Fast Track fit
First results with accumulative method

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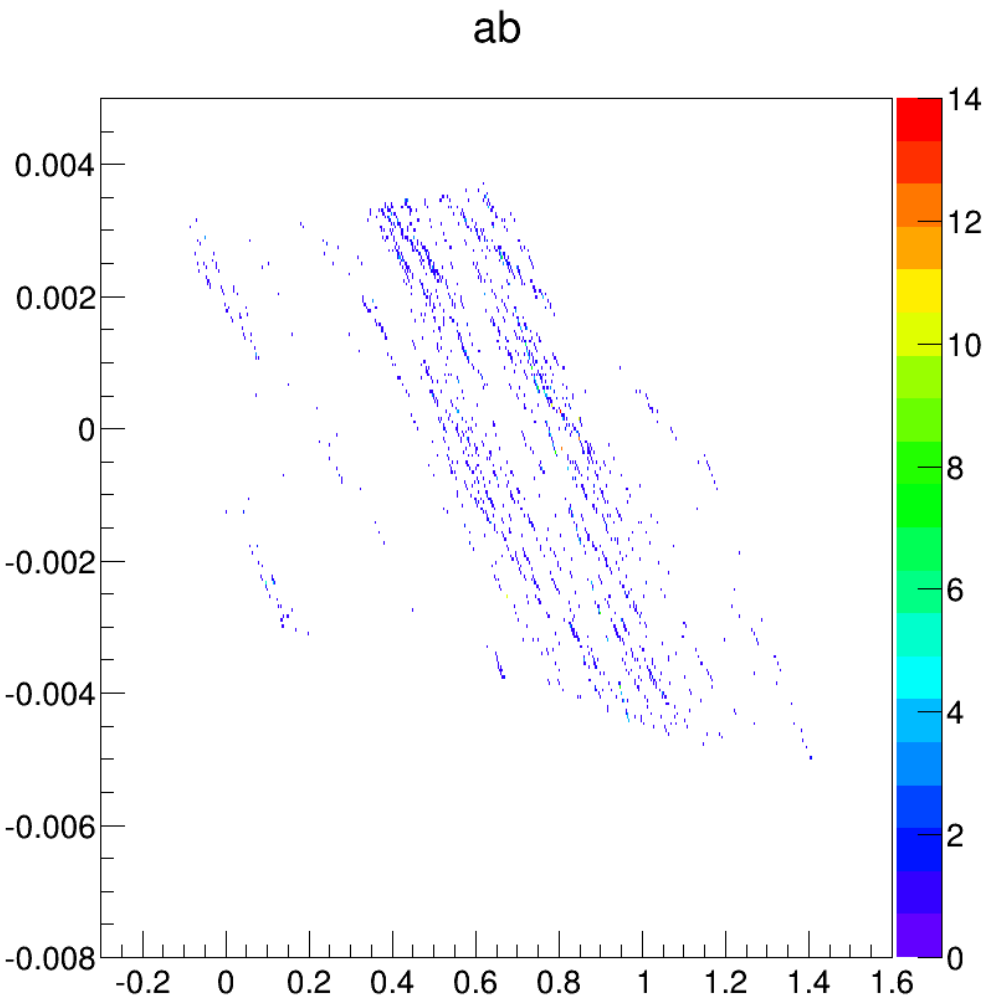
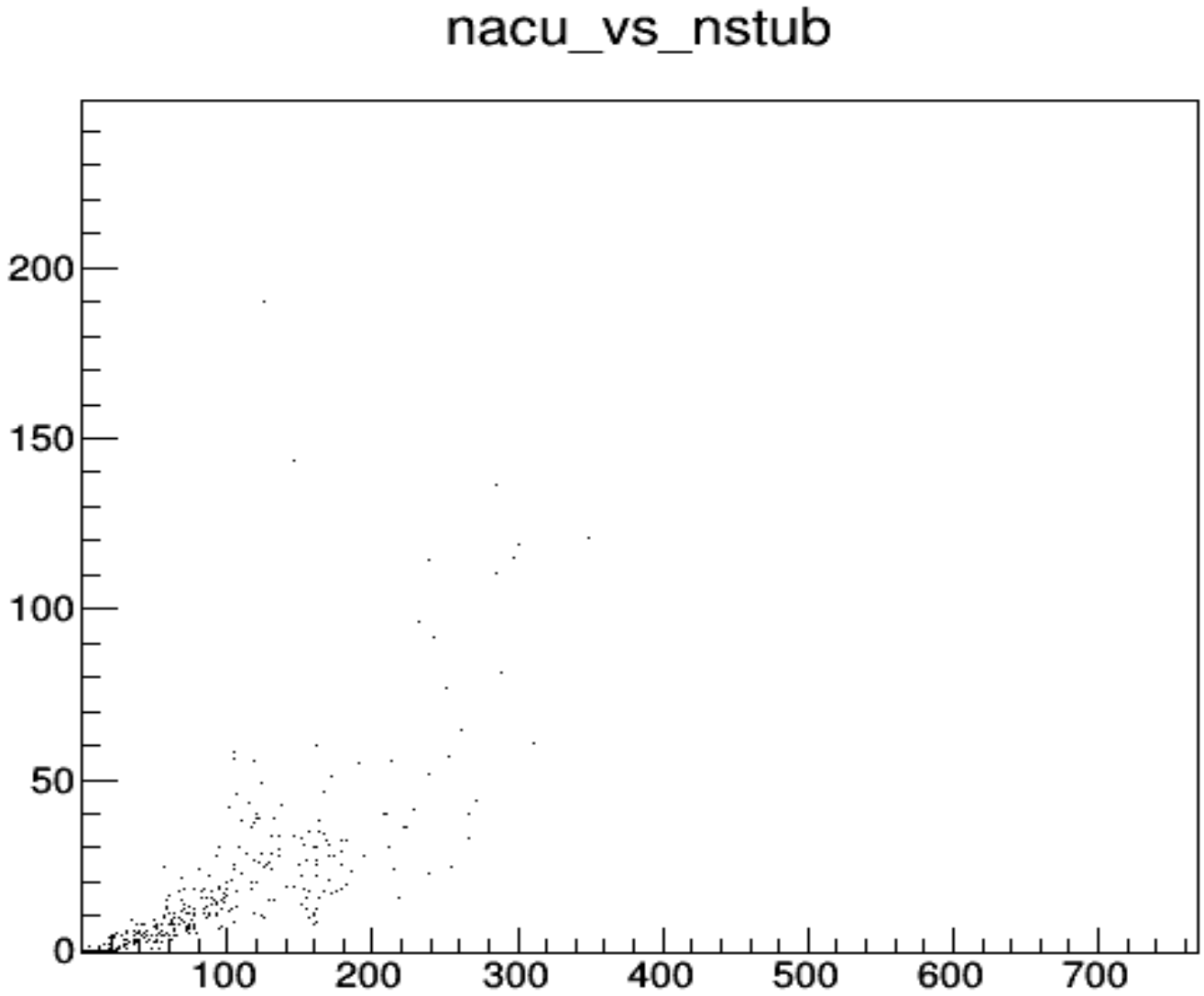
October 29, 2014

Accumulation

- Put all stubs in conformal space ($x' = \frac{x}{r^2}, y' = \frac{y}{r^2}$)
- Calculate all possible combination of 2 layers hits, excluding the inner most one.
- Fill an histogram in (a, b) space of found combinations
- Select bins with ≥ 3 entries (or 4 if more than 150 stubs)



Accumulation numbers



Adding hits

For all candidates

Loop on all layers

1. Skip if layers already touched
2. Extrapolate the candidate to the layer $y_{ext} = a_{cand} \times x + b_{cand}$
3. Calculate distance and add nearby hits

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Fit

- Requires at least 4 hits in (x,y) and 2 hits in (R,z) selected
- Linear regression in the 2 planes
- Reject low pt candidates

Sample & Results

140 Pile-up + 4 tops

- File AMana_4TPU140_d01pt2.root
- 295 events
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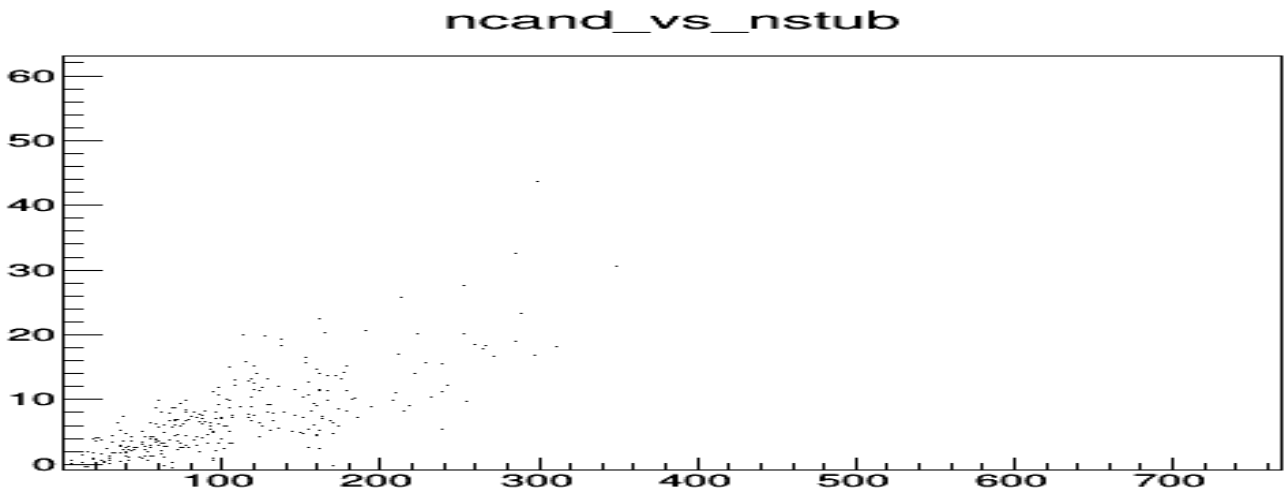
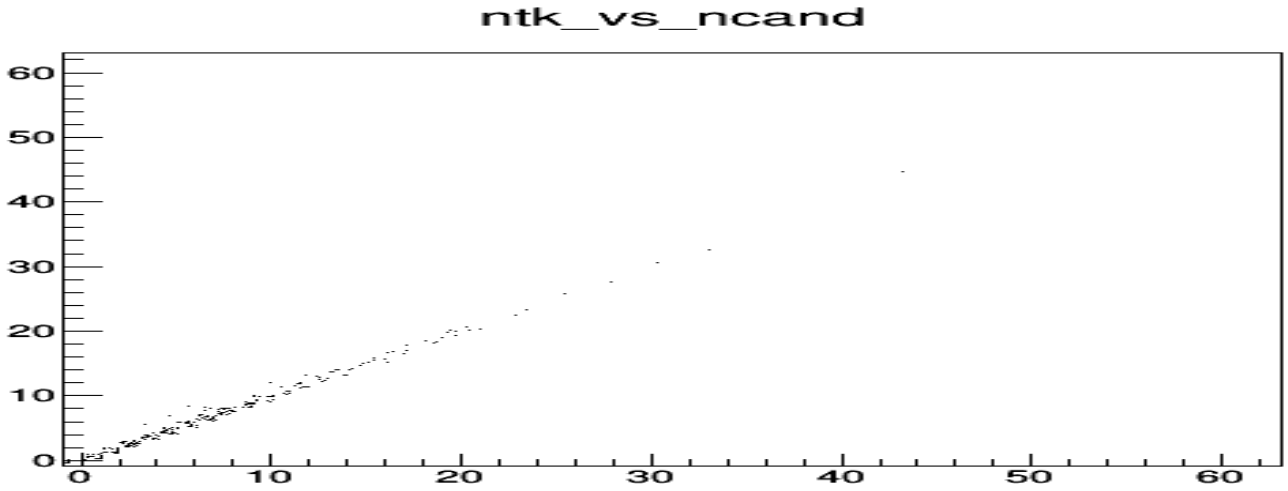
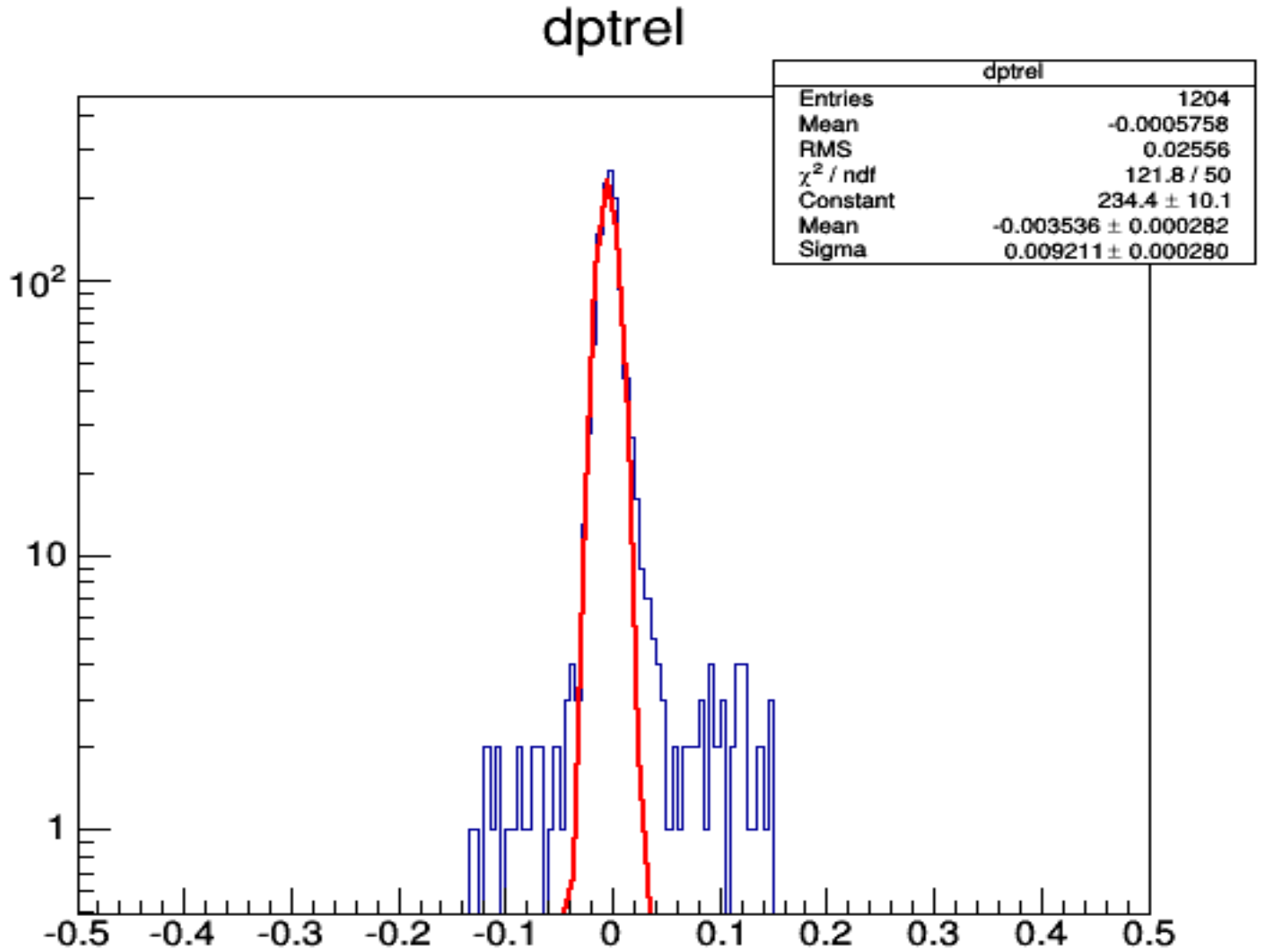
Sector	N Track MC	Ntrack Reco	Efficiency	Fake rate
16	1314	1736	90.64	10.05

Candidates track statistic

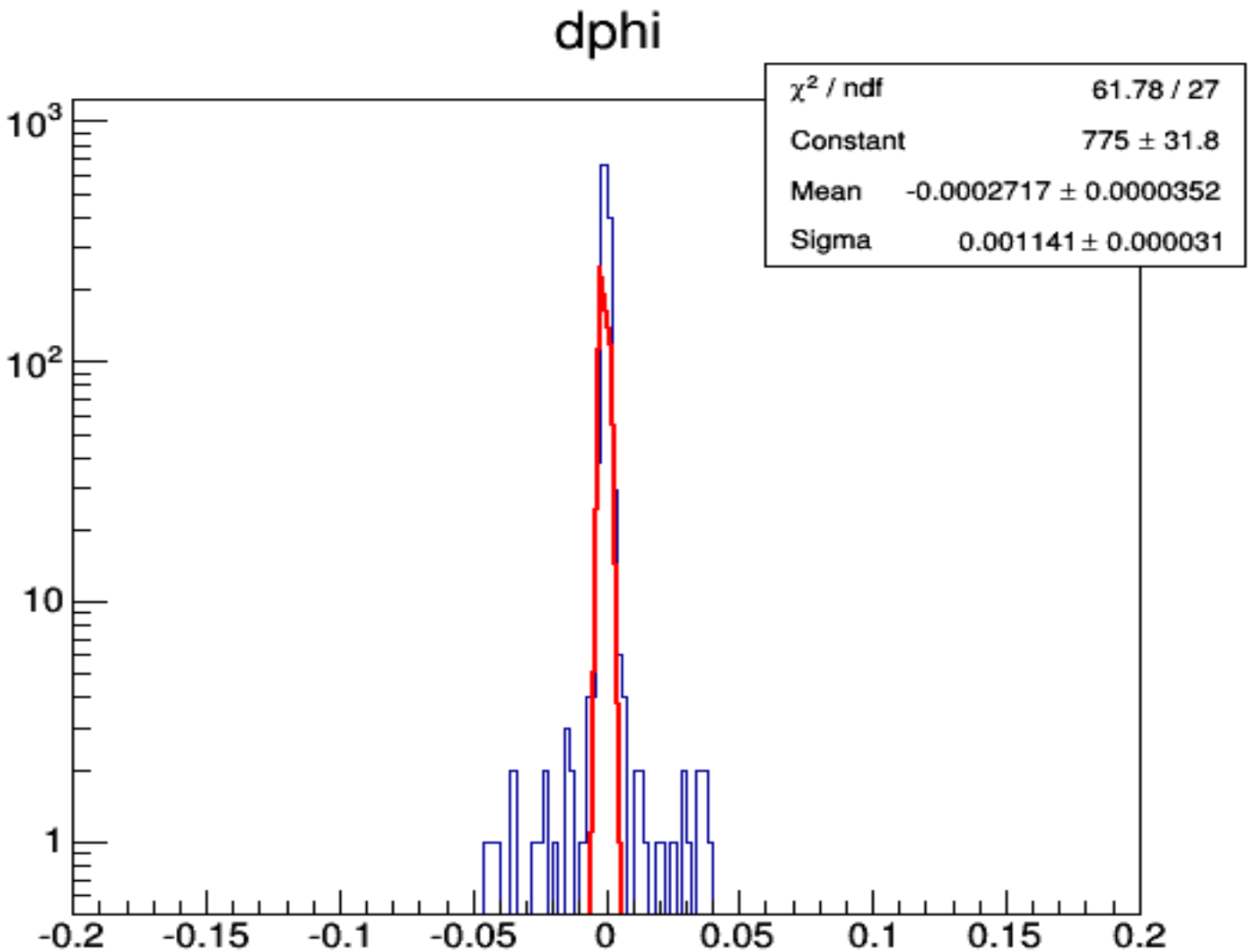




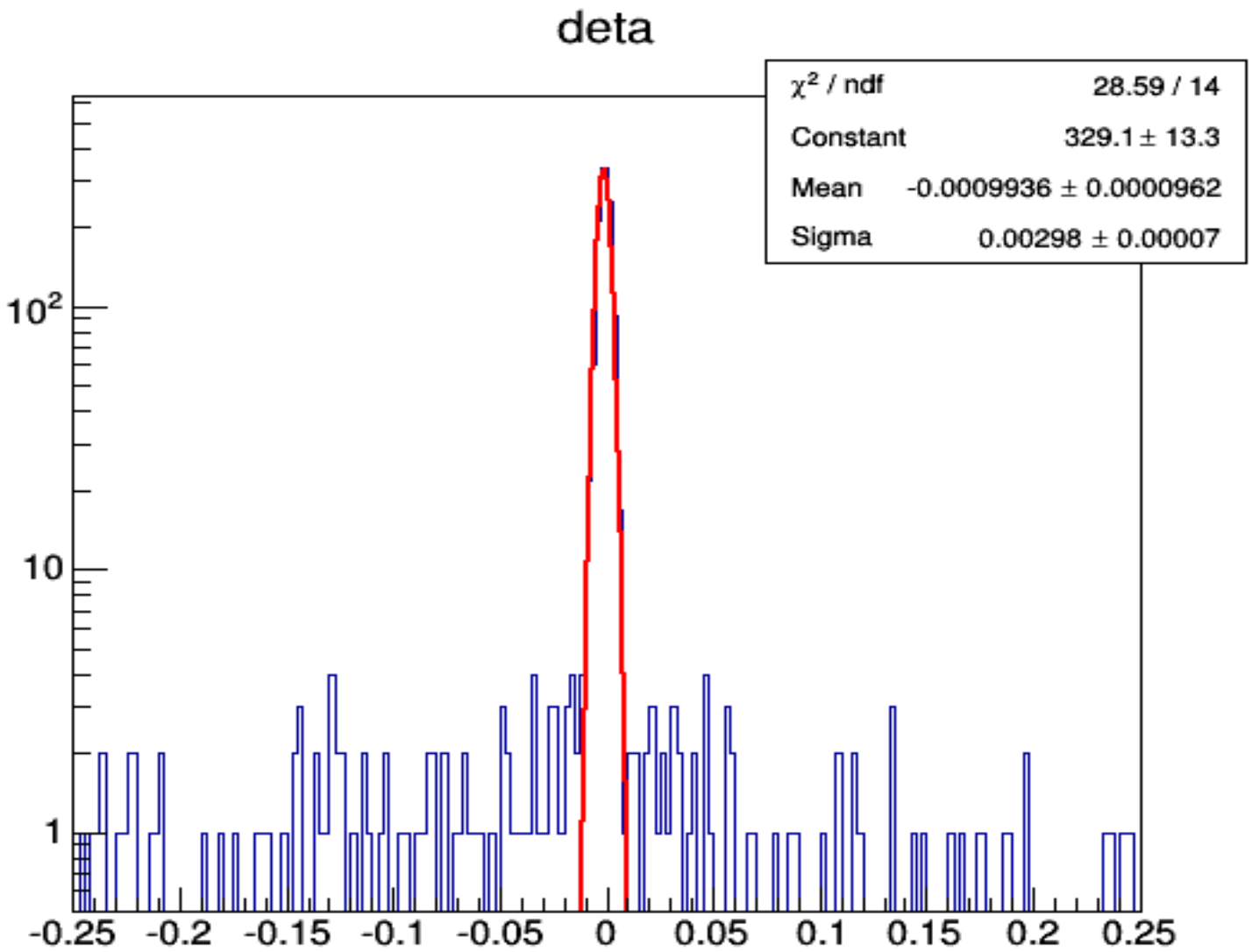
Pt resolution



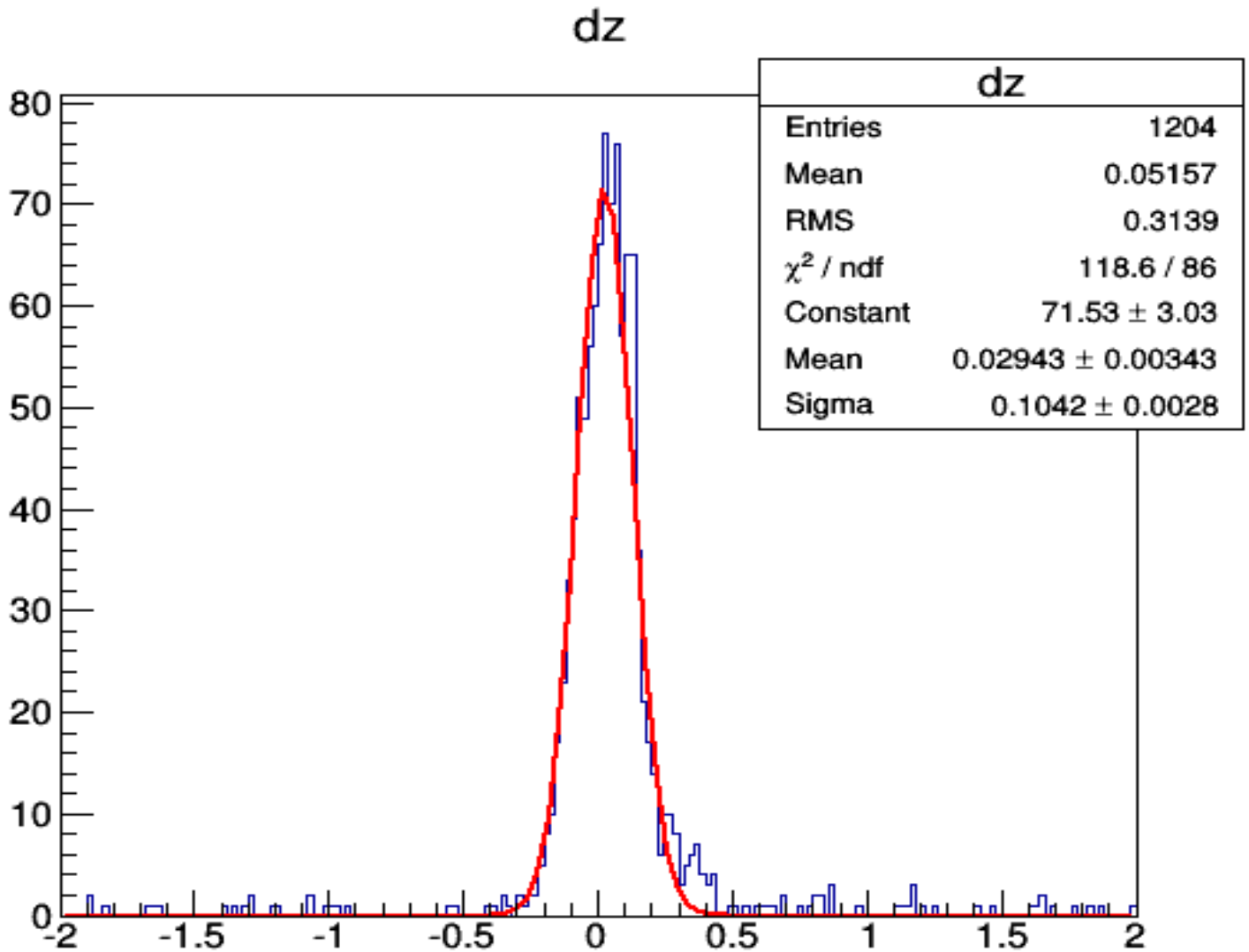
ϕ resolution



η resolution



z resolution



Summary

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Only the first step is quadratic in stub numbers (without the inner most layer ones) so the performances should be comparible to the Hough transform approach.
The final steps are linear in number of stubs and limited (≤ 64) in parallel blocks.

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Futur

- Cuts tuning
- Sector tuning
- GPU & FPGA implementation