

FTKSIM updates

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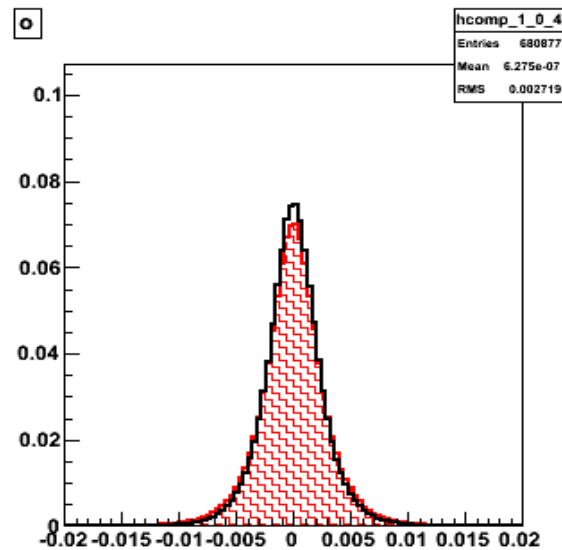
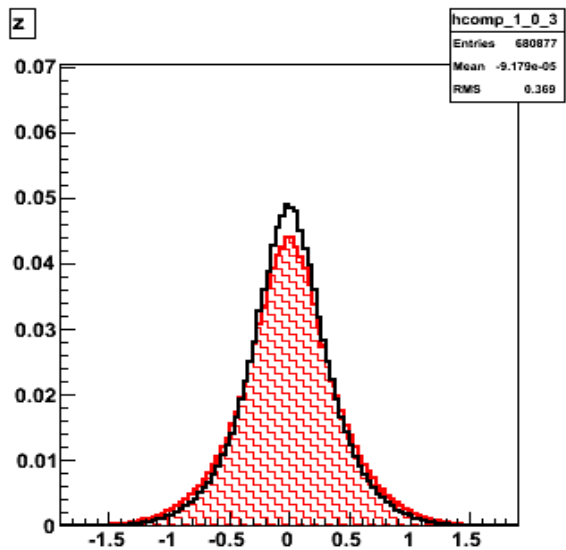
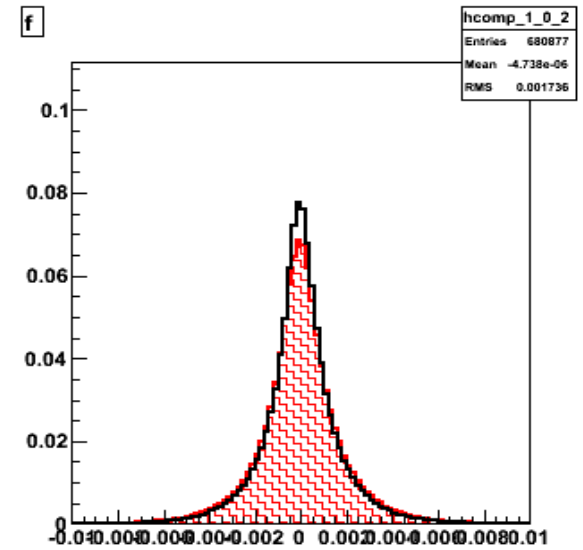
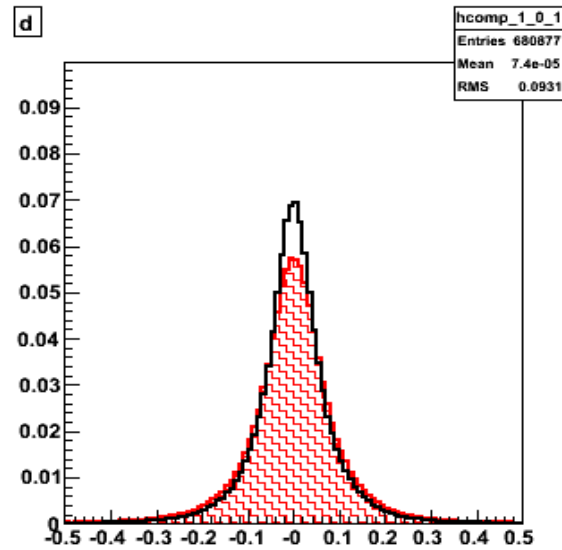
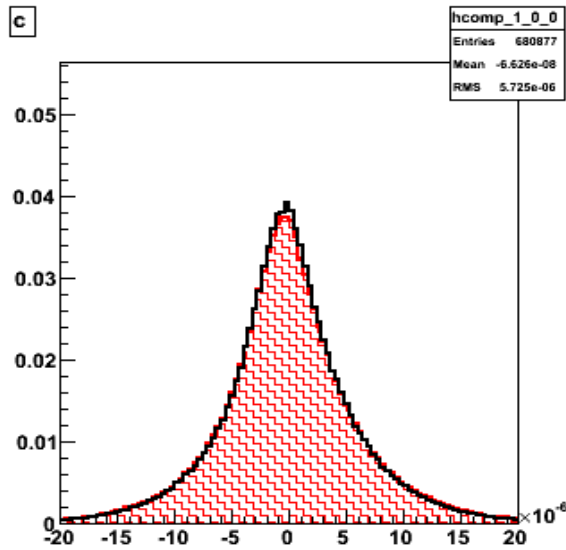
Changes to athena branch

- Cleaned up `ambanks_rd` and `ssmap_rd`
 - Used AM map that's now deprecated
- Fixed `get_name` and other places with hardcoded string length
 - Global `BUFLLEN` in `lib/errlvl.h`
 - Defaults to 1024
 - Even if exceeded, we gracefully report error
- Changed `svt_err` to `svt_fmterr` in a few places – more detailed error reporting
- Clustering in `pattgen` and `corrigen`
 - Major revamp of `atltrackUtilsM.c`
- Training flat in `cot(theta)`, rather than `eta`:
 - `/pnfs/uchicago.edu/data/users/antonk/data_flat/` on `uct3-edge3`

Clustering (CL) in training

- Independent from ftksim clustering
 - Simpler and faster
- Only clusters IF (remember – used only on single muon tracks!):
 - Two hits per entire plane
 - Both hits in the same module
 - $\Delta(z) \leq 1$ AND $\Delta(x) \leq 1$ – i.e. adjacent or diagonal
 - This is a pretty often-occurring scenario
- Events accepted for training:
 - Every plane must have at least 1 hit
 - If two adjacent hits, cluster and average x,z
 - If >2 hits/module, or 2 non-adjacent – don't use
- BEFORE: took 1st hit from any 2-hit cluster

Effect of CL (via corrgen)



 **FTK : RAW11L+CL**

 **FTK : RAW11L**

Little change – see next slides to see effect on resolution

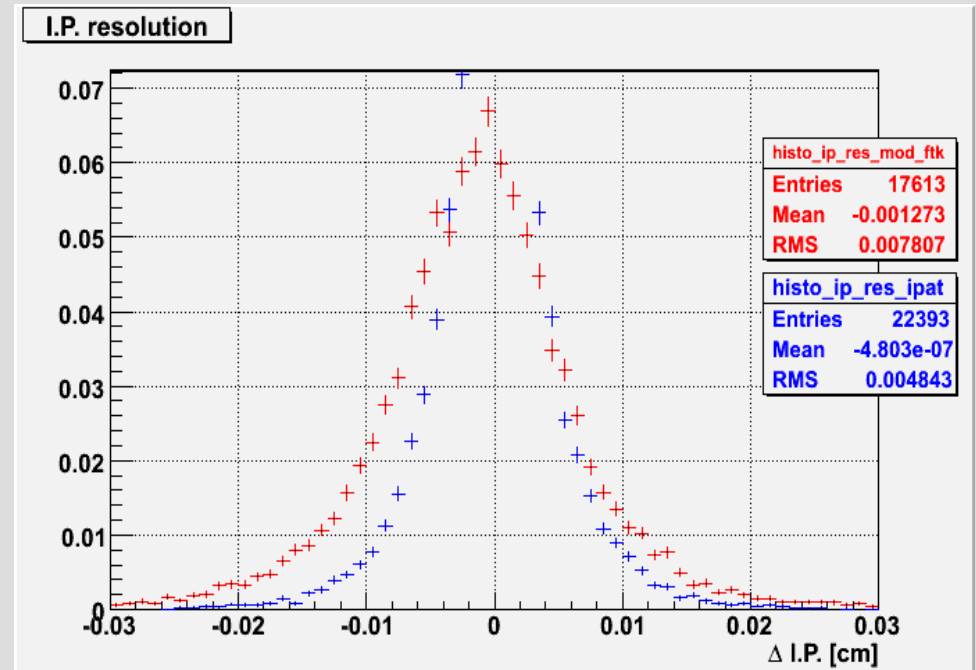
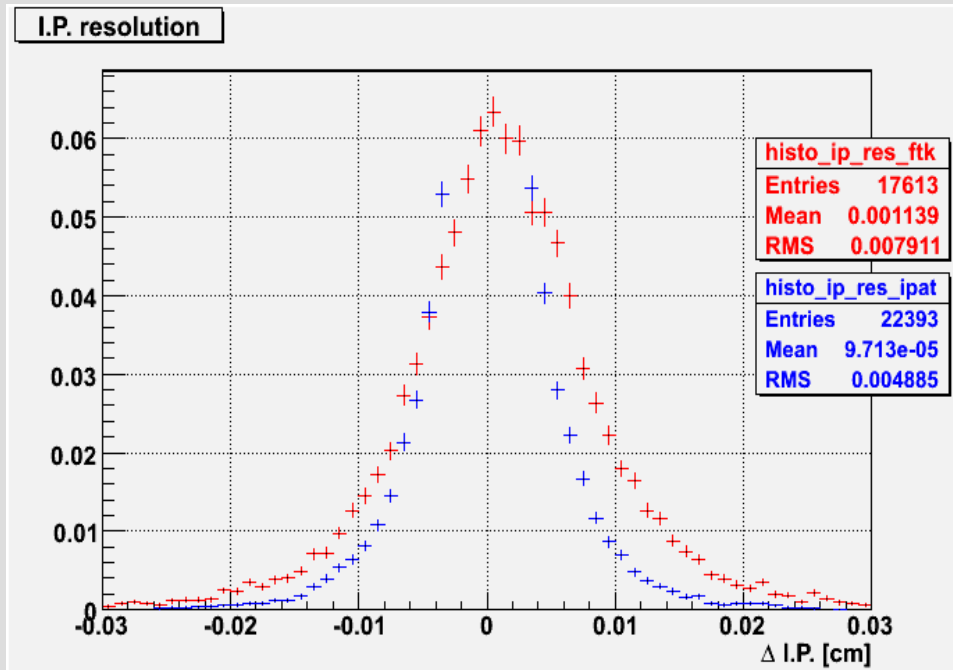
FTKSIM on training tracks

No CL, flat in η

Original plot from last time

IP[ftk] - IP[truth]

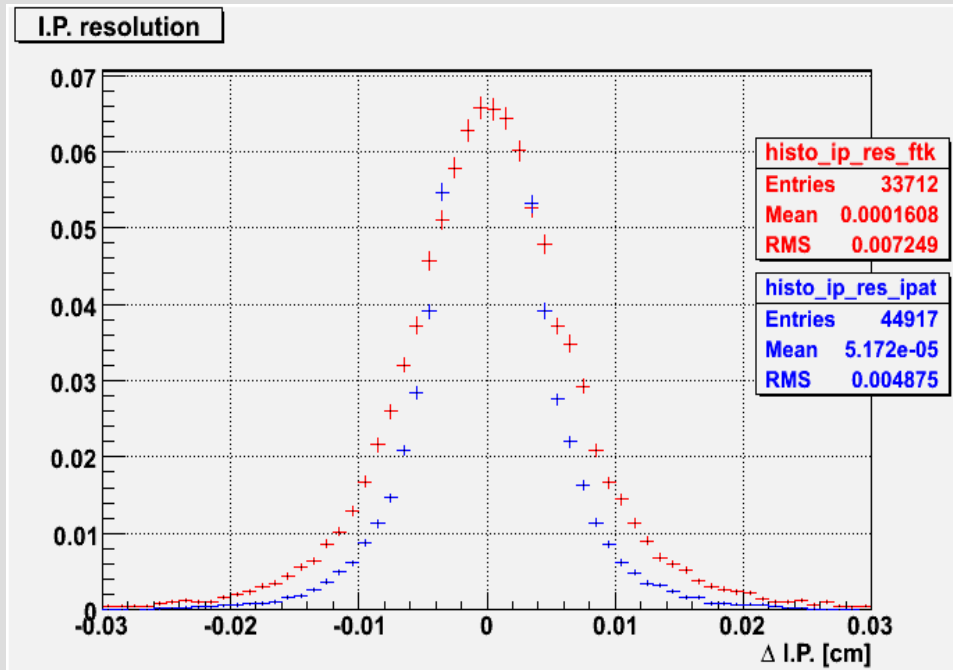
$|\text{IP}[\text{ftk}]| - |\text{IP}[\text{truth}]|$



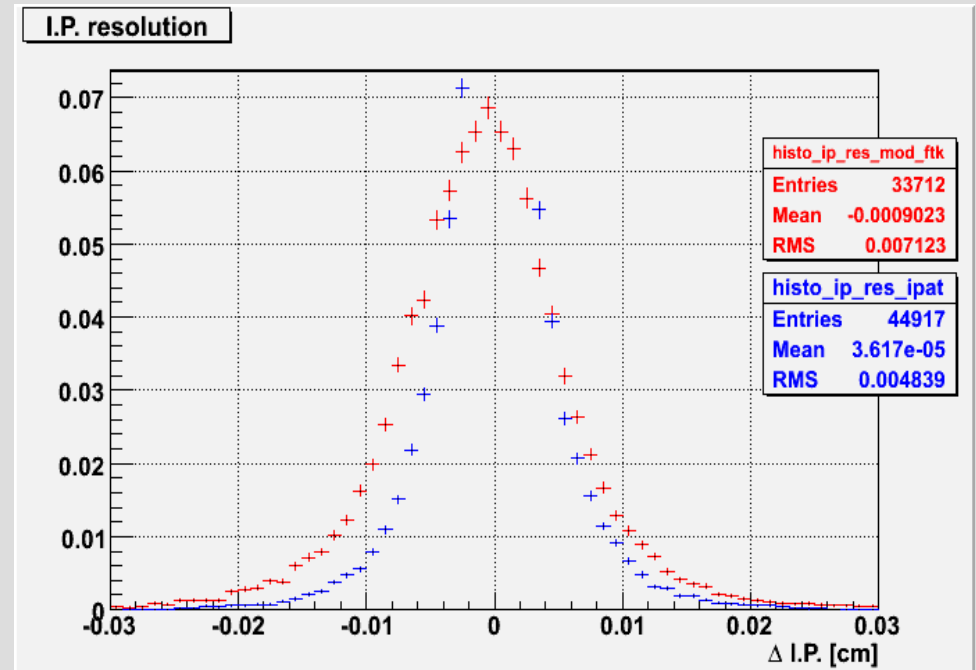
ftk's 2D IP tend to be closer to beam axis compared to ipat

FTKSIM on training tracks pattgen/corrgen CL, flat in η

IP[ftk] - IP[truth]



$|\text{IP}[\text{ftk}]| - |\text{IP}[\text{truth}]|$



Asymmetry is still visible, especially on a modulus-difference plot:
ftksim tracks are on average closer to beam axis

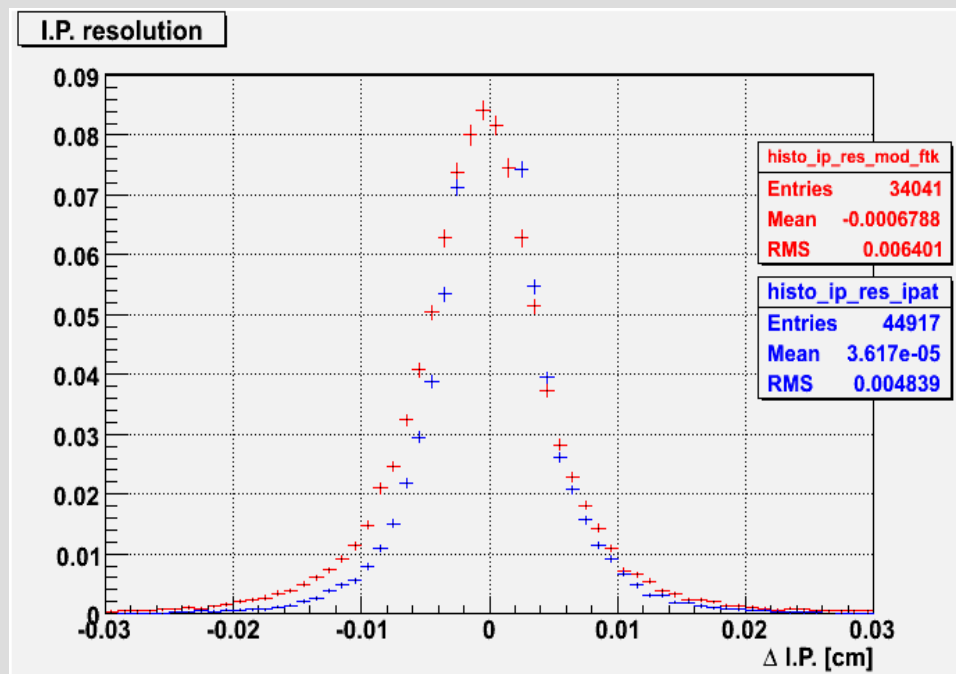
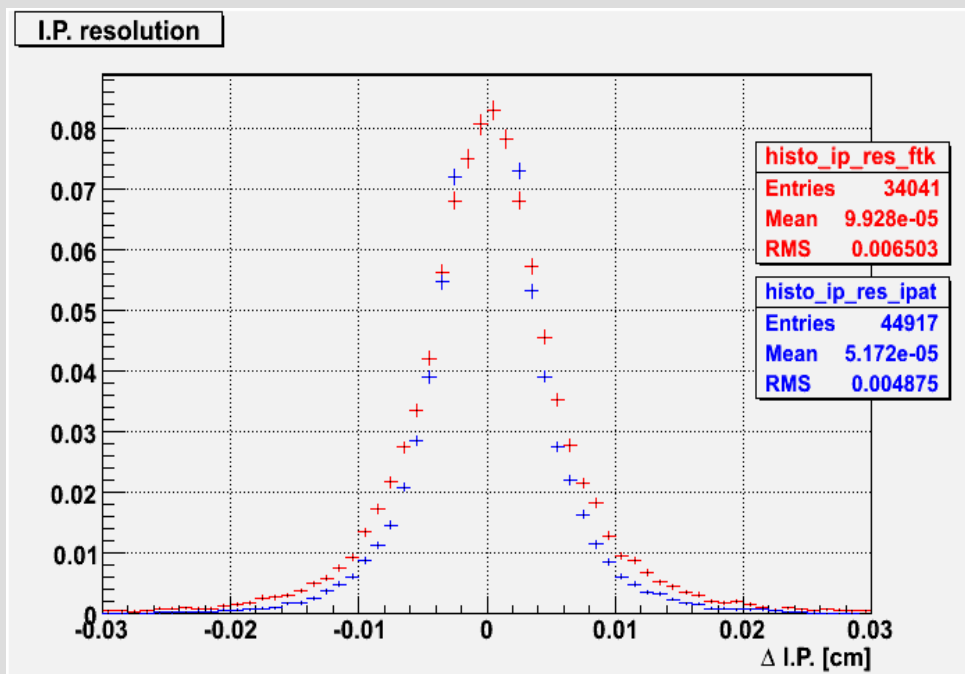
FTKSIM on training tracks

pattgen/corrgen/ftksim CL, flat in η

This uses banks generated with clustering, and also runs ftksim with clustering ON.

IP[ftk] - IP[truth]

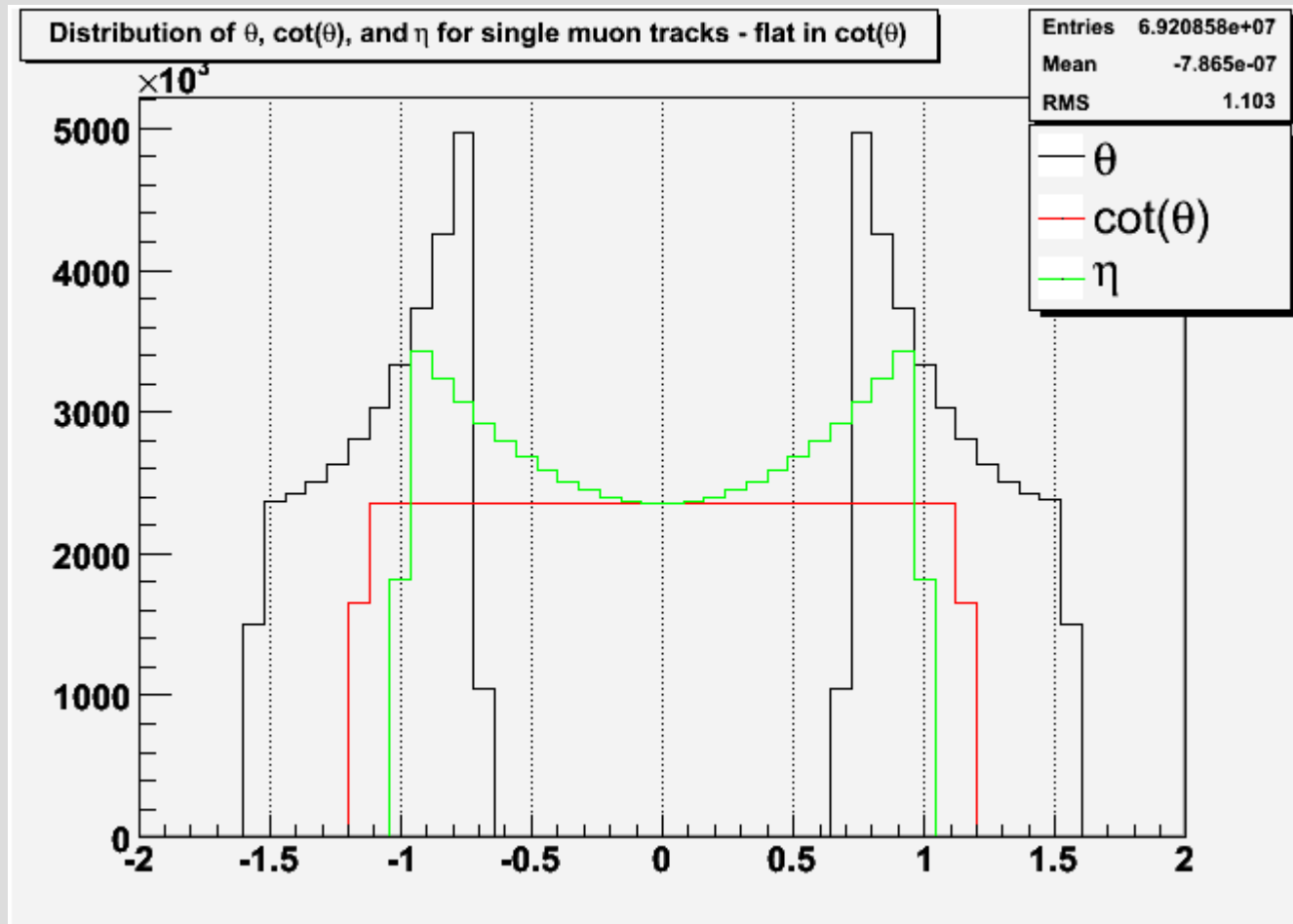
$|\text{IP}[\text{ftk}]| - |\text{IP}[\text{truth}]|$



Best out of the bunch.

But: asymmetry is still visible on a modulus-difference plot (or I have a bug in making it)

Training flat in η



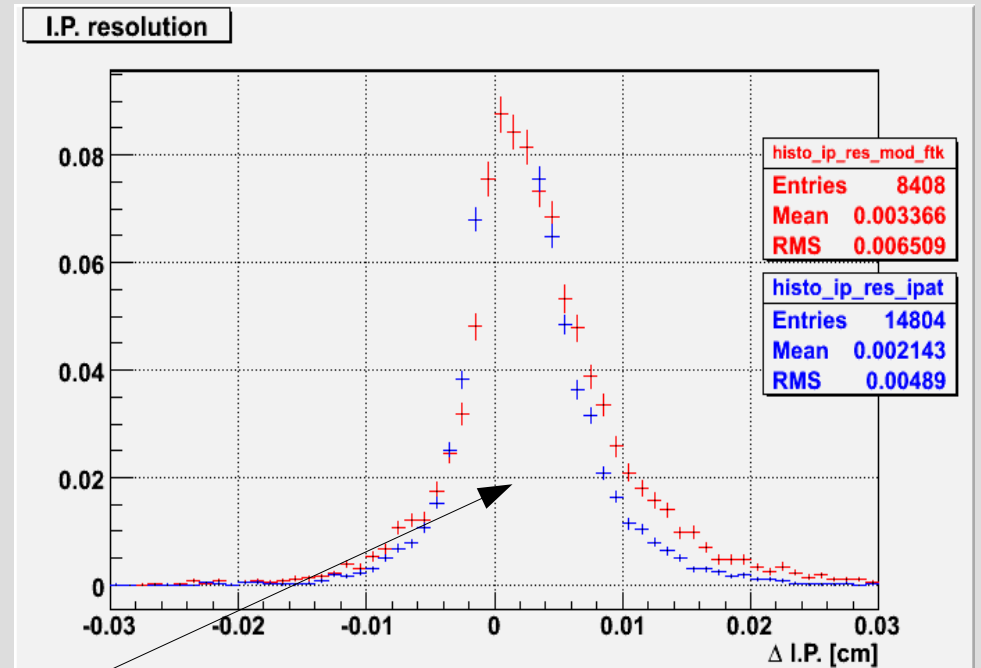
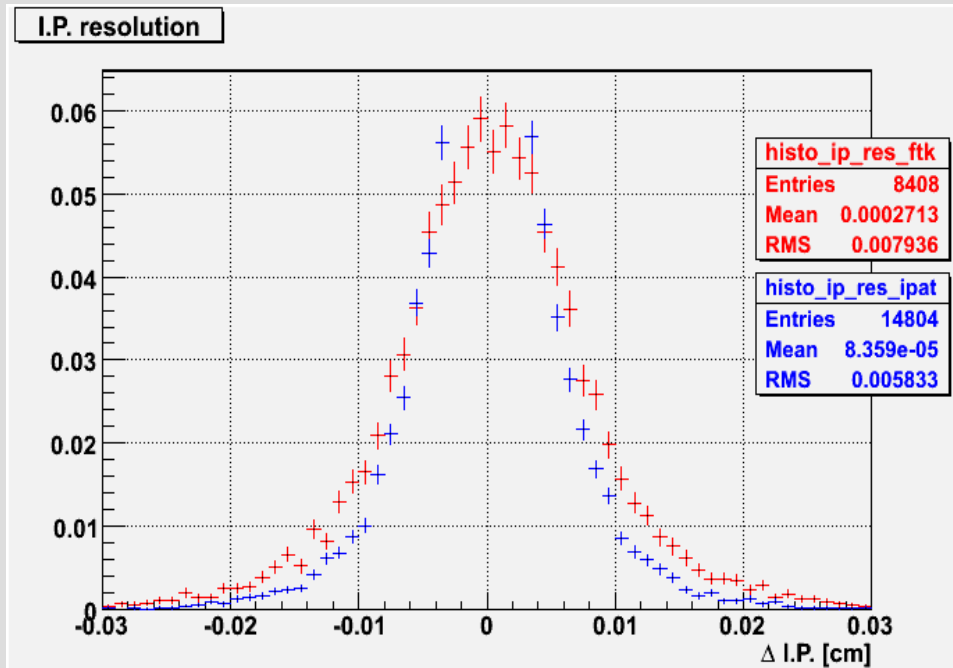
Obtained by capping the original distribution. Reduction in data from 110M to 70M events
[/pnfs/uchicago.edu/data/users/antonk/data_flat/](https://pnfs.uchicago.edu/data/users/antonk/data_flat/) on uct3-edge3

FTKSIM on bsmumu tracks pattgen/corrgen CL, flat in η

Using banks generated with clustering, but no clustering in ftksim

IP[ftk] - IP[truth]

$|IP[ftk]| - |IP[truth]|$



? this comes from the same data as the left plot!

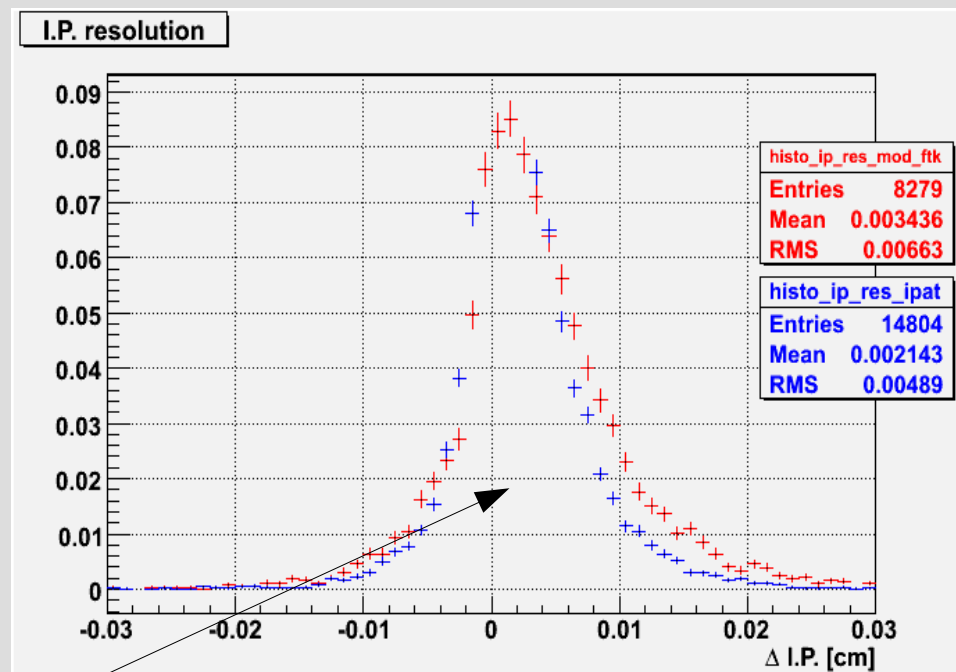
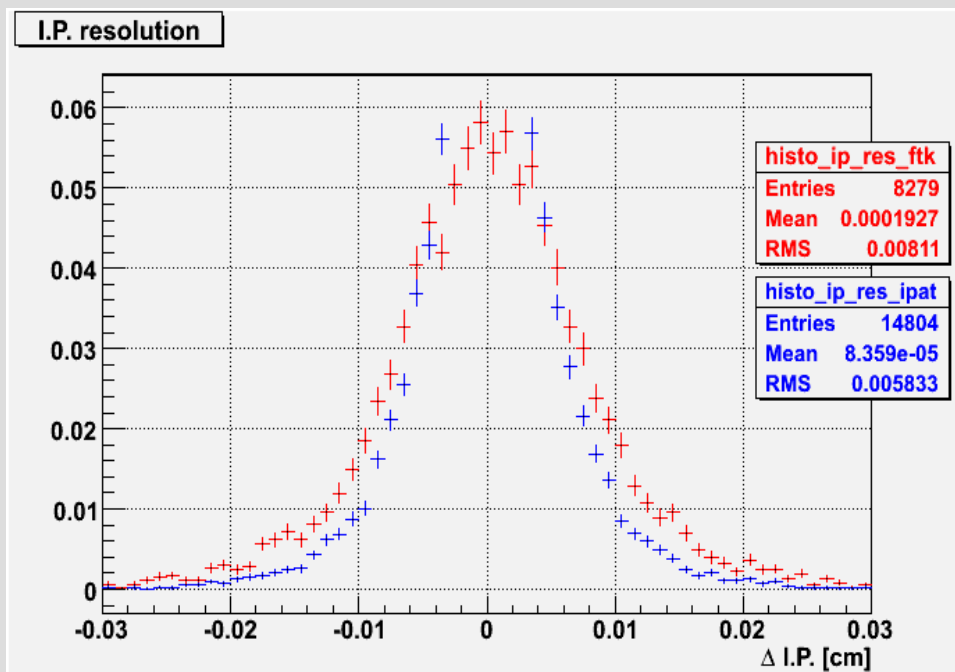
Weird shape with ipat and ftk tracks. Could be a bug in track matching algorithm?
Or could it be due to “barcode” – I disabled filter on barcode<10001 in ftksim_comp

FTKSIM on bsmumu tracks pattgen/corrgen CL, flat in $\cot(\theta)$

Using banks generated with clustering, but no clustering in ftksim

IP[ftk] - IP[truth]

$|IP[ftk]| - |IP[truth]|$



? same weird shape

Ignoring the funny shape of modulus plots, it looks like using flat-in-cot(theta) training is no different from flat-in-eta training, at least for bsmumu track reconstruction