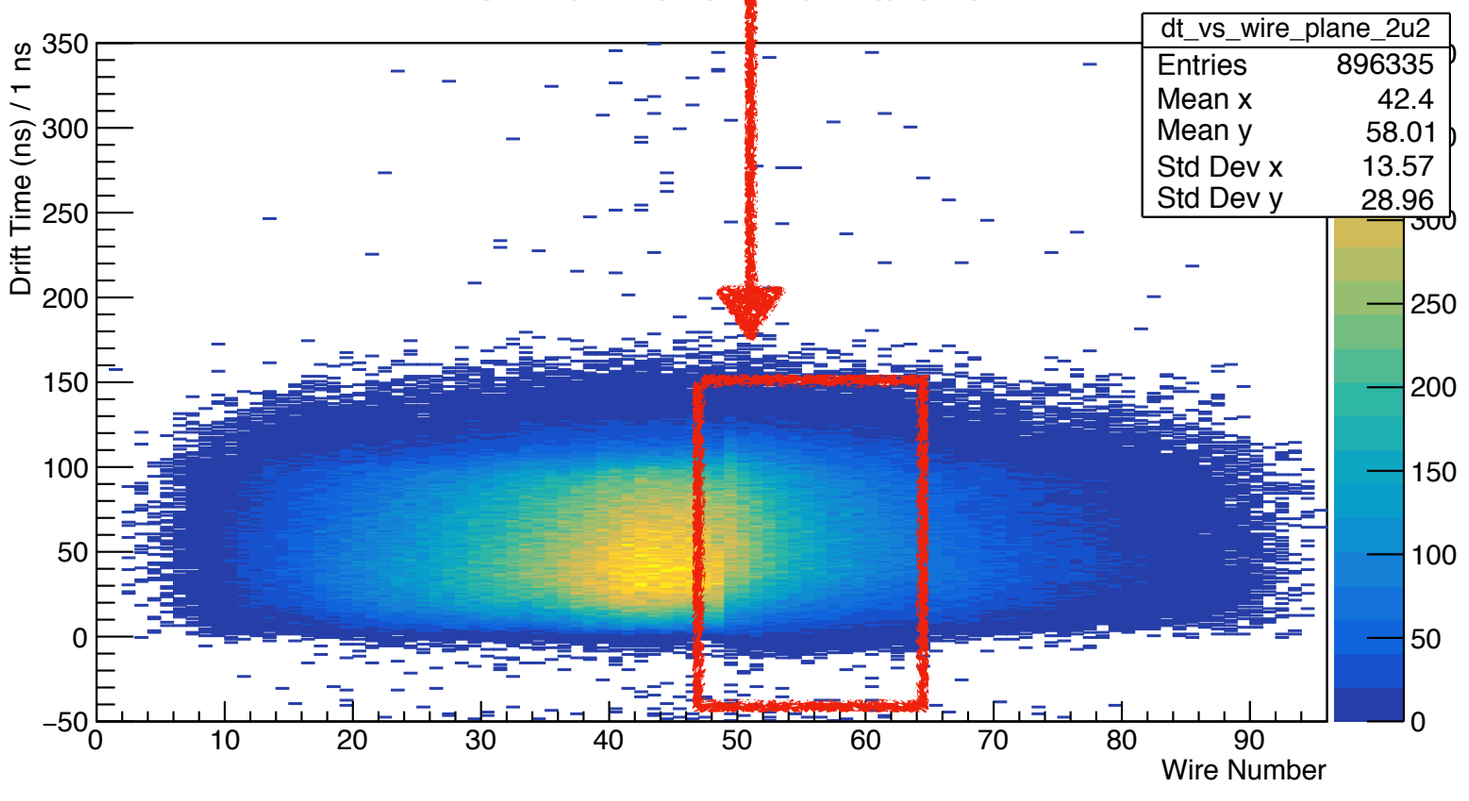
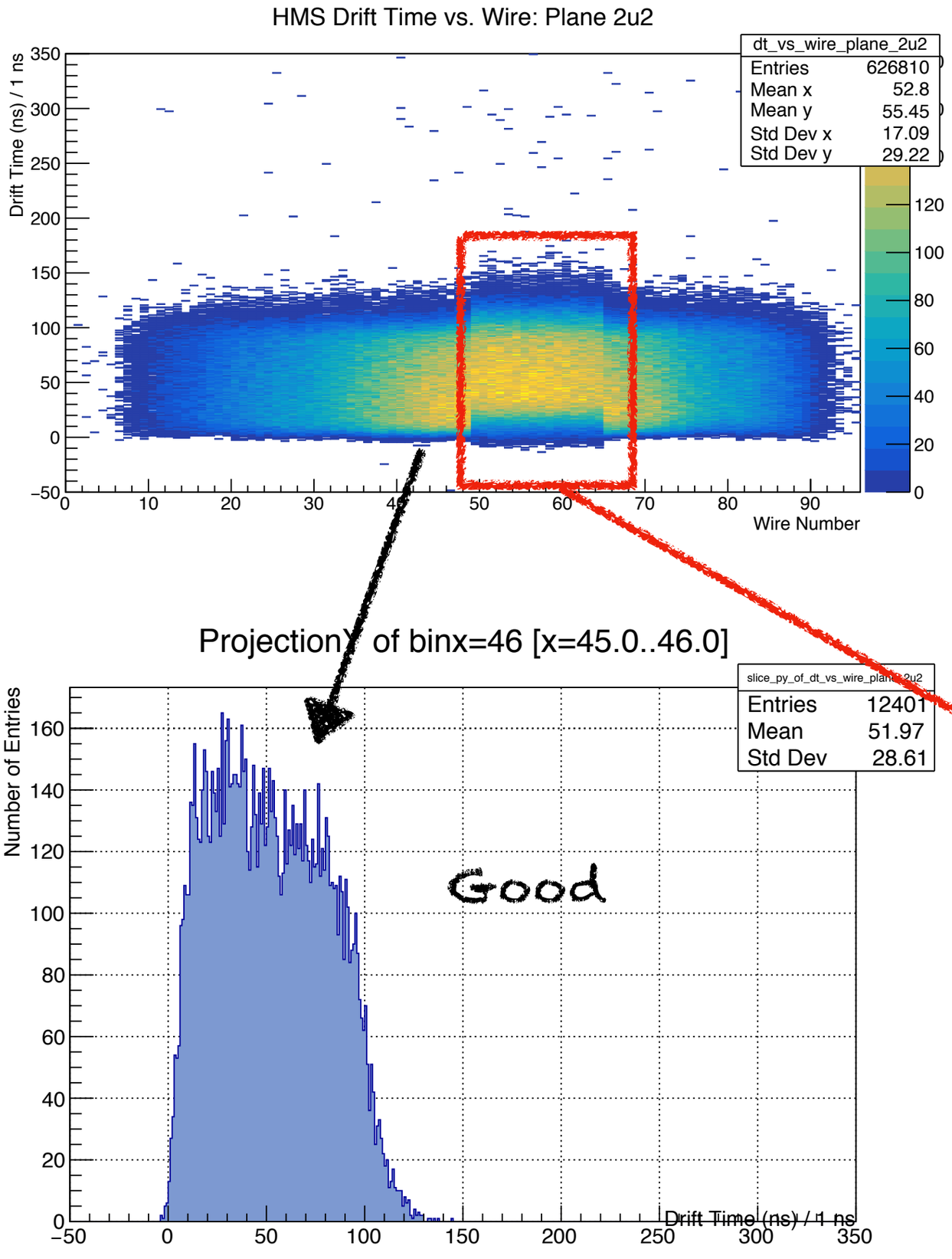


The other groups of edge wires From this run were not that obvious, And were not included

1 PASS (2.2 GeV Beam):
HMS RUN 1267



It is as if SLOT 2 TDC, is NOT determining the Right reference time and so it appears to be OUT of SYNC

NOTE: This was the slot that Had an abnormal shift in time, so the DC calibration Need to correct for this.

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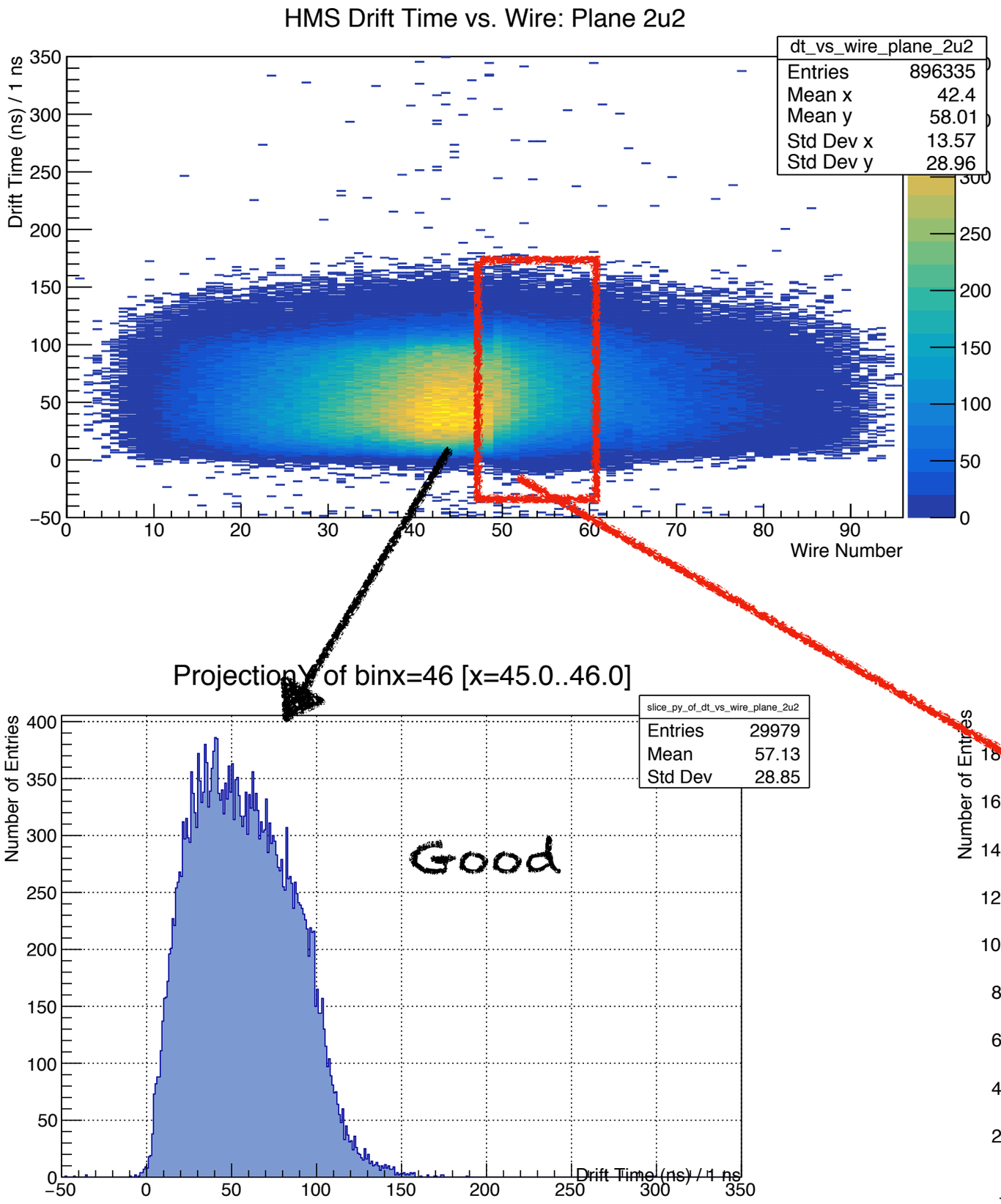
HMS RUN 1856



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Conclusion

- **The region of bad residuals is consistent between different runs, and seems to be coming from the same TDC SLOT 2, which has been known to have this Weird time offset.**

- **This problem observed in the residuals was hidden by another problem with The horoscope start-time being subtracted twice from the tdc time. But after this 'start-time' problem was solved, it uncovered, this other problem with the residuals.**

- **After discussing with Mark Jones, we came to the conclusion that these odd drift times observed stemming from the same tdc module, had to do with the module itself, and NOT the chamber.**

The TDC Module in SLOT 2 of the HMS DC crate should be replaced before starting the FALL 2018 Run Period