Analyze of the Gaushitfinder

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Outline

- Goals for this Project
- Description of Data and Parameters
- Results
- Conclusion
- Further Studies

Goals

- Confirm studies by Jonathan
- Make standard histograms for the gaushitfinder
- Study the single hit resolution of the GausHitFinder
- Study the disambiguation with multiple hits on a wire

Data that is used

- Single muon events
- 10 events
- Same starting points but different momentum
- Energy 2 GeV

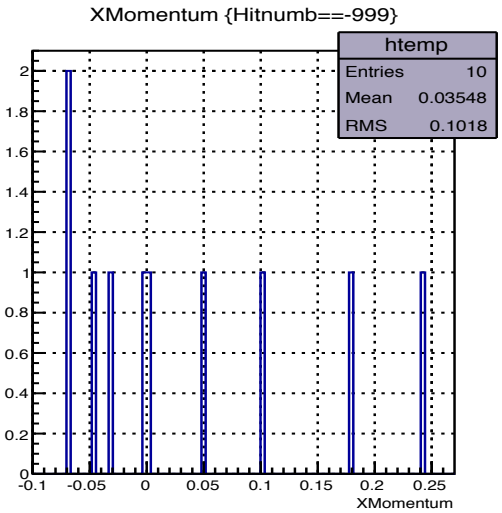
Parameters for the Reco

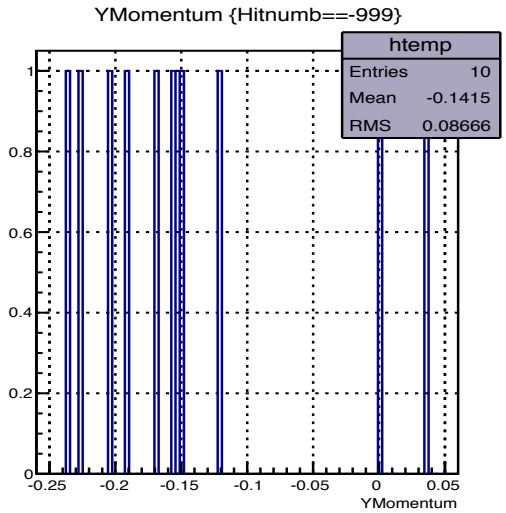
Parameter	Value	Explanation
MinSigInd	6.0	Induction signal height threshold
MinSigCol	11.0	Collection signal height threshold
IndWidth	6.0	Initial width for induction fit
ColWidth	7.8	Initial width for collection fit
IndMinWidth	4.0	Induction Hit width threshold
ColMinWidth	6.0	Collection hit width threshold
MaxMultiHit	3	Maximum hits for multi fit
AreaMethod	0	0= Area by integral (1=area by gaussian)
AreaNorms	[13.25 , 26.31]	Normalizations to put area in same scale as peak height

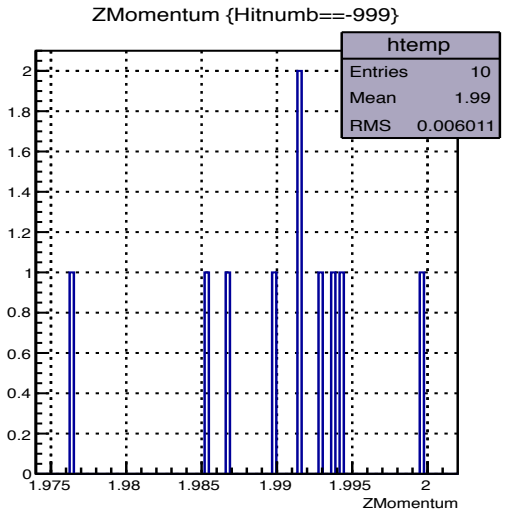
Parameters in the Histograms

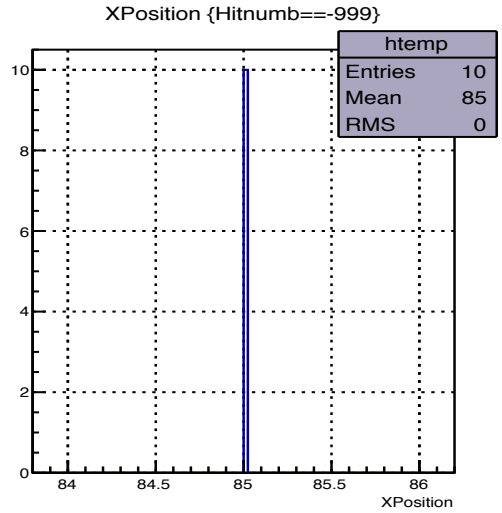
- True: Comes from HitCheater
- Multiplicity : How many gaussianfits on the wire
- PeakTime: Match first hit in HitFinder with first in HitCheater
- Wirenumbers: distributions in u, v and w planes
- Z-positions: X-position distributions in u, v and w planes. Calculated as Starttime times the driftvelocity. Are also compare for different multiplicities.
- HitWidth: (EndTime-StartTime) per hit
- Amplitude: maxvalue for Charge per hit
- Area: Integral of the Charge per hit

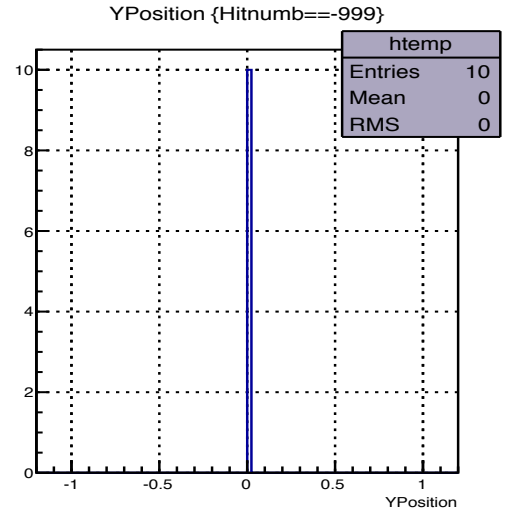
Kinematics of the Events

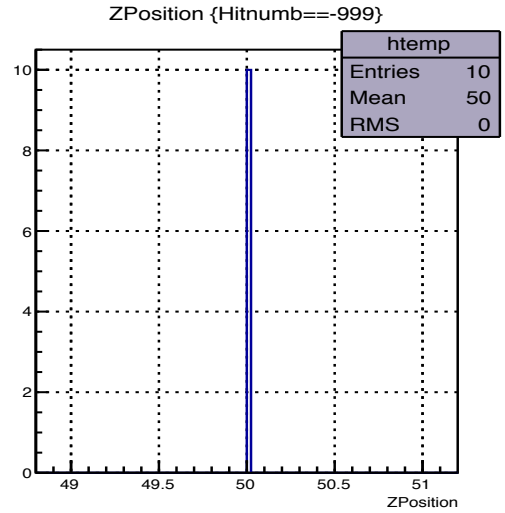




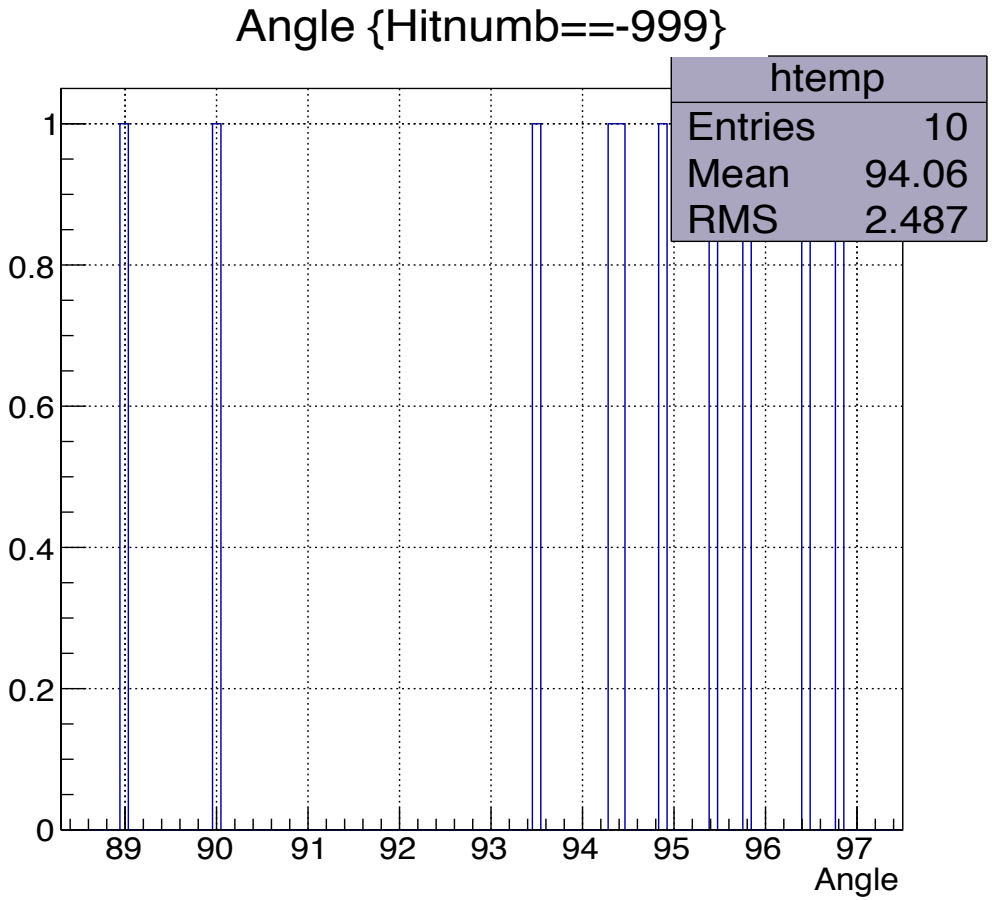




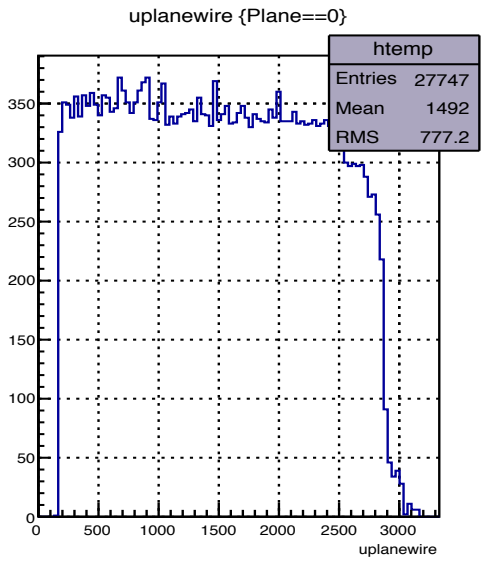


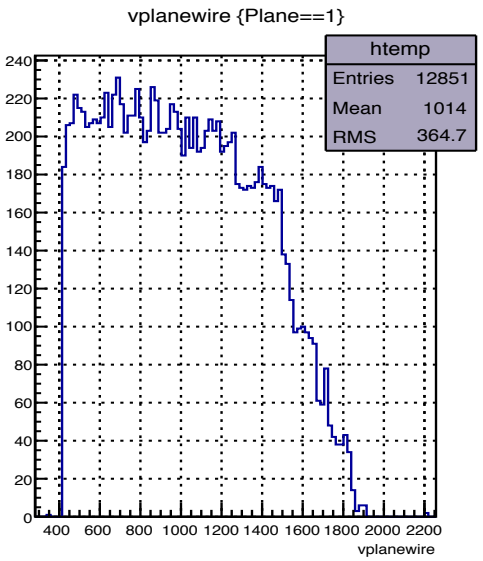


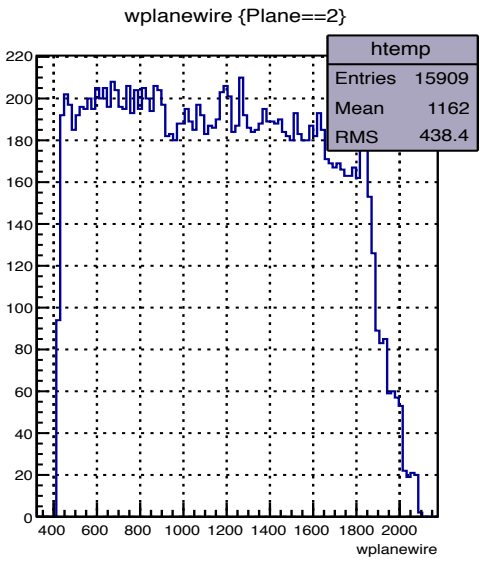
Angles between the track and the z-axis



Wire distribution in the Detector

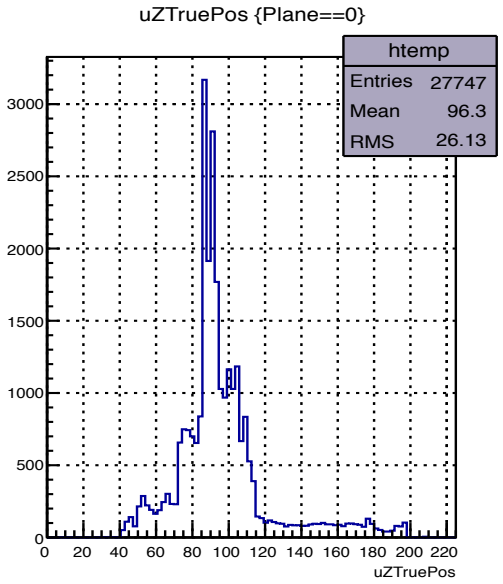


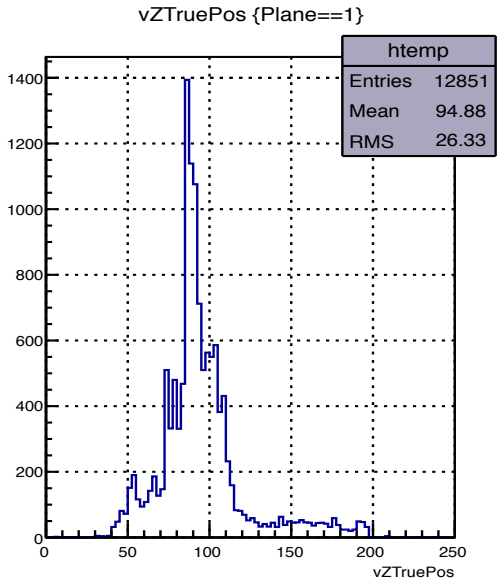


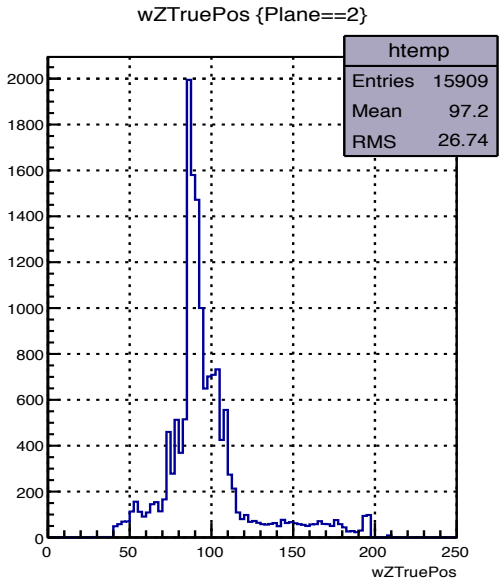


For the u, v and w plane

X-position (drift distance) distribution in the Detector

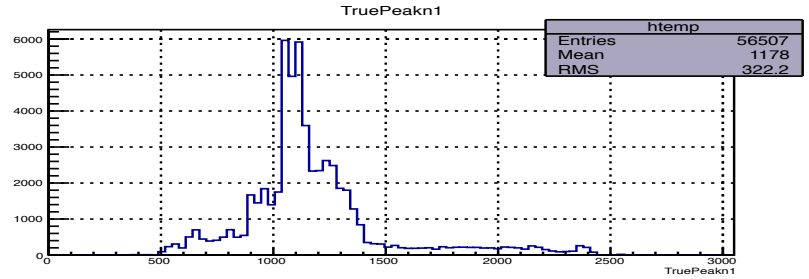


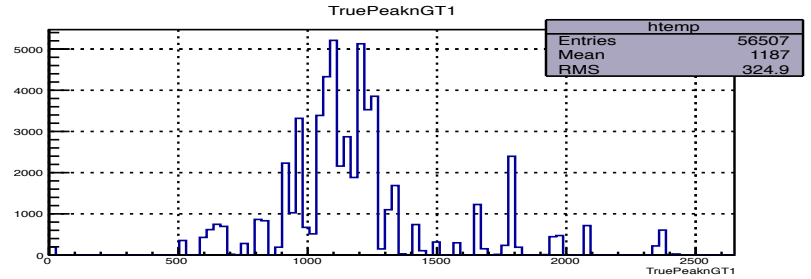


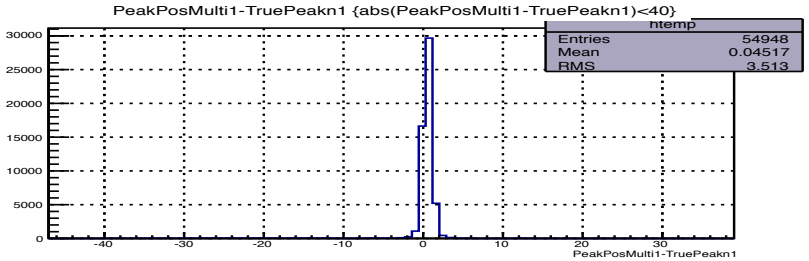


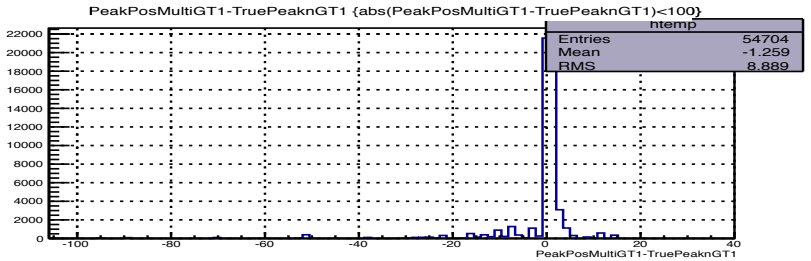
For the u, v and w plane

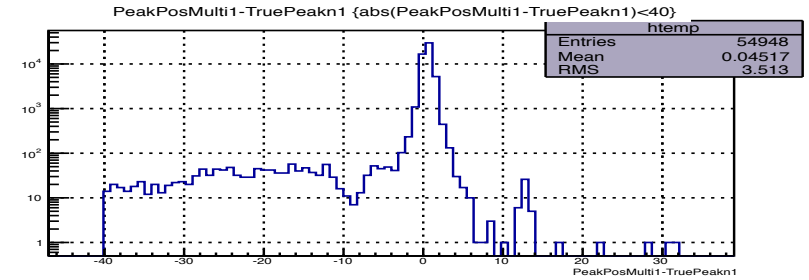
Comparing PeakTime between HitCheater and HitFinder for multiplicity 1 and GT1

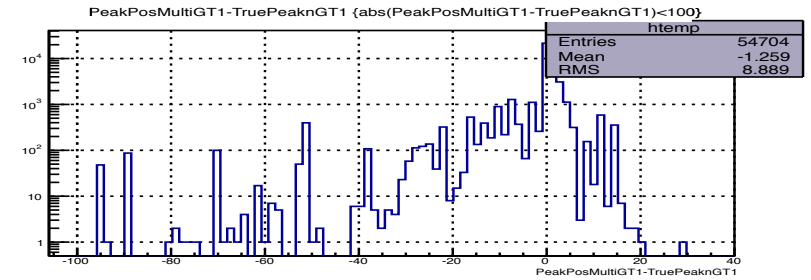




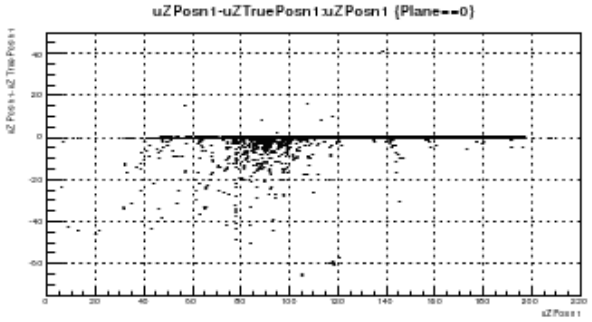


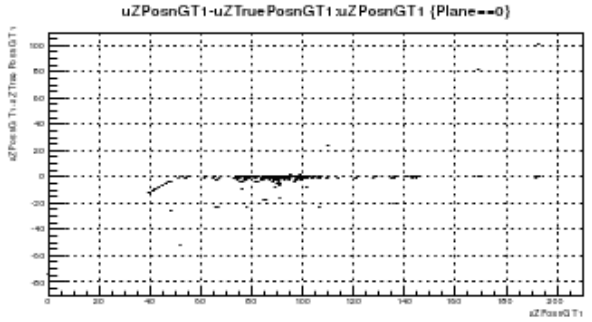


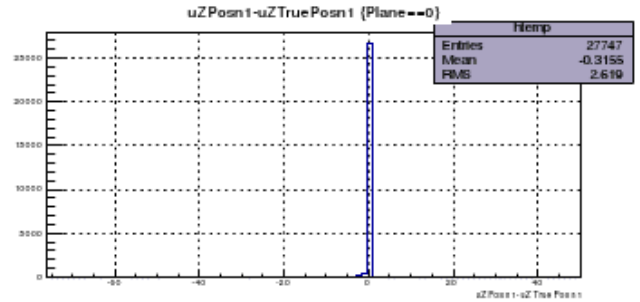


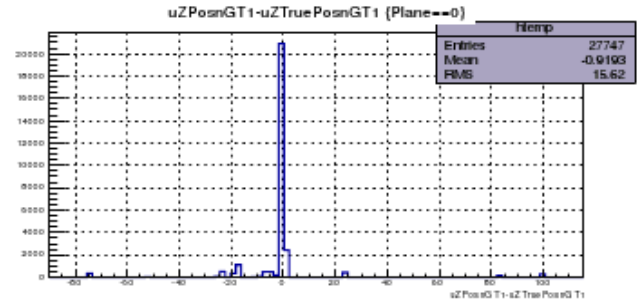


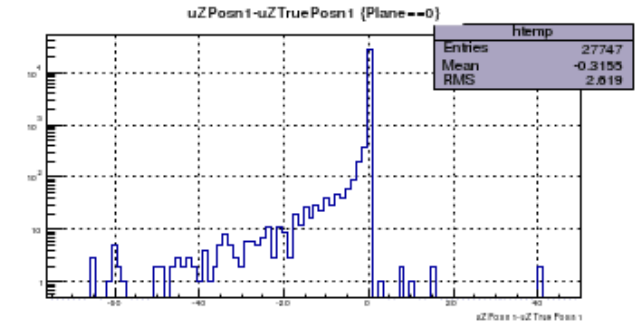
Comparing drift distance in the U-plane between HitCheater and HitFinder for multiplicity 1 and GT1

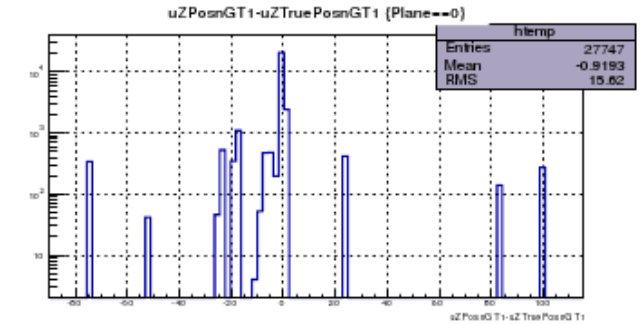




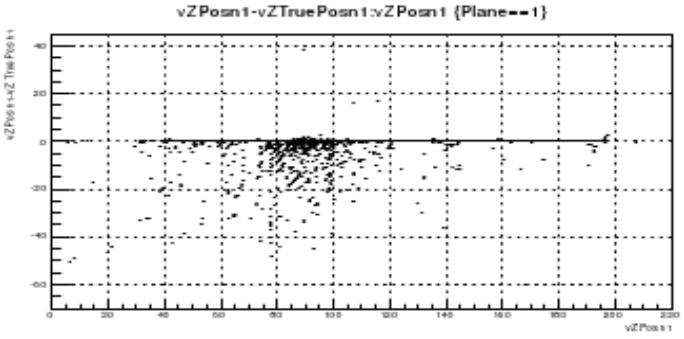


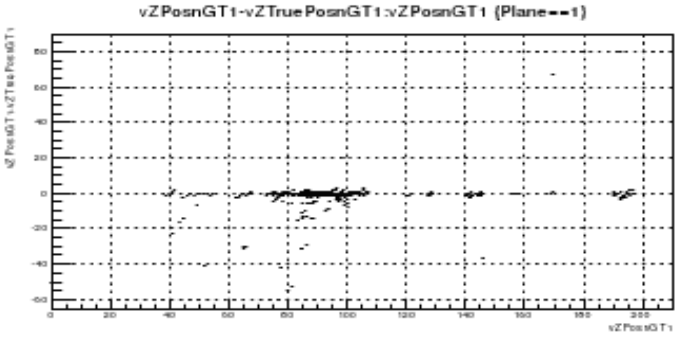


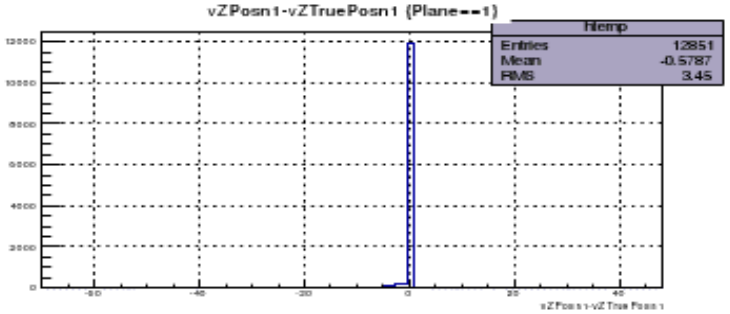


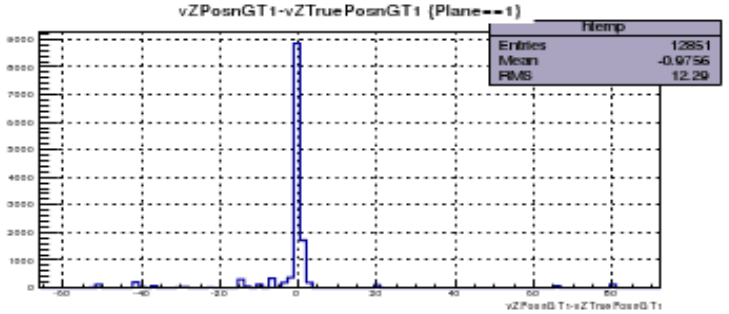


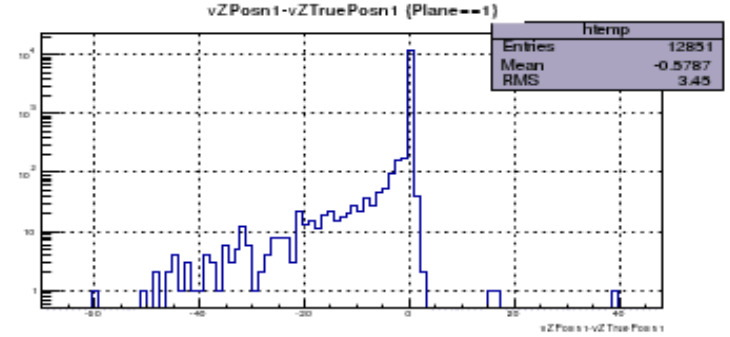
Comparing drift distance in the V-plane between HitCheater and HitFinder for multiplicity 1 and GT1

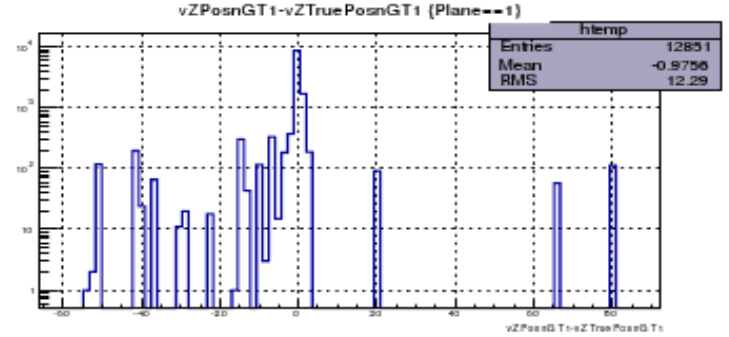




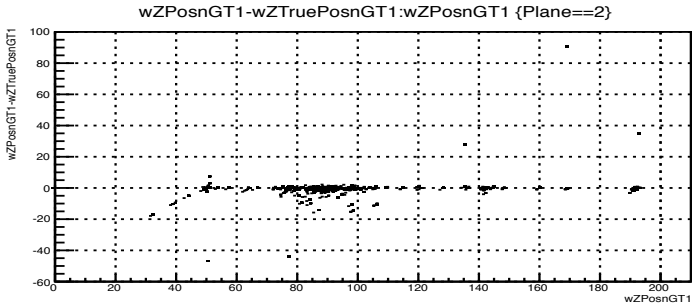


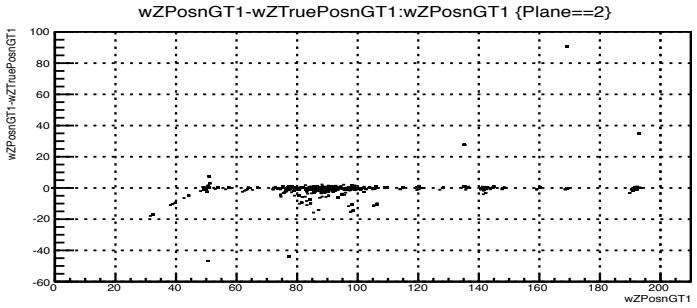


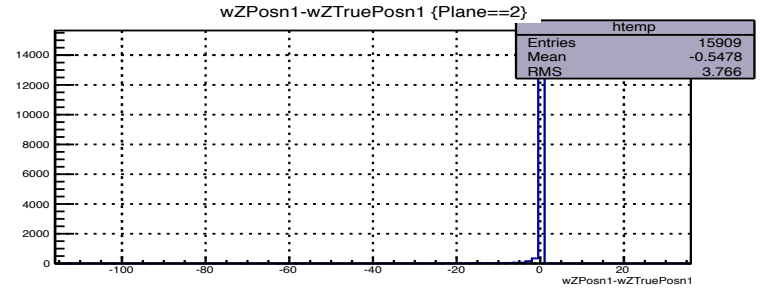


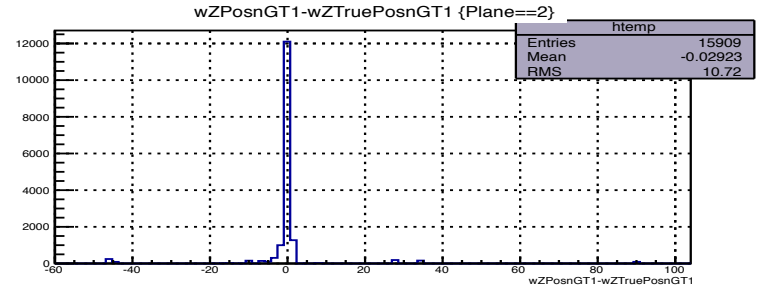


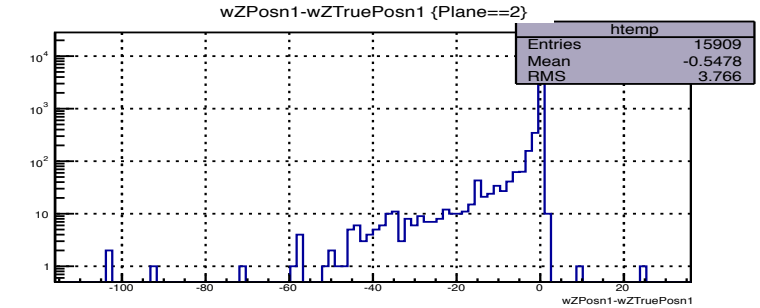
Comparing drift distance in the W-plane between HitCheater and HitFinder for multiplicity 1 and GT1

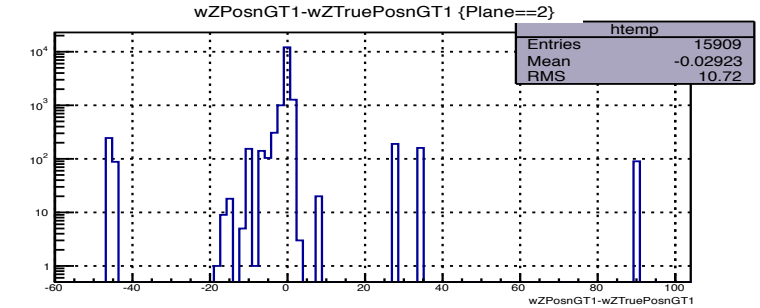




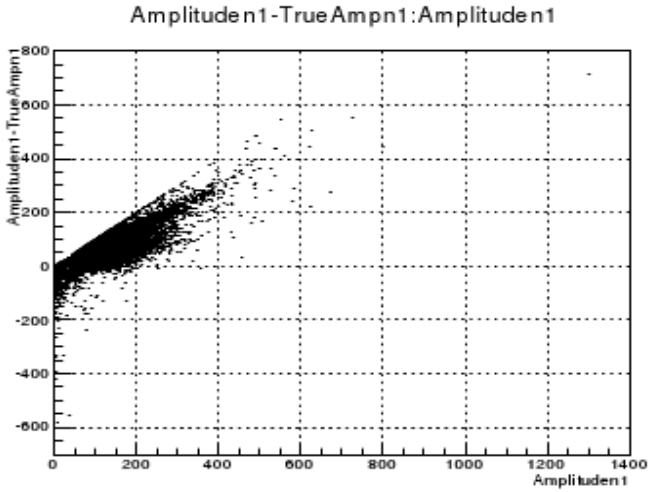


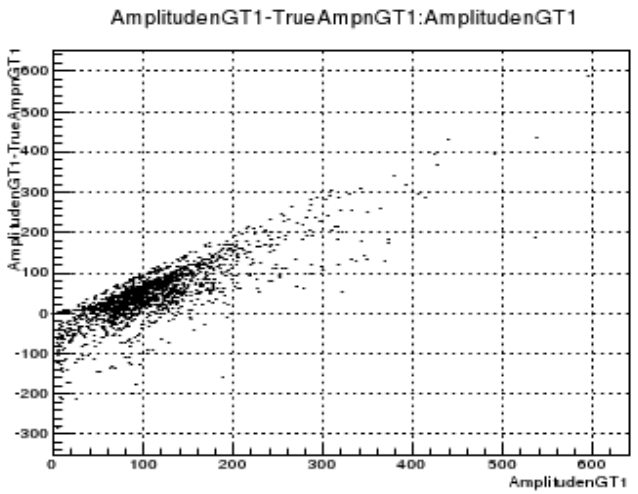


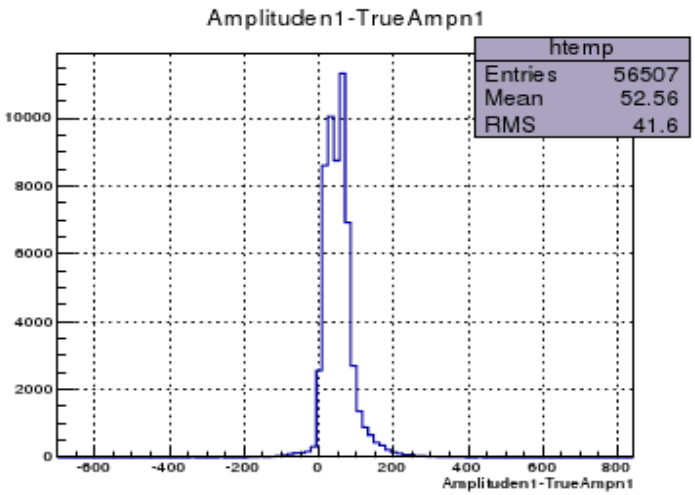


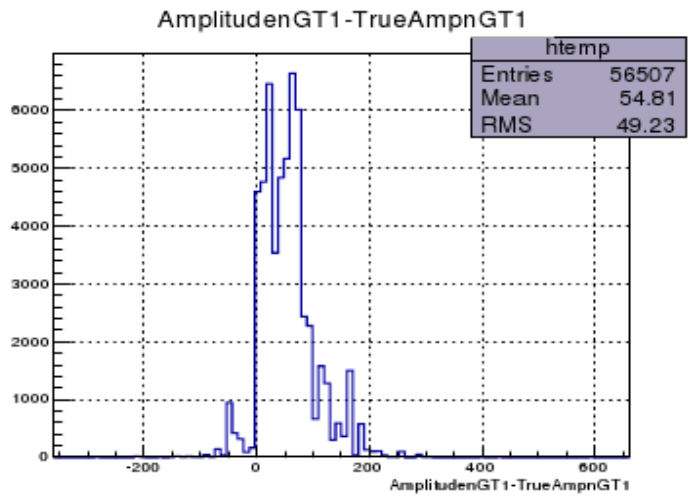


Comparing the Amplitude between HitFinder and HitCheater for multiplicity 1 and GT1

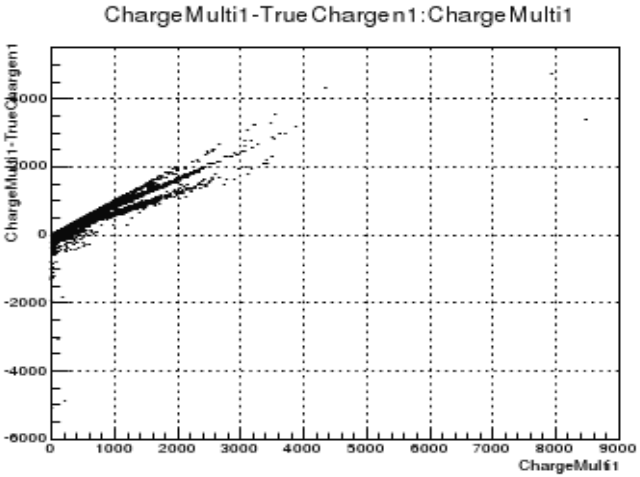


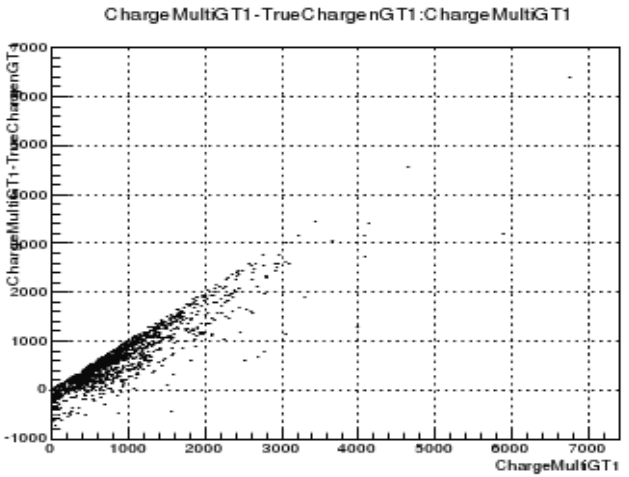


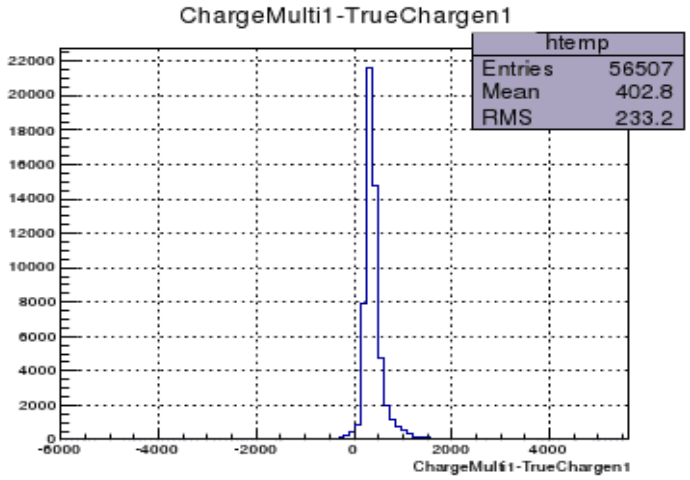


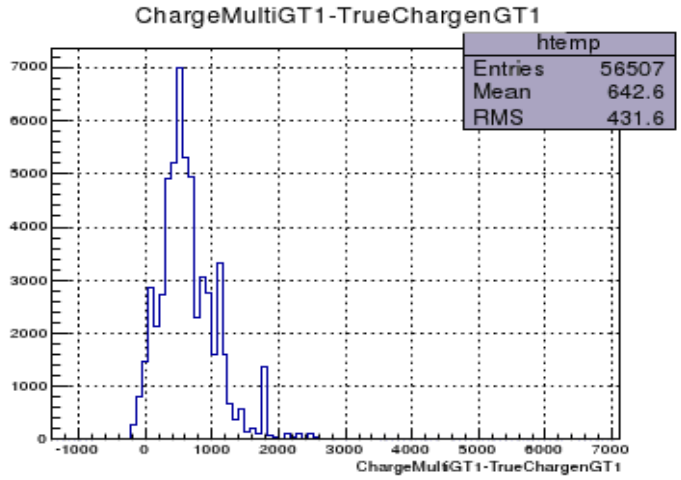


Comparing the Area between HitFinder and HitCheater for multiplicity 1 and GT1

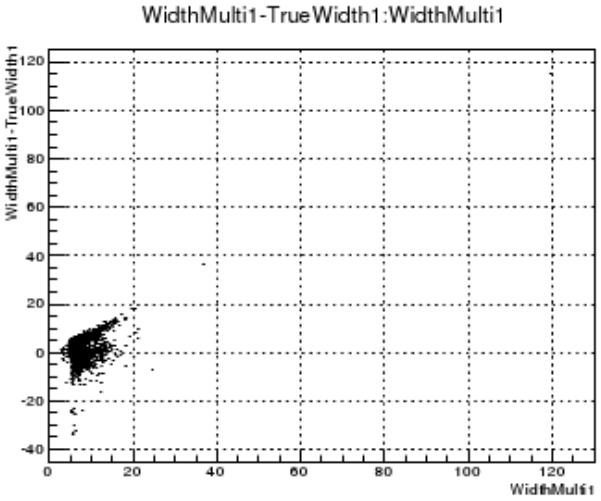


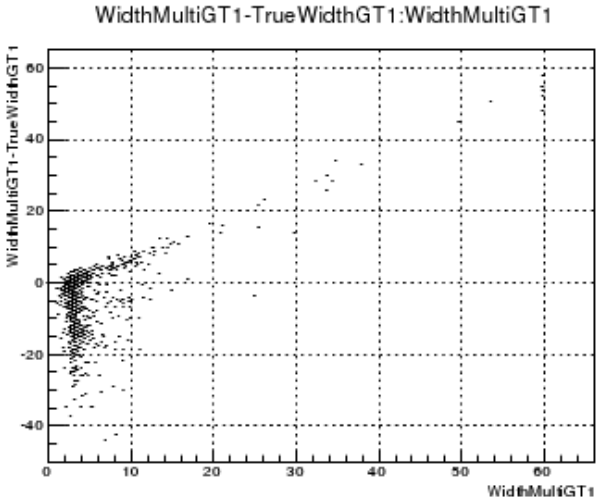


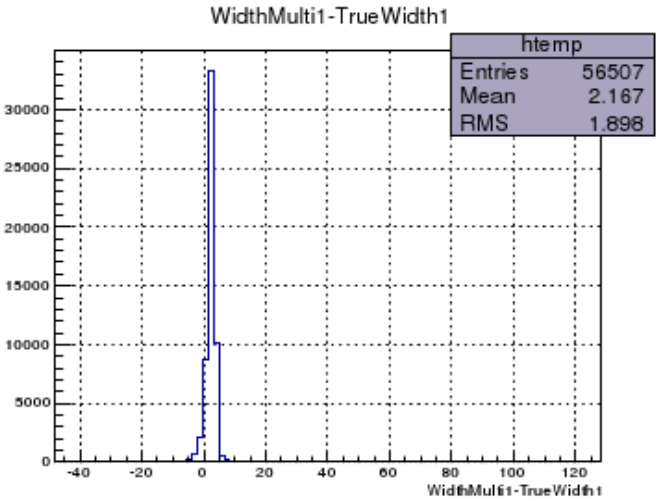


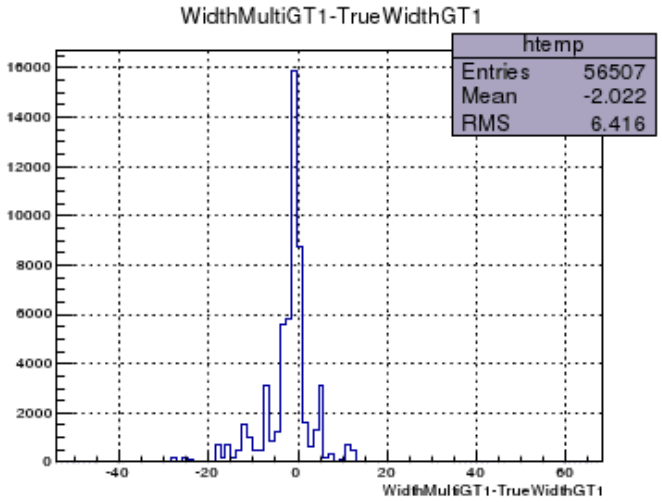


Comparing the Width between the HitFinder and the HitCheater for multiplicity 1 and GT1









Conclusions

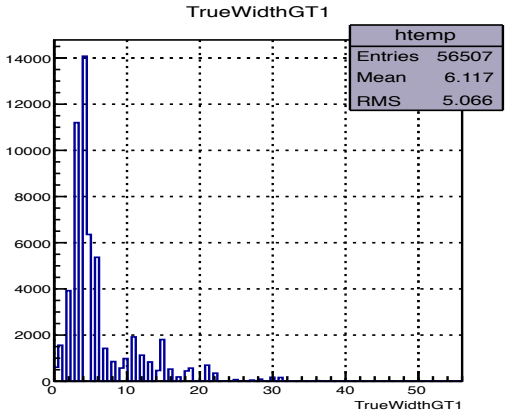
- Seing the same effects that Jonathan saw with tales on the left side of the deltas.
- Overall better resolution for multiplicity 1 than GT1
- The resolution is worse with higher Amplitude, Area and Widths.

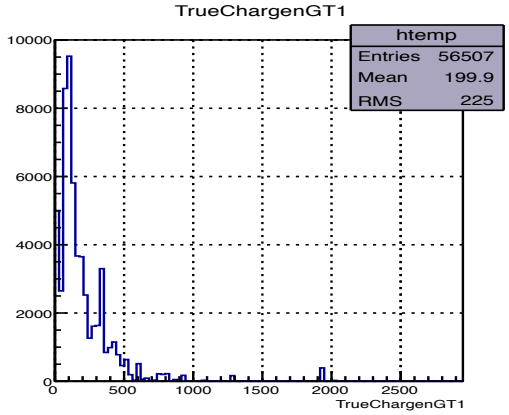
Further Studies

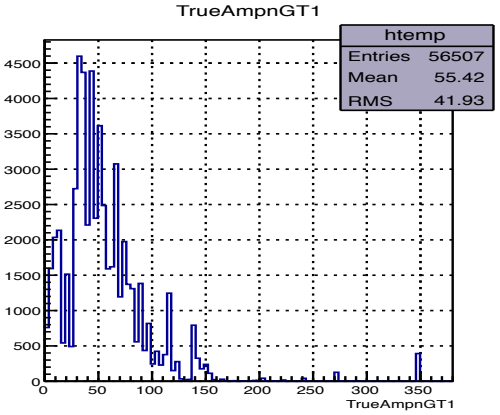
- Do the same but for more events to get a distribution over the whole detector and see how it behaves around 60 degrees.
- What is the disambiguation for how close 2 hits can be?
- Figure out a more exact method to match the hits
- The plan is to use this as a unit test for hitfindermodules

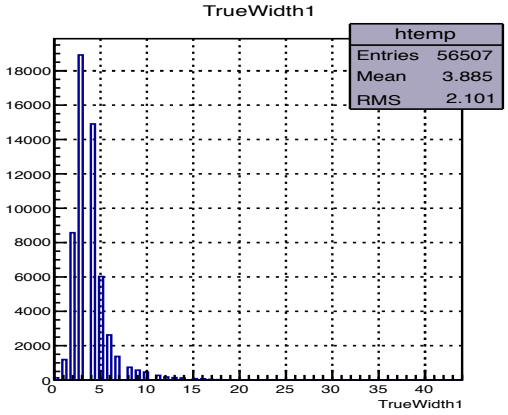
Thank you for the Summer!

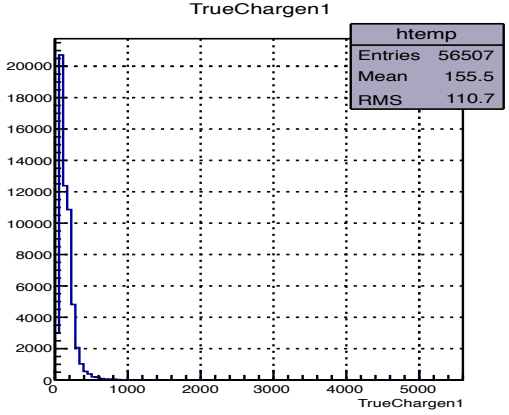
Backup Slides

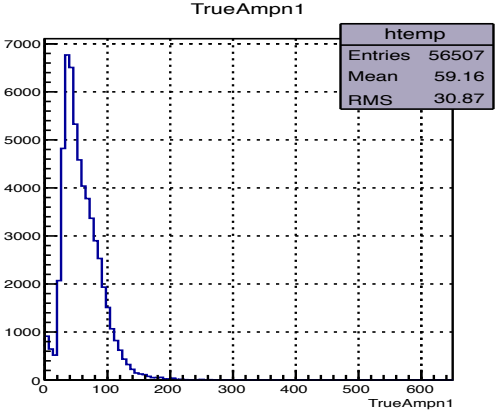












Width, Amplitude and Area from the HitCheater