

FTKSIM with rawhits

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Status

- Ran on training & bsmumu samples
- Verified that can run on hilumi (10^{34})
- Still some problems (with resolution etc)
- Looked at the effect of clustering

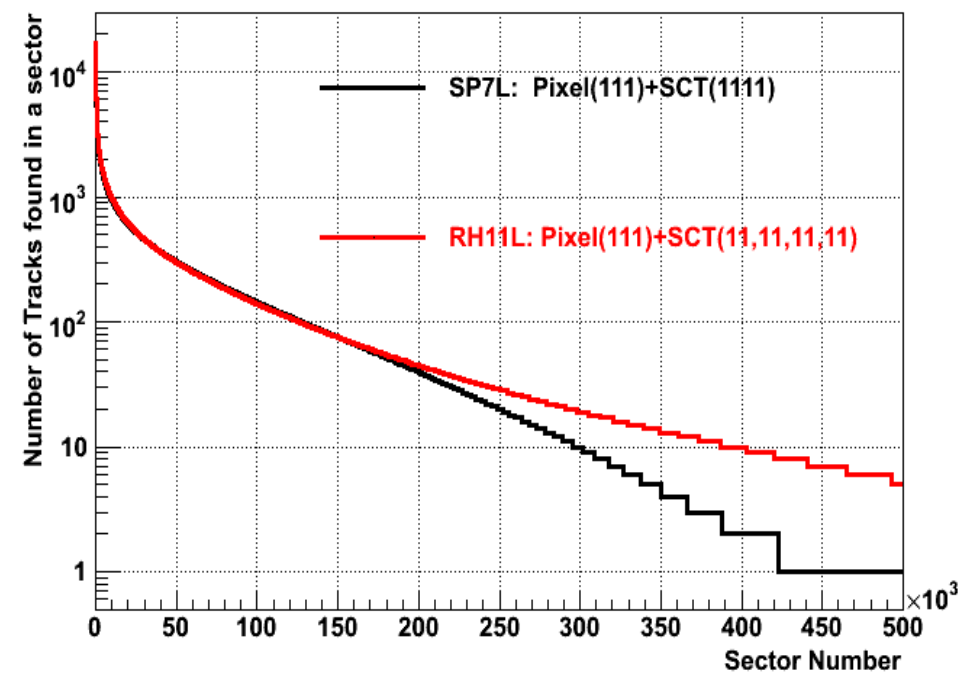
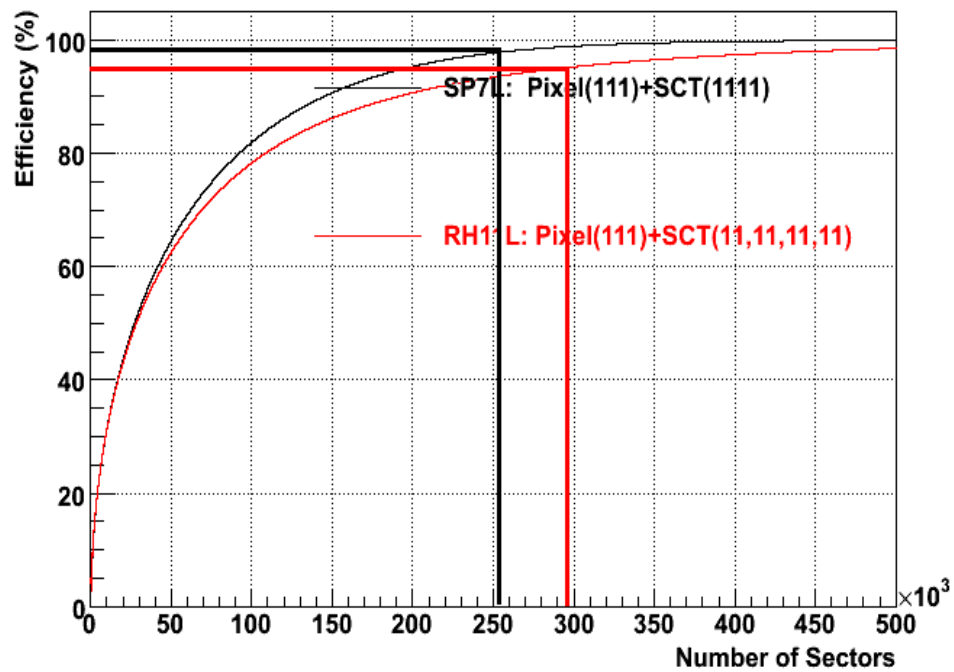
- Fully automated with data/scripts/ftk.sh
- Integrated Guido's plotting scripts
- Latest CVS commit: October 29, 2007
 - Tagged RAWHITS

Conventions

- HW3
 - Hitwarrior is enabled
 - MAX of 3/14 of non-close coords for HW
 - 1 PIX and 1 SCT planes differ – apply HW
 - 3 SCT planes differ – apply HW
 - 2 PIX or (1 PIX and 2 SCT) – accept both tracks
 - Tolerances: 2 pixels in PIX and 1 strip in SCT
- CL1
 - Clustering enabled with $R=1.1$ (see next slide)
- 3x5
 - 3 mm PIX ss; 5 mm SCT ss

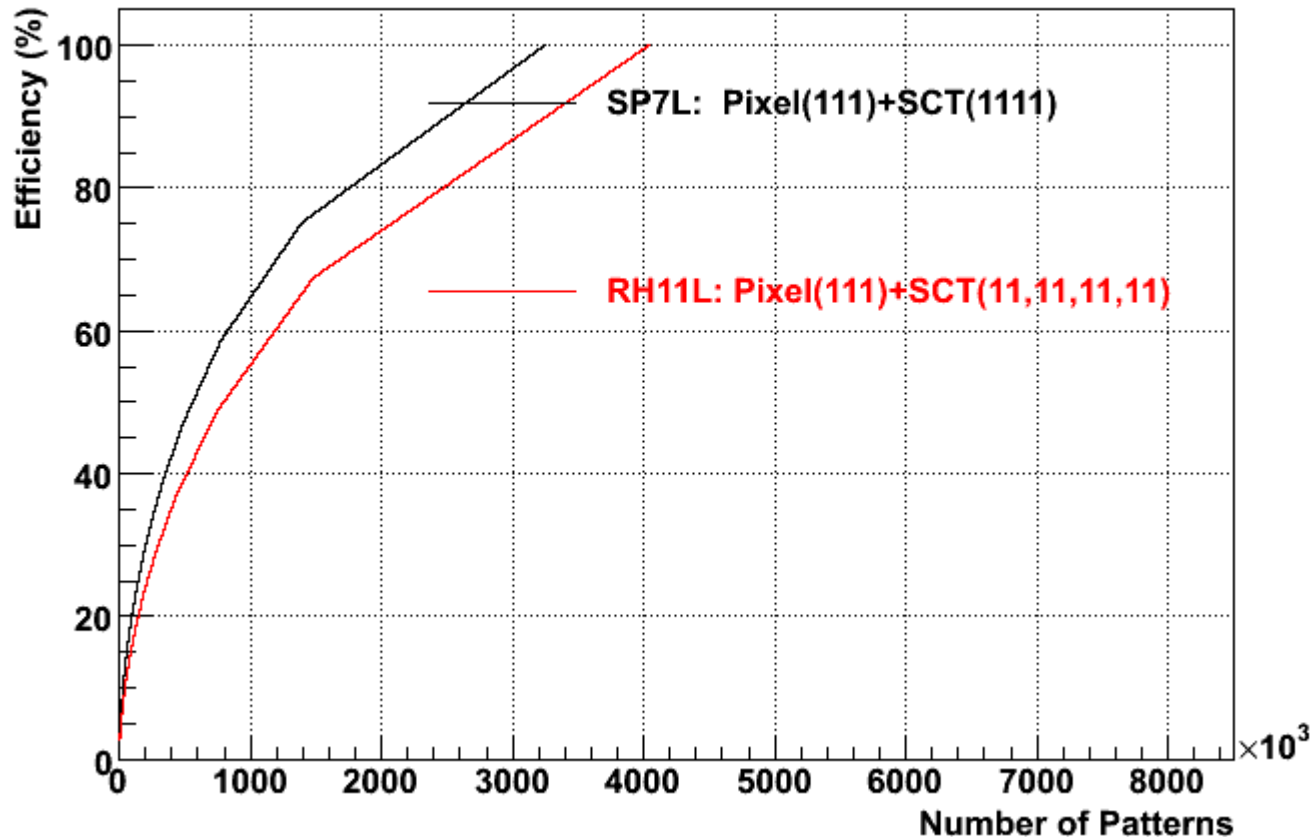
Banks – sectors

RAW vs SP



Banks – patterns (3x5)

One of 8 pattern banks:



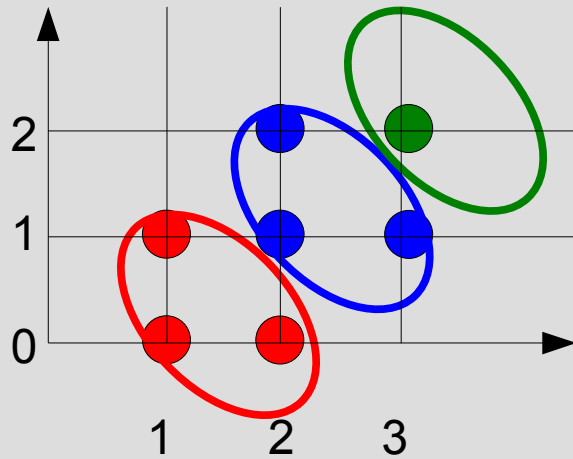
LOTS of single-event patts

Can't judge coverage!

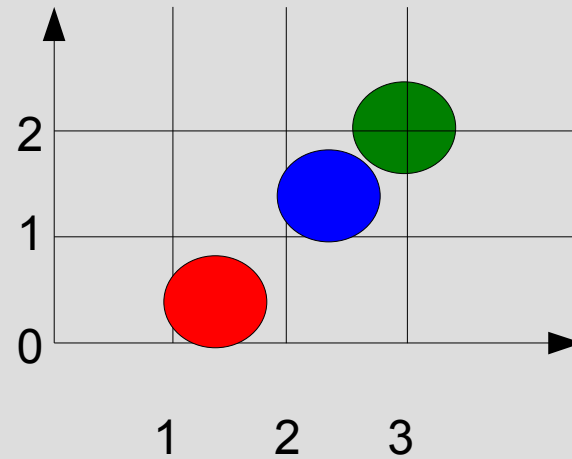
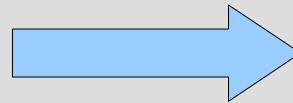
Will run on bsmumu sample to get a better feel for sample coverage.

Type	size	on disk
RAW	4M	300MB
SP	3M	200MB

Clustering example



Cluster 1: [(1,0) (1,1) (2,0)]
 Cluster 2: [(2,1) (2,2) (3,1)]
 Cluster 3: [(3,2)]



(1.33,0.33)
 (2.33,1.33)
 (3.00,2.00)

$$R = \sqrt{x^2 + y^2} \leq 1.1$$

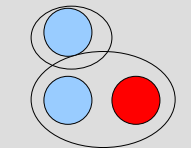
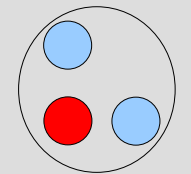
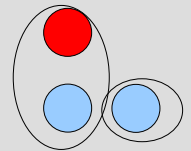
In rawhits, x would be **r-phi pixel number**; y would be **z pixel number**

Since they have different widths, we may introduce a weight parameter:

$$R = \sqrt{x^2 + (a*y)^2}$$

OR: have an independent cut on delta-X and delta-Y

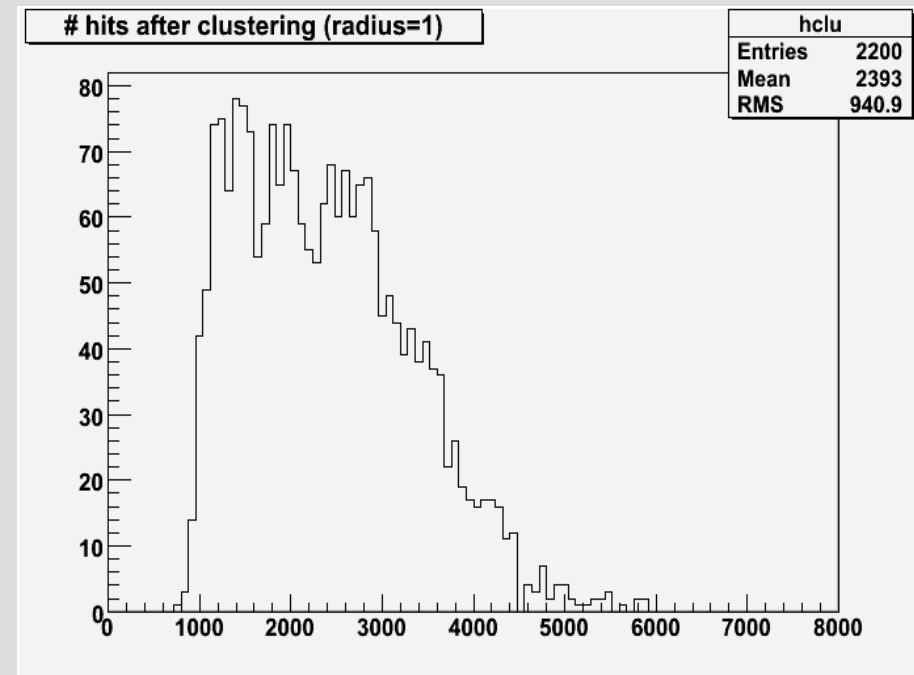
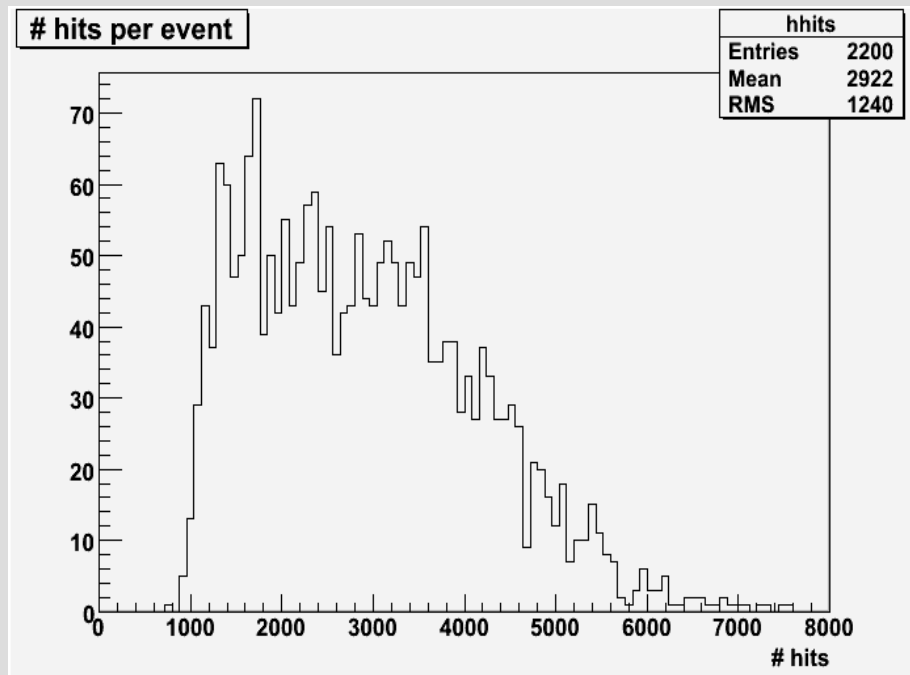
Ambiguity!



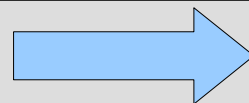
Can't do anything without doing more combinatorics!

Clustering & # hits

hits per event and # clusters (which are merged into hits) for bsmumu2 sample



2922

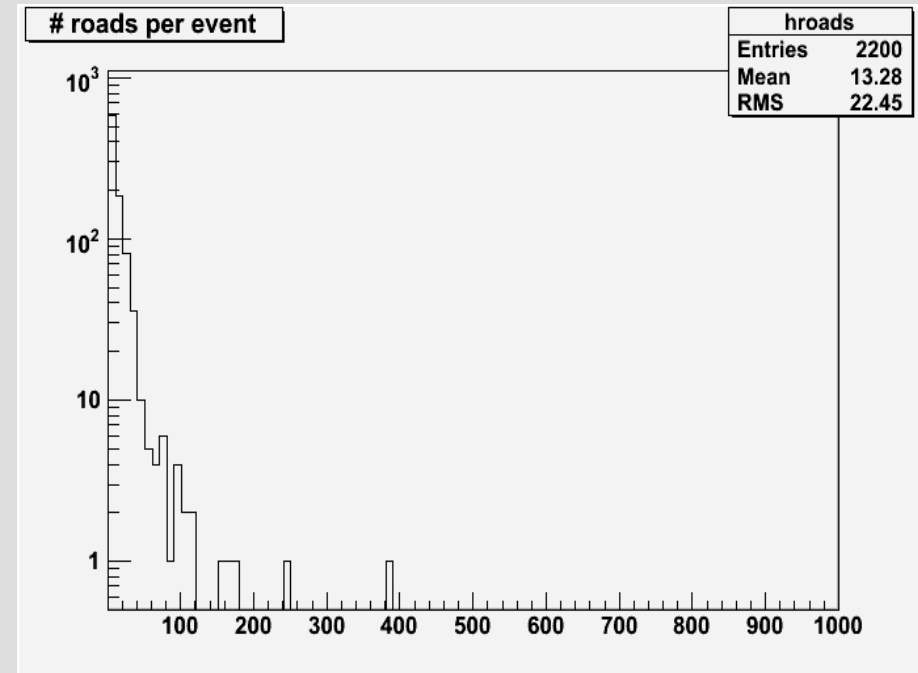
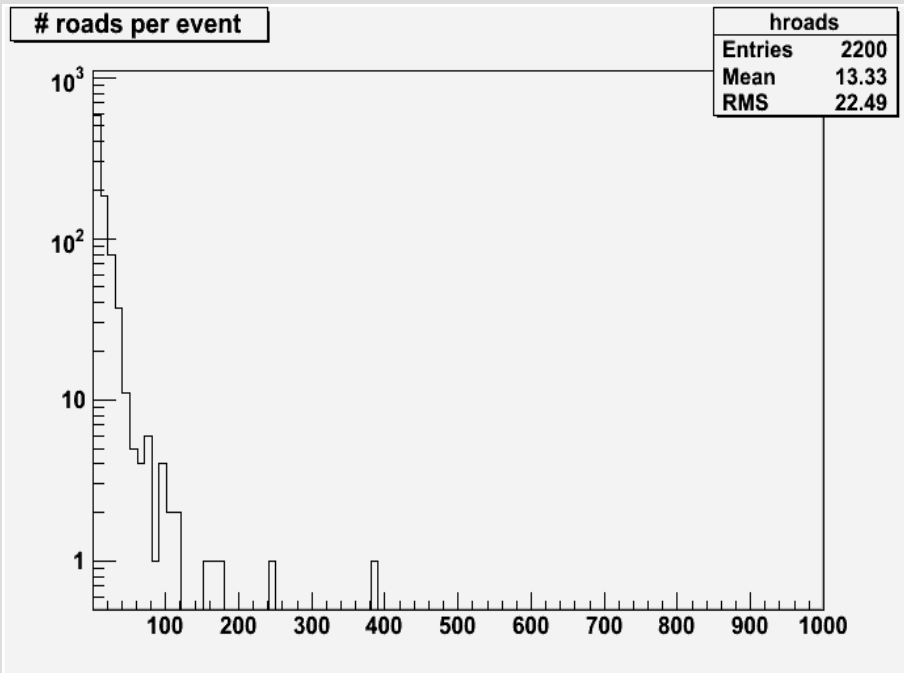


2393

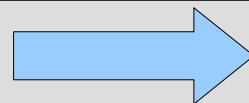
20% reduction

Clustering & # roads

roads per event with and without clustering for bsmumu2 sample



13.33

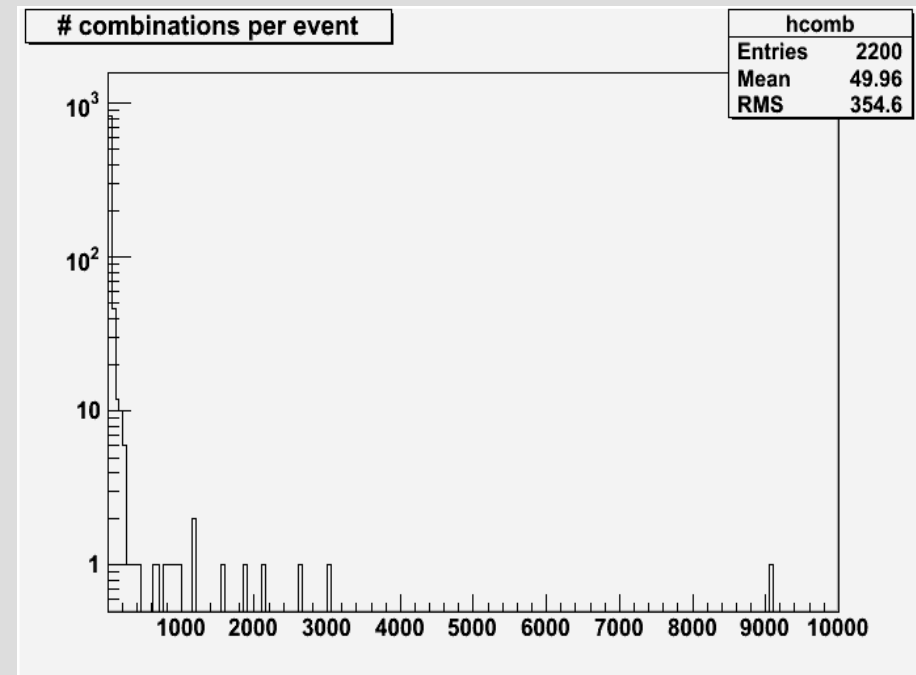
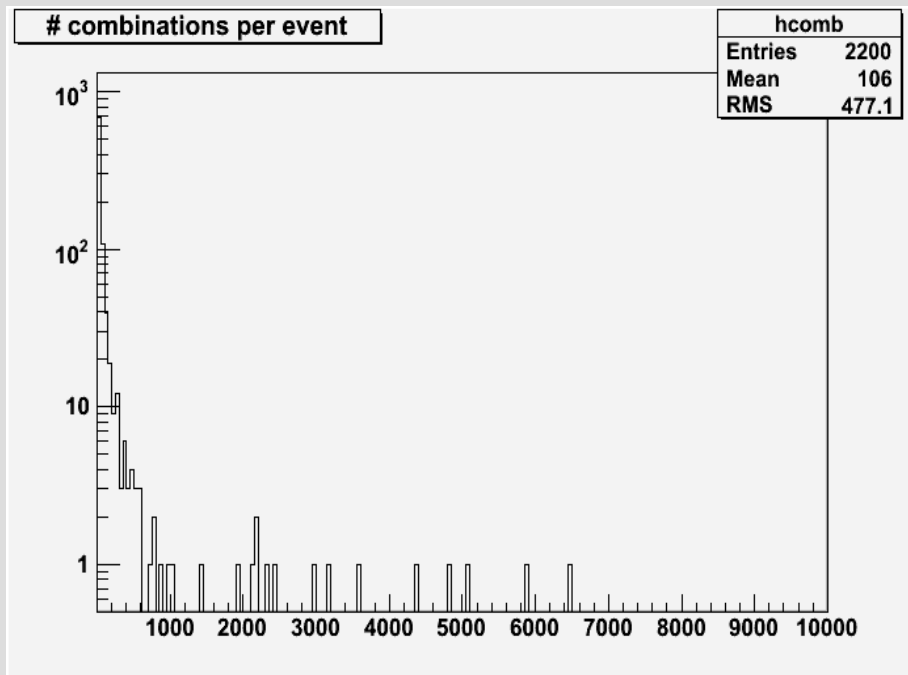


13.28

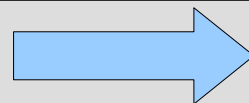
No change in roads!

Clustering & # fits (= # combs)

of fitting combinations per event (summed over all roads)
with and without clustering for bsmumu2 sample



106

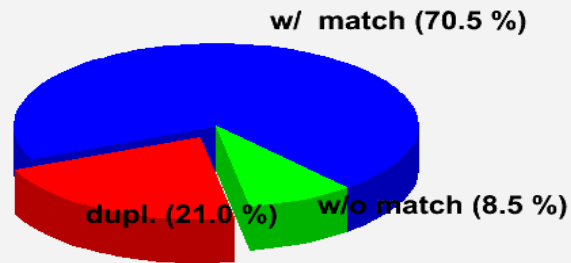


50

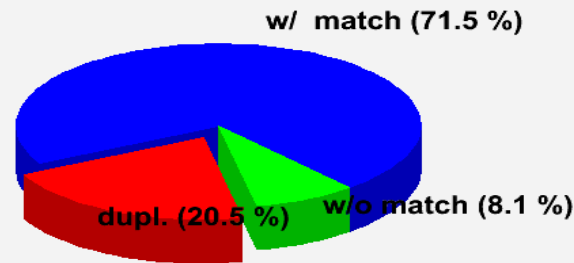
x2 reduction in required # fits!

Clustering & performance

Fakes Summary



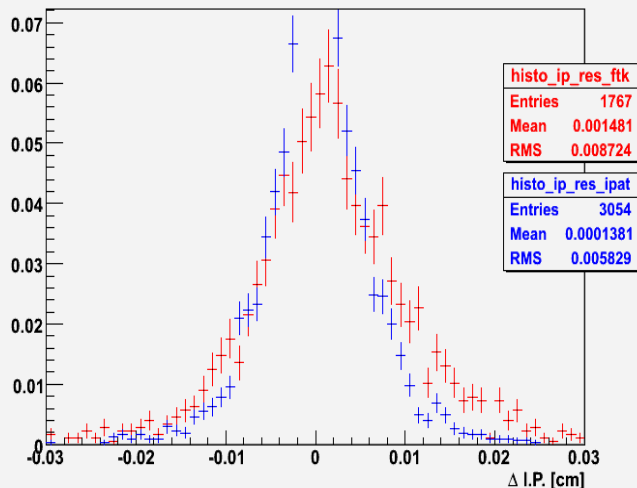
Fakes Summary



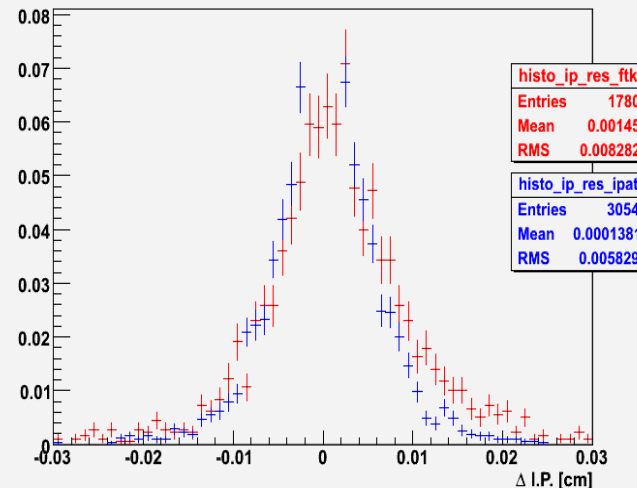
Almost no difference on final performance.

-> because HW is ON.

I.P. resolution



I.P. resolution



Clustering effectively kills combinations that are otherwise eliminated by HW

Mean, rms: 0.00148 & 0.0087

0.00145 & 0.0083

Training sample: PLOTS

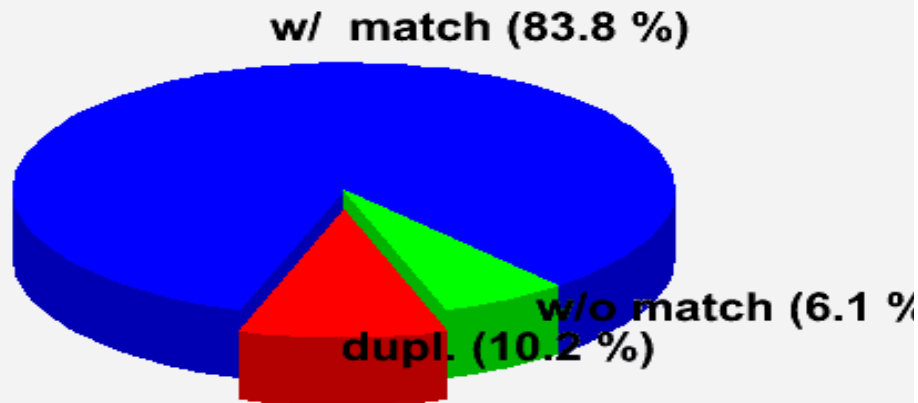
SP and RAW comparison of ftk performance

Training: fakes

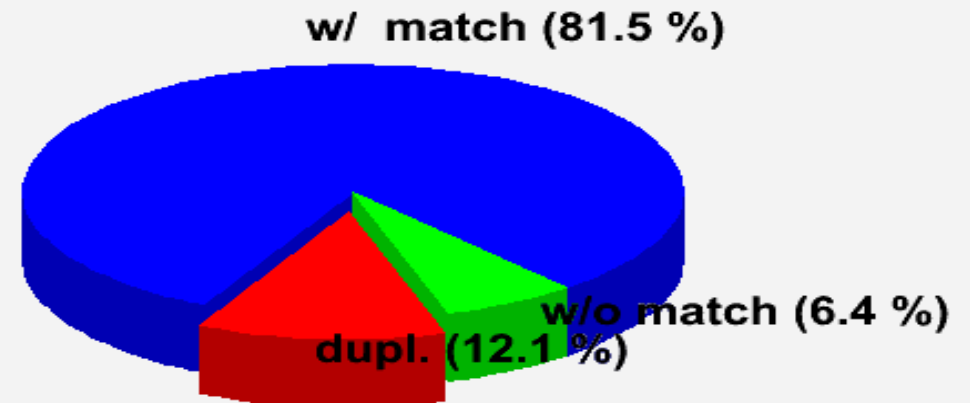
SP, 7L

RAW, 11L

Fakes Summary



Fakes Summary



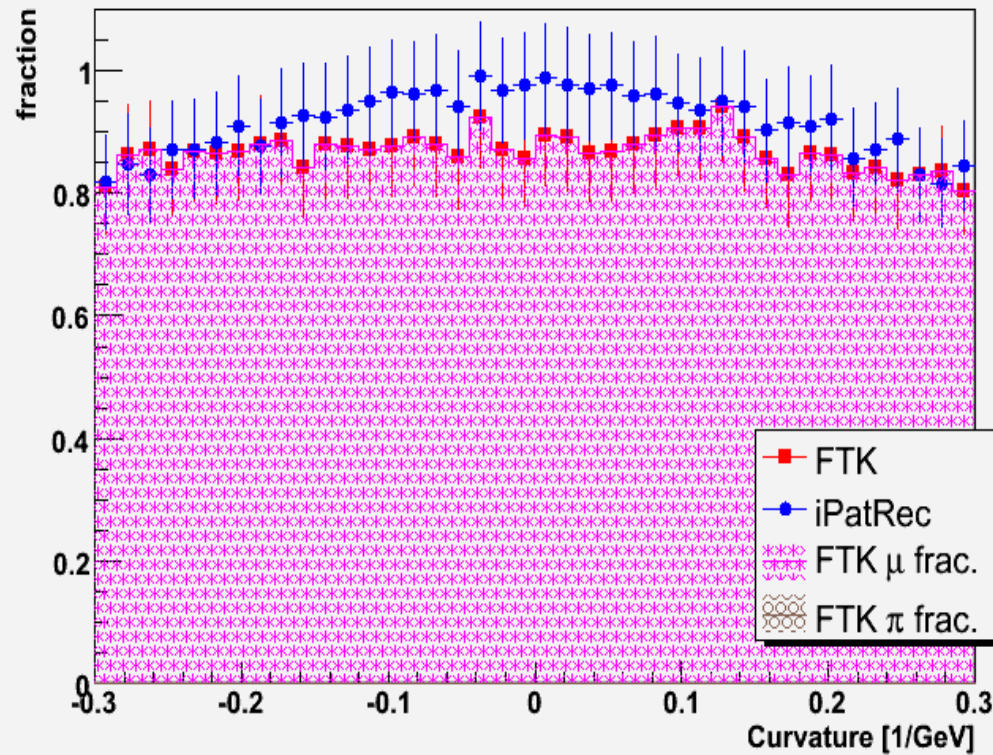
Very similar!

Training: efficiency vs curv

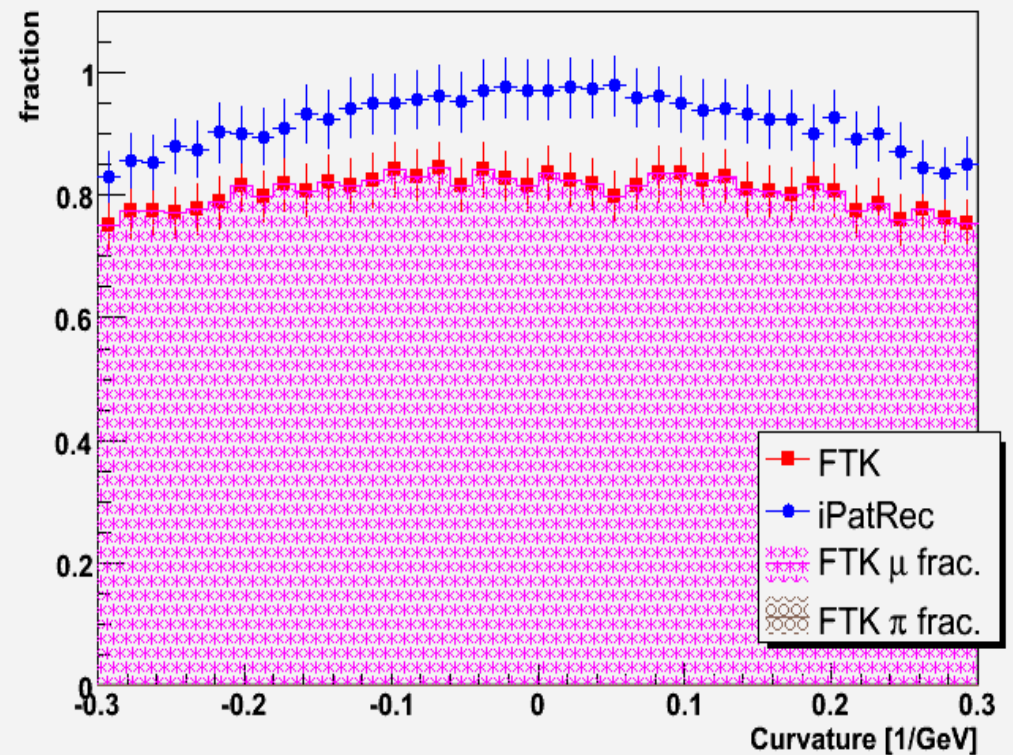
SP, 7L

RAW, 11L

Efficiency vs Curvature



Efficiency vs Curvature

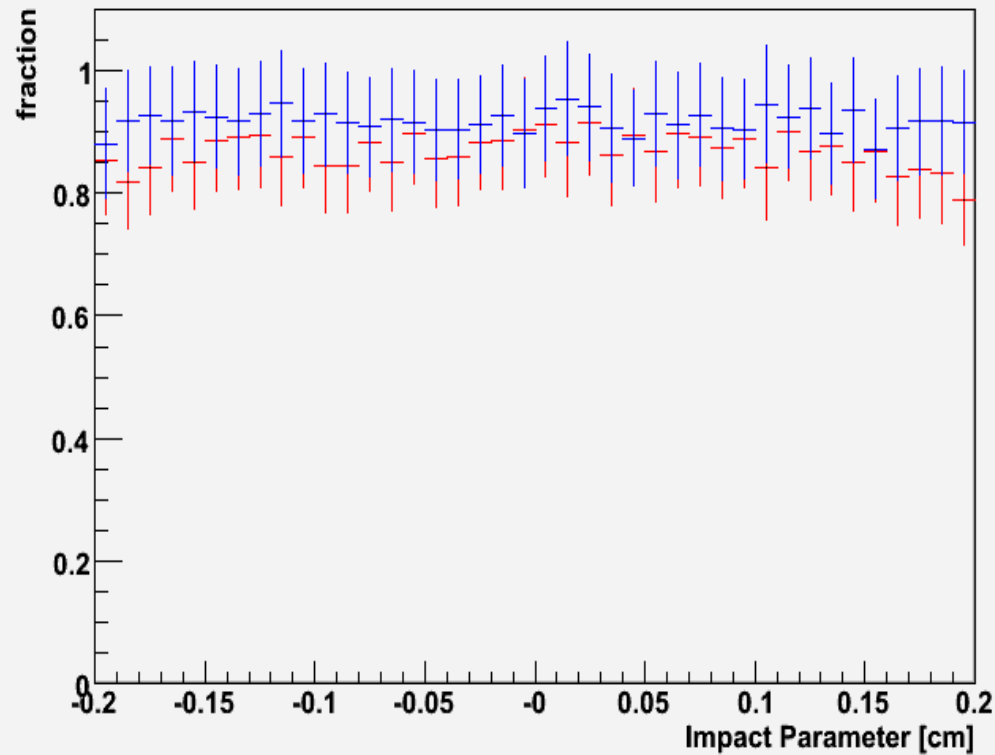


Training: efficiency vs IP

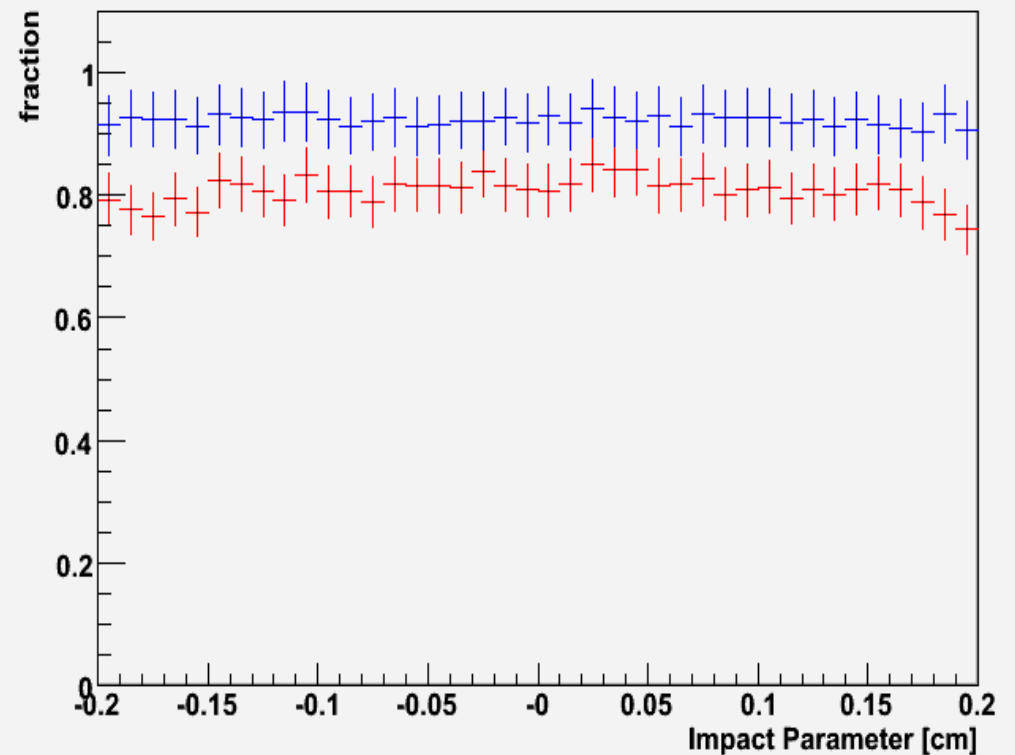
SP, 7L

RAW, 11L

Efficiency vs I.P.



Efficiency vs I.P.

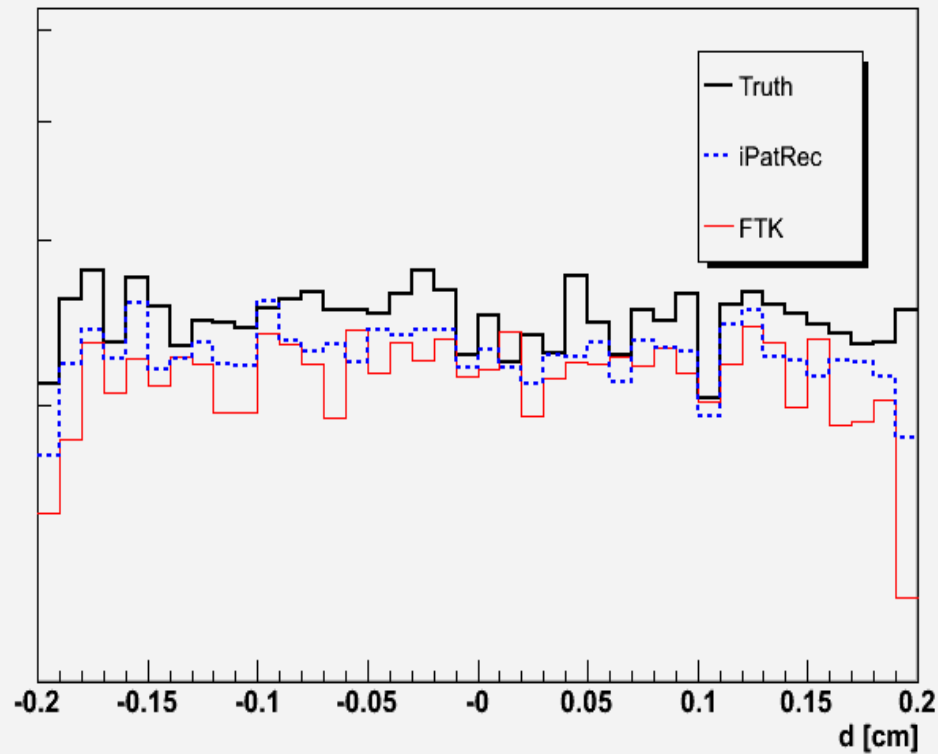


Training: IP distribution

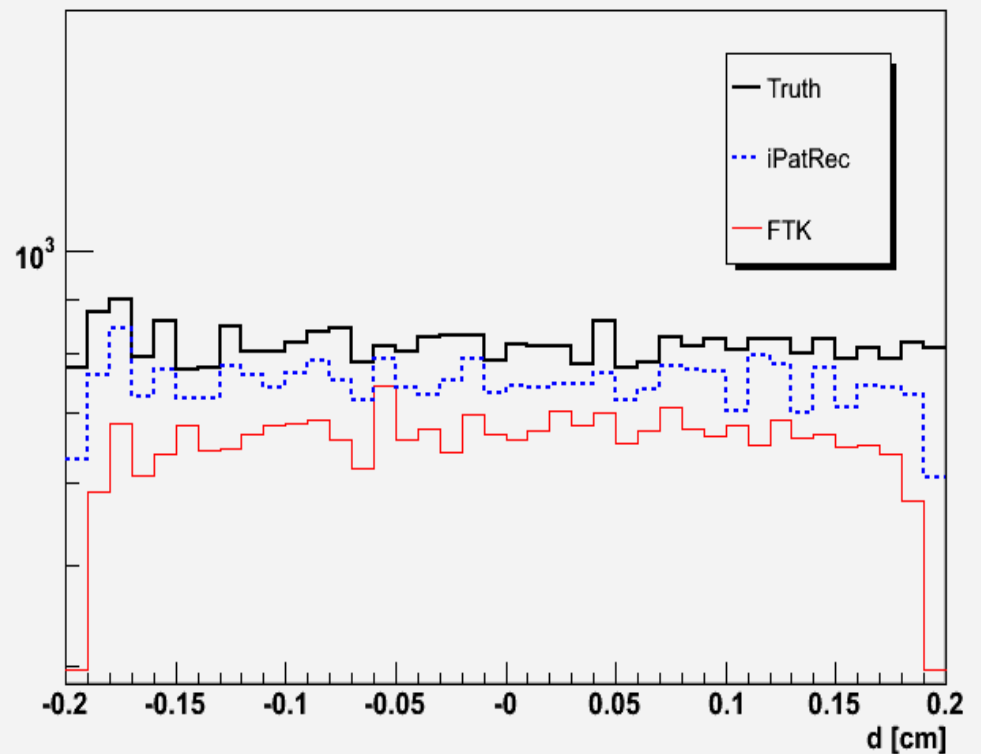
SP, 7L

RAW, 11L

Impact Parameter Distribution



Impact Parameter Distribution

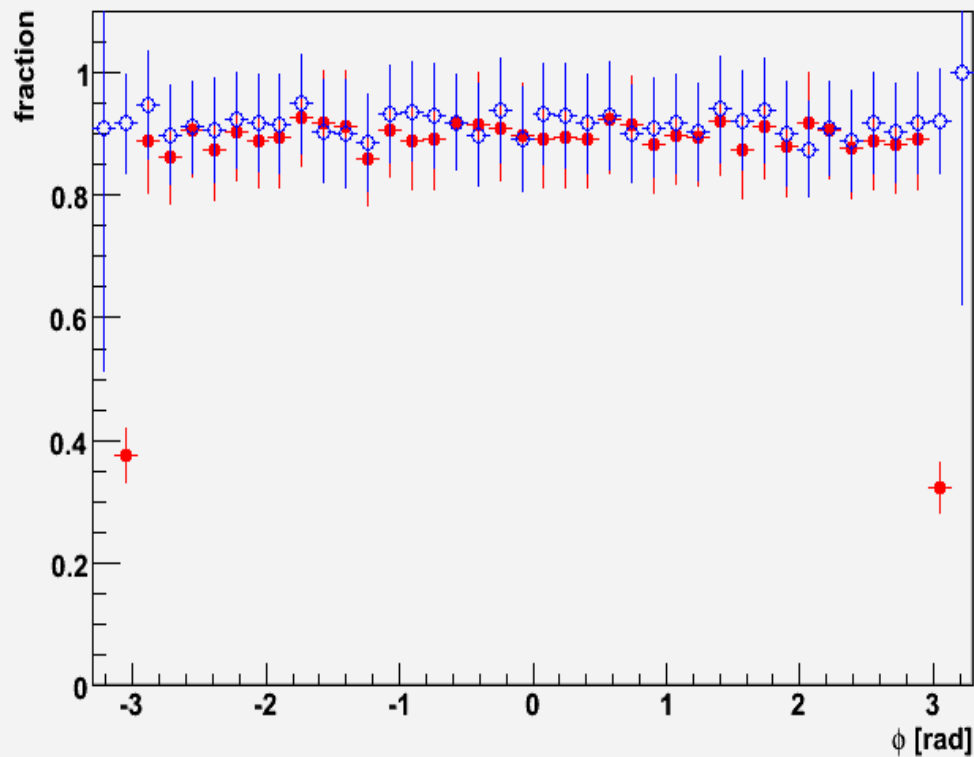


Training: efficiency vs phi

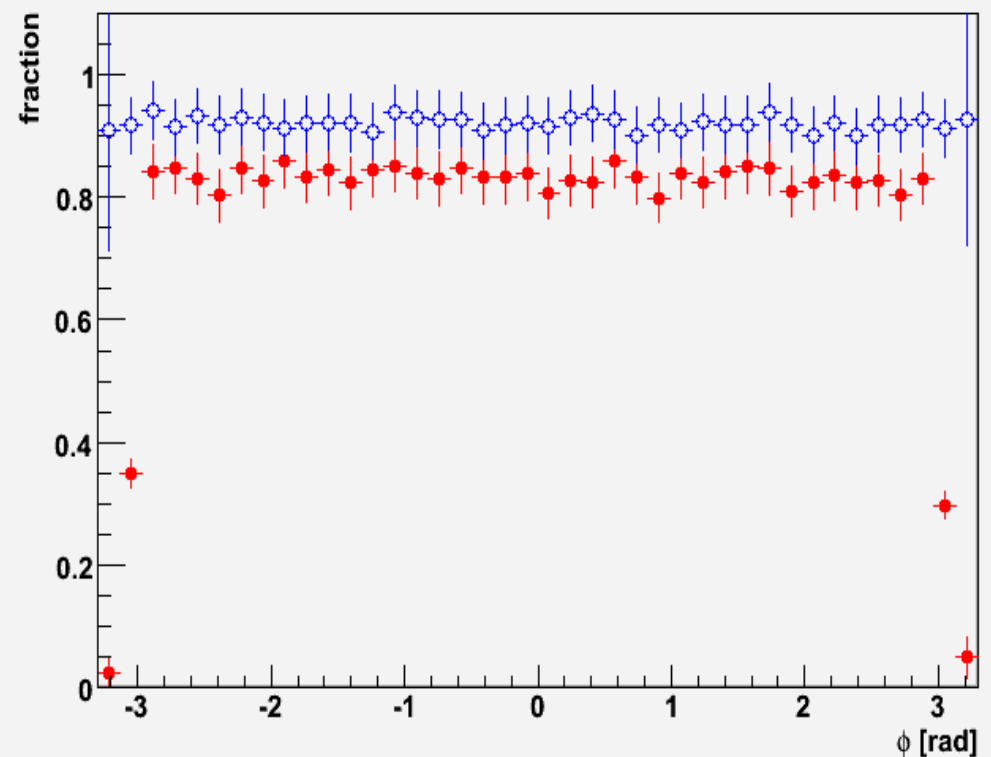
SP, 7L

RAW, 11L

Efficiency vs ϕ



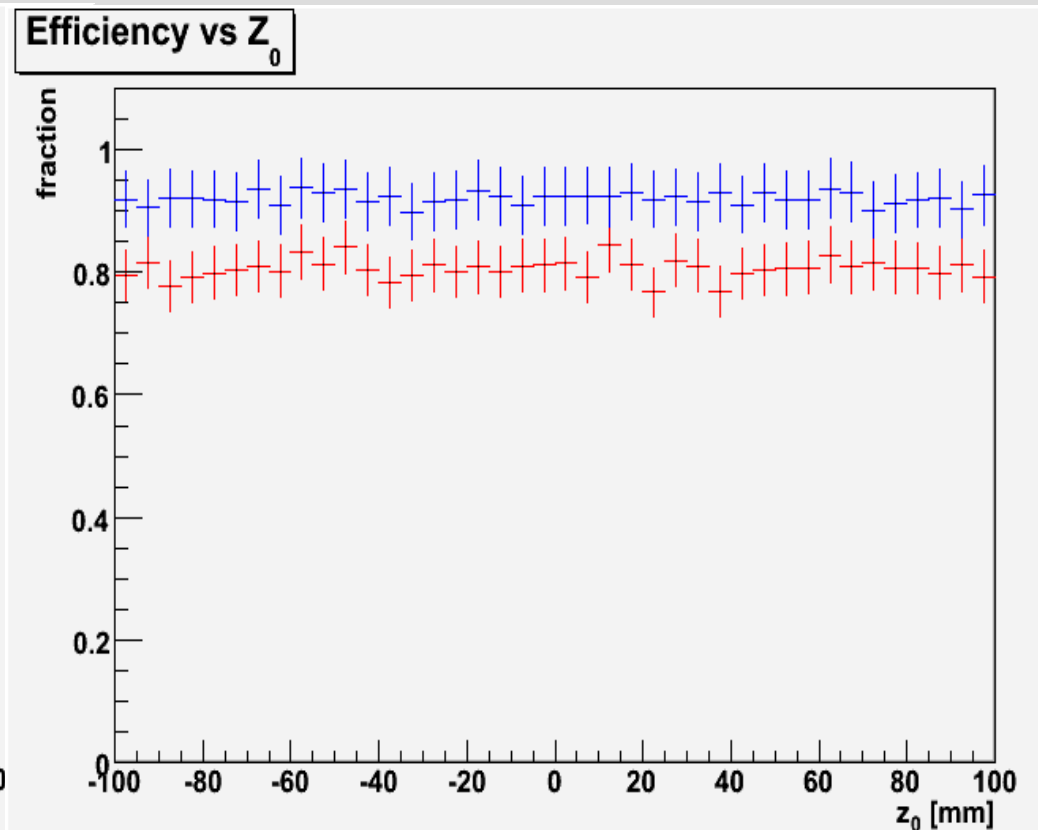
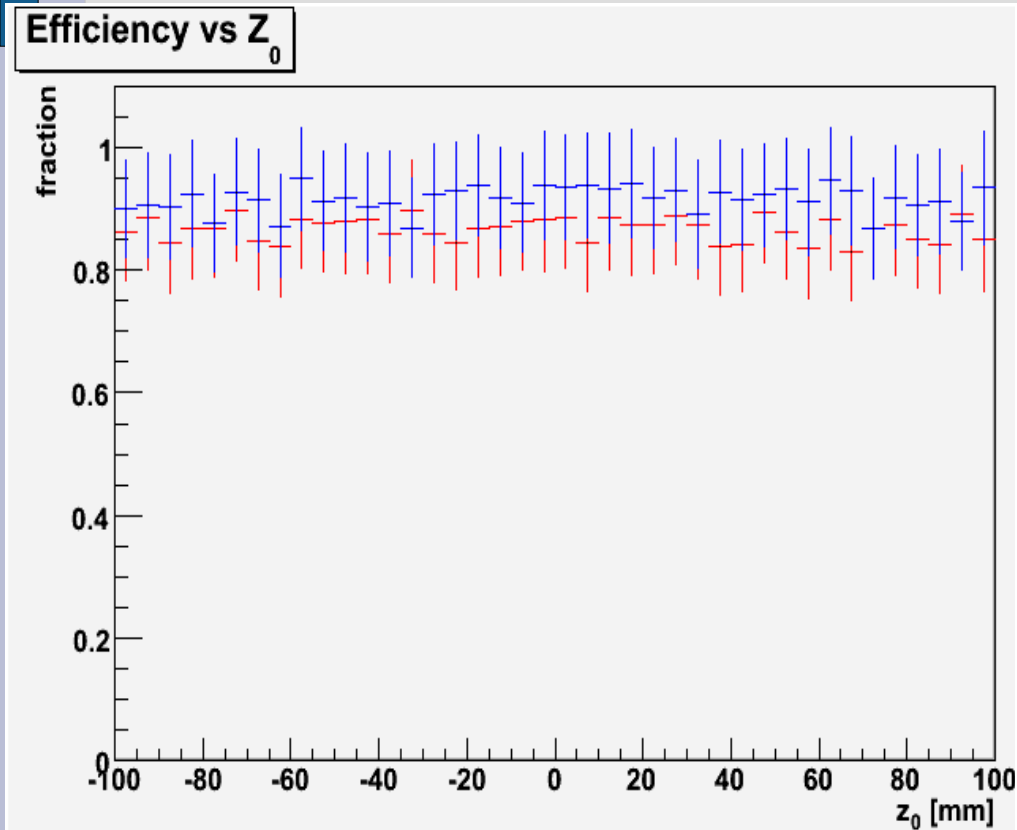
Efficiency vs ϕ



Training: efficiency vs z_0

SP, 7L

RAW, 11L

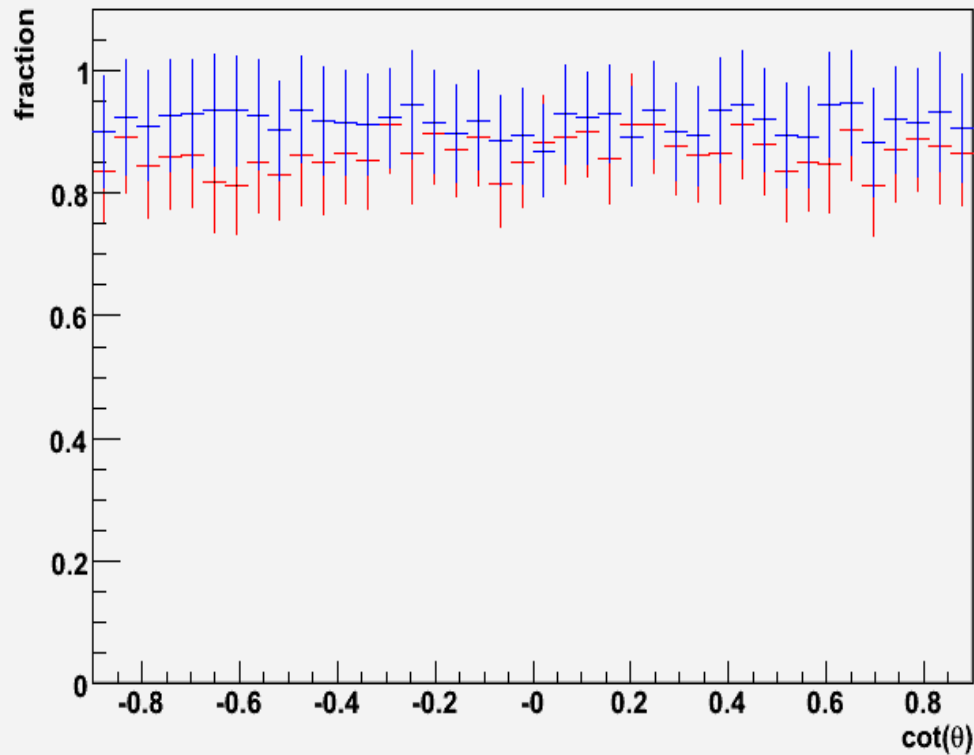


Training: efficiency vs $\cot(\theta)$

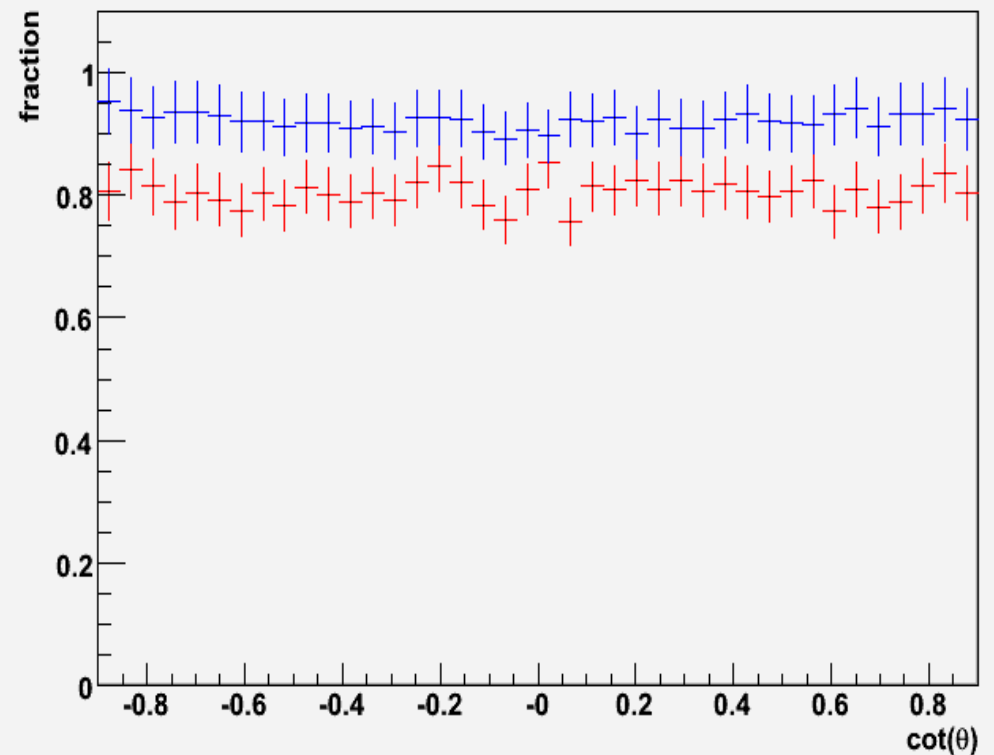
SP, 7L

RAW, 11L

Efficiency vs $\cot(\theta)$



Efficiency vs $\cot(\theta)$

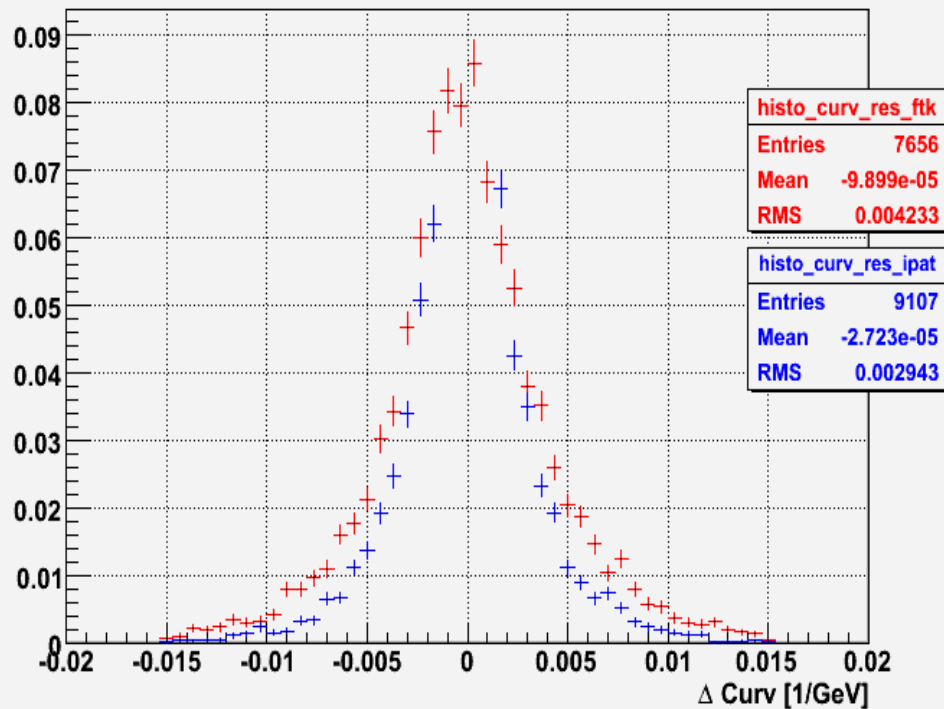


Training: resolution of curv

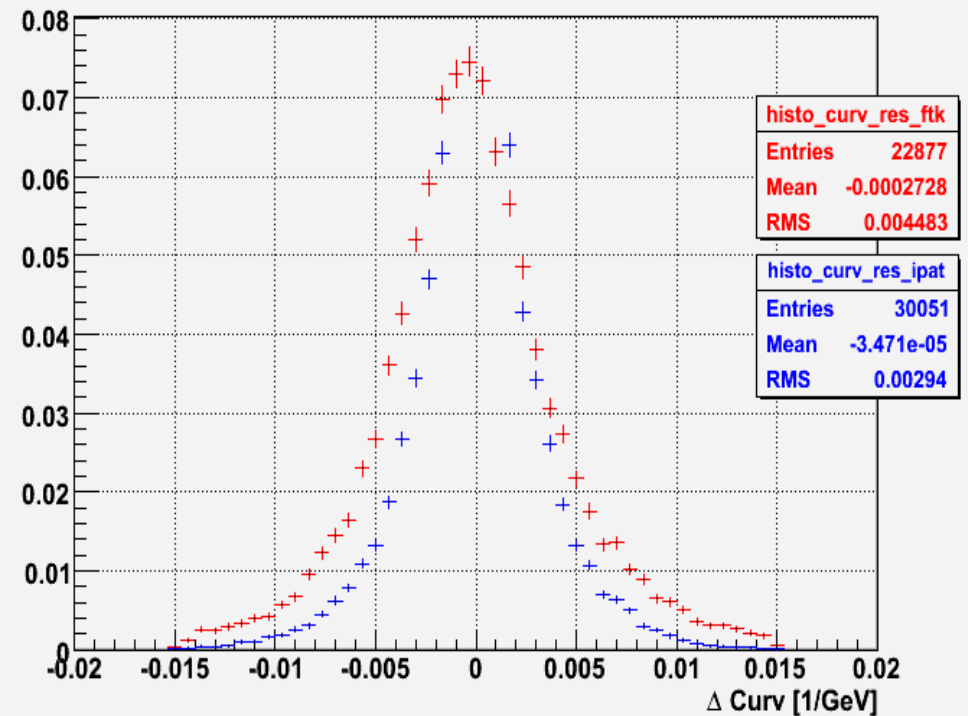
SP, 7L

RAW, 11L

Curvature resolution



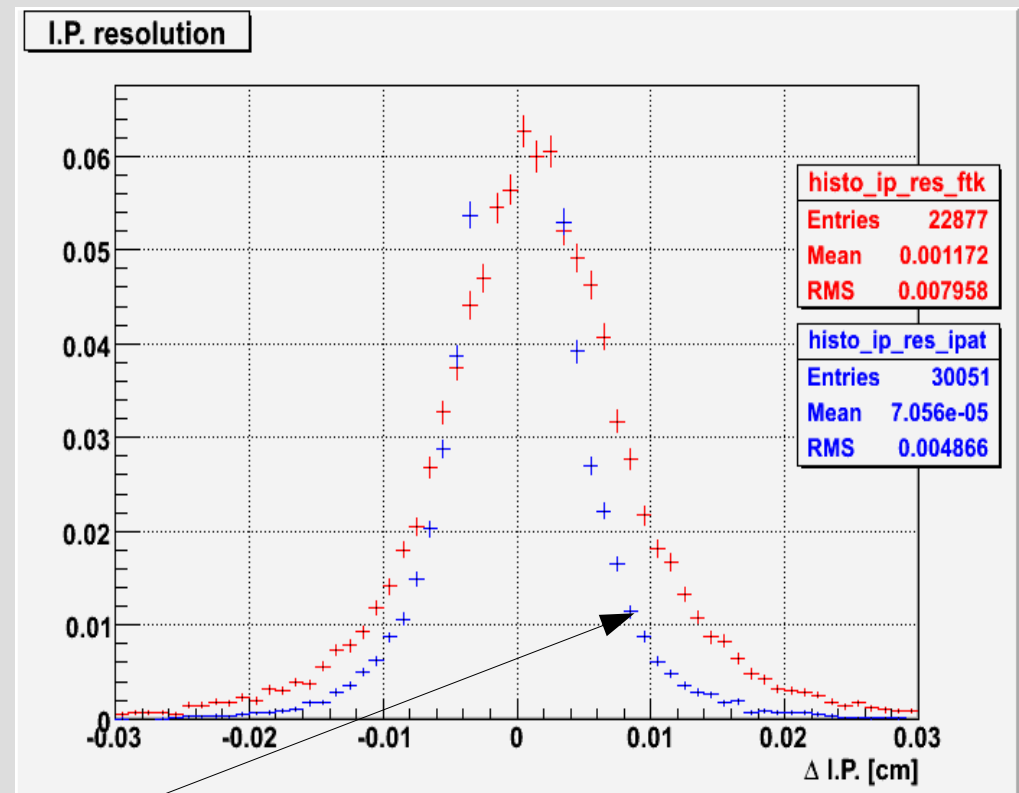
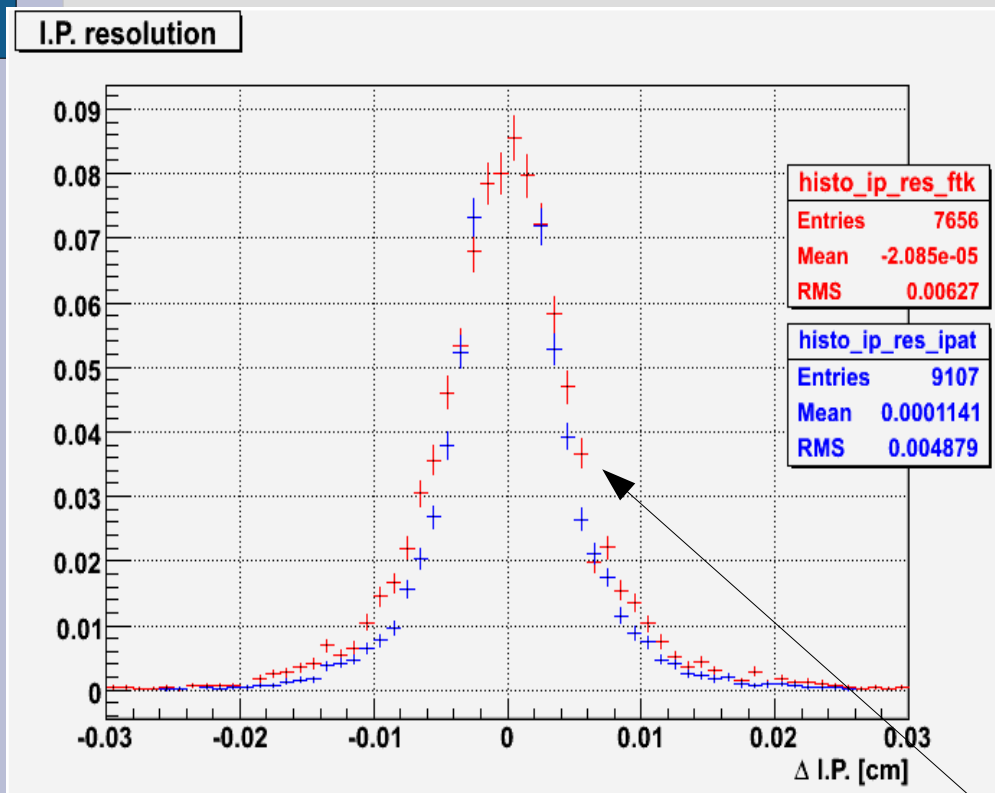
Curvature resolution



Training: resolution of IP

SP, 7L

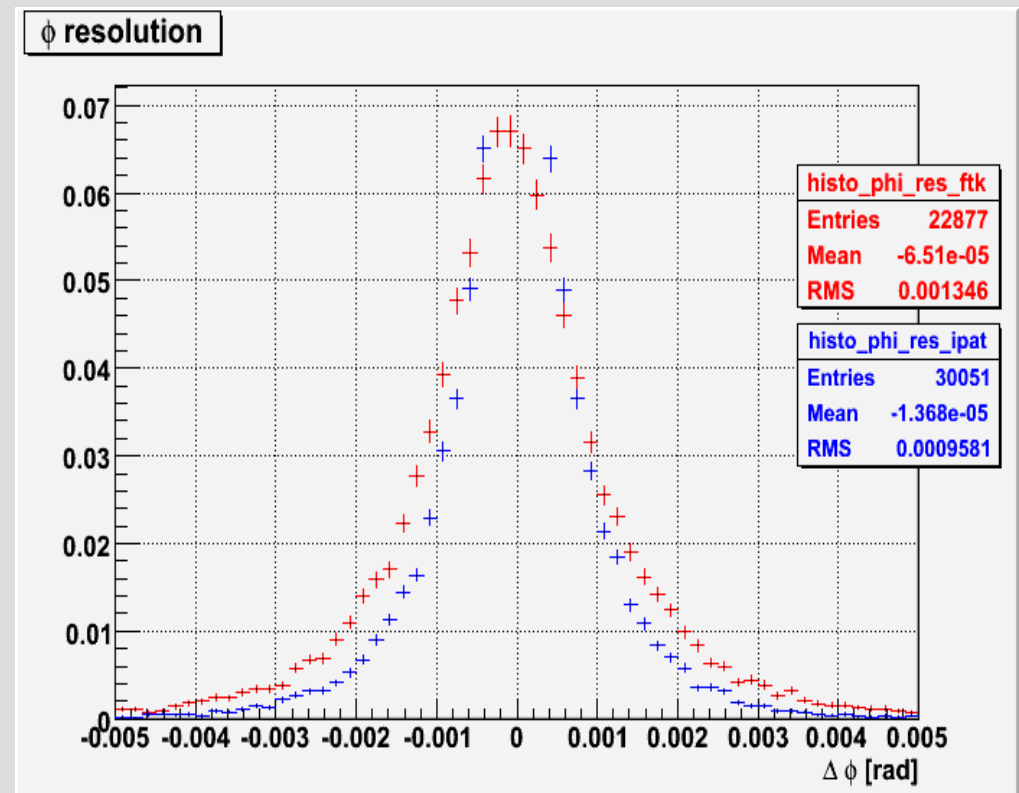
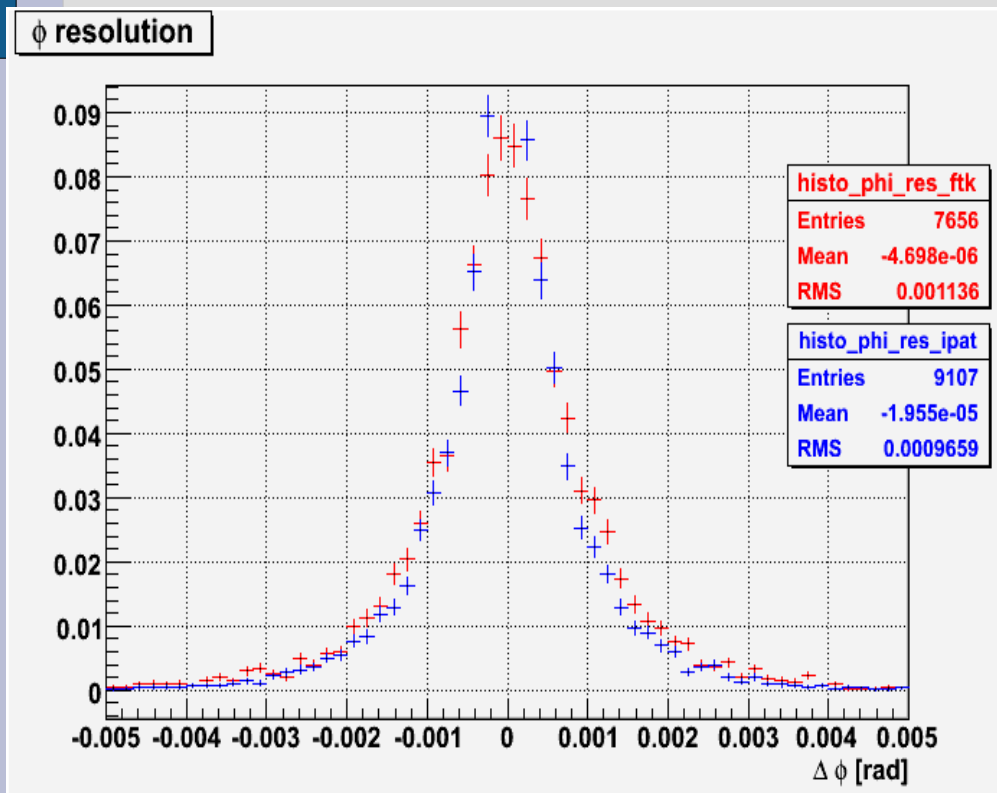
RAW, 11L



Training: resolution of phi

SP, 7L

RAW, 11L

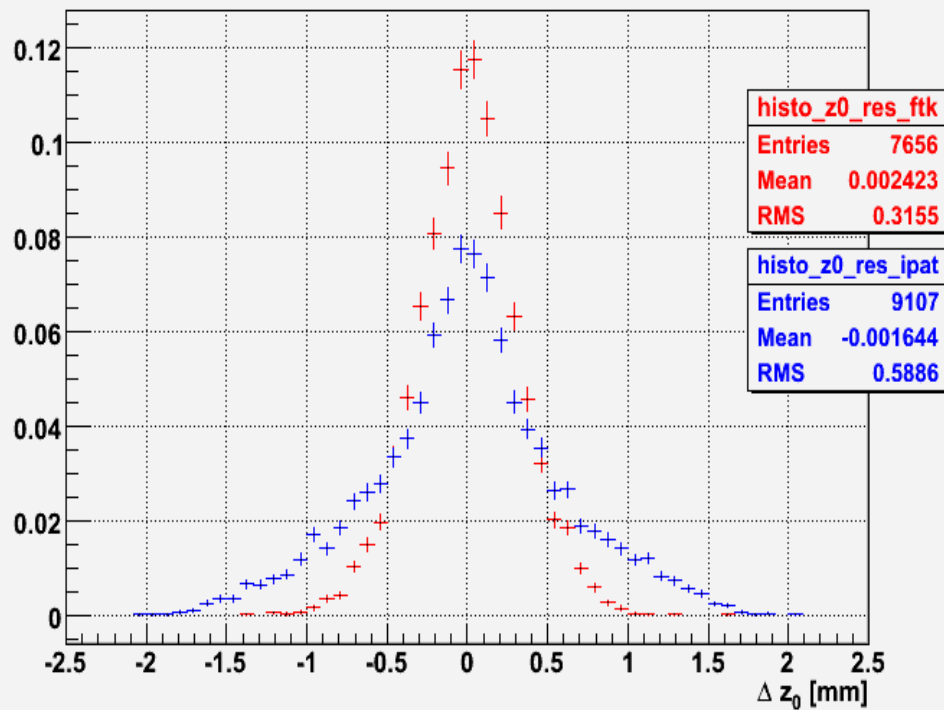


Training: resolution of z_0

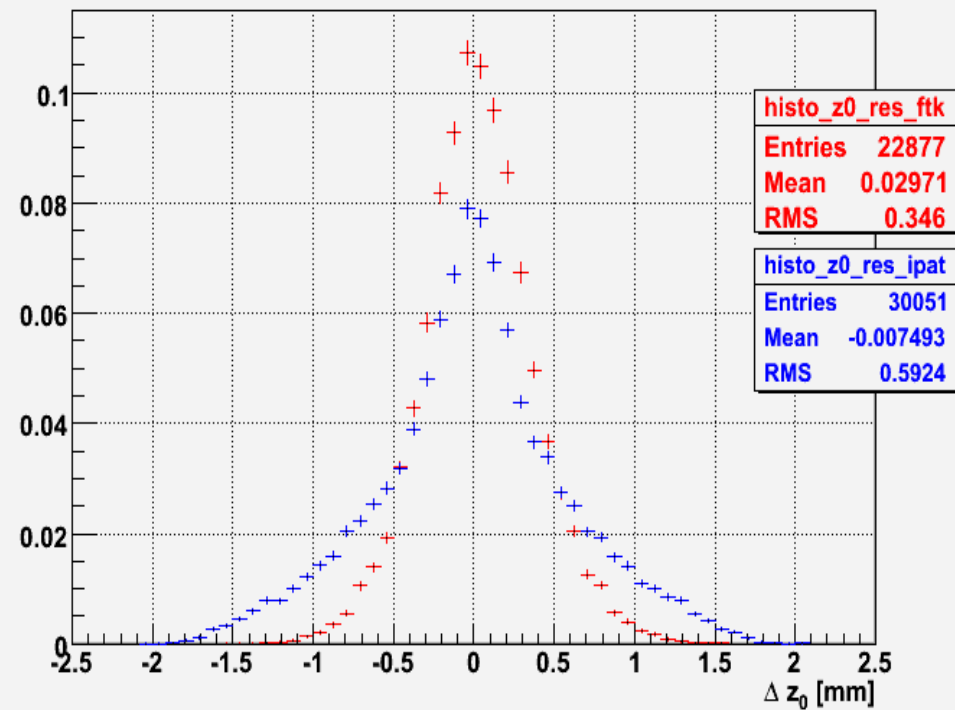
SP, 7L

RAW, 11L

z_0 resolution



z_0 resolution



bsmumu sample: PLOTS

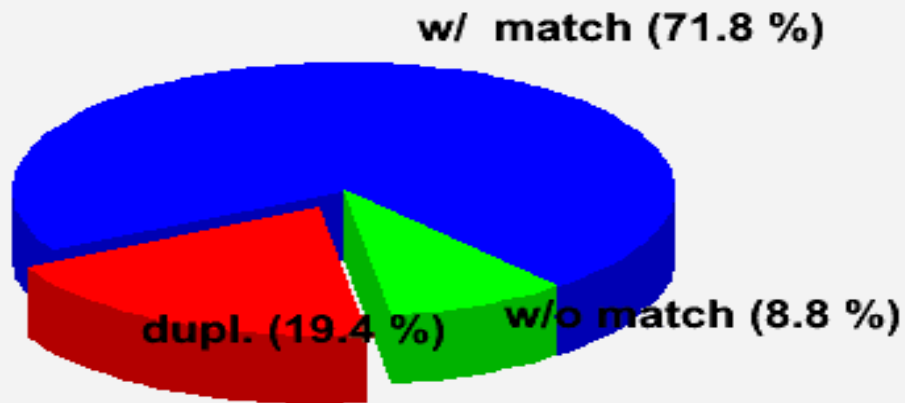
SP and RAW comparison of ftk performance

bsmumu: fakes

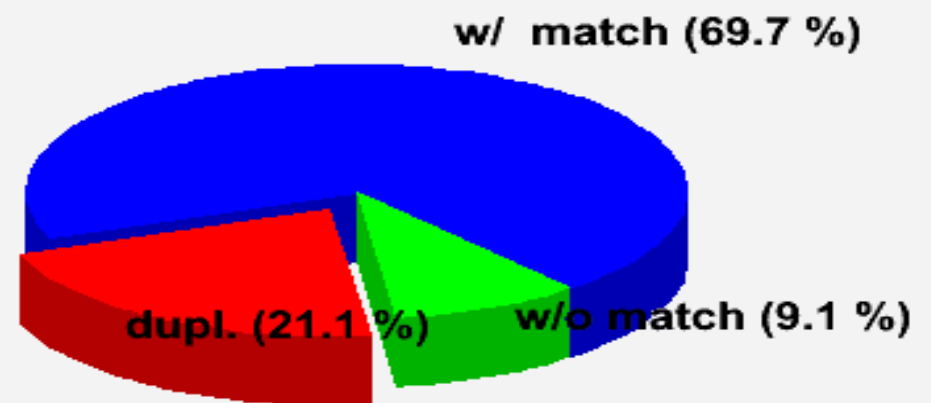
SP, 7L

RAW, 11L

Fakes Summary



Fakes Summary



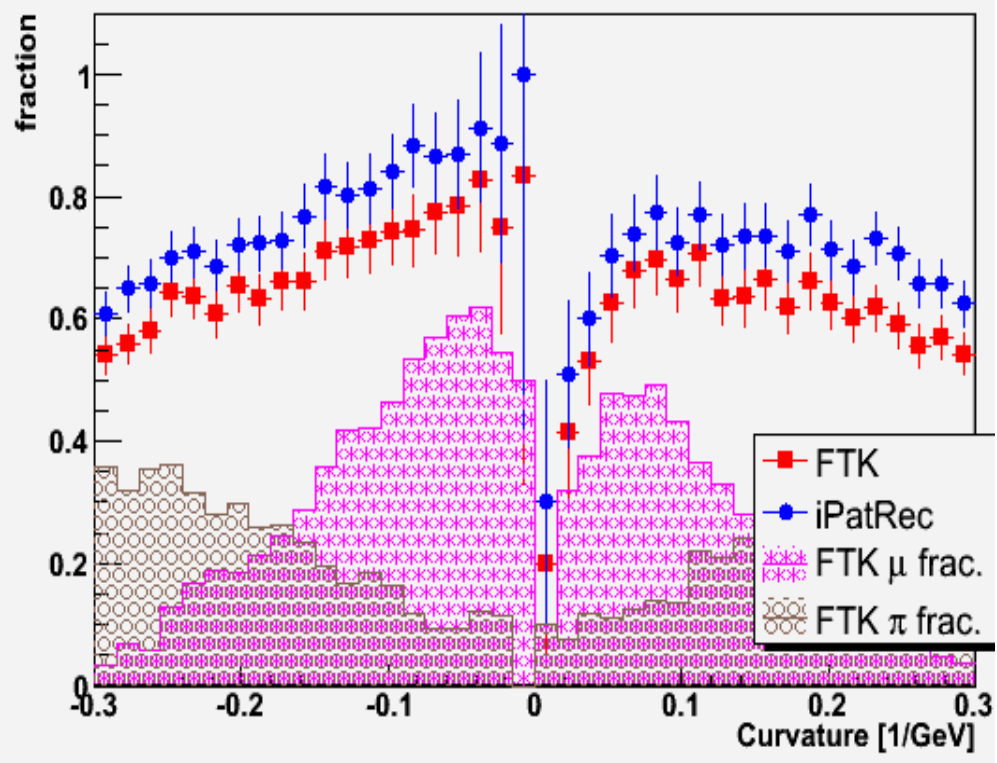
Very similar, again!

bsmumu: efficiency vs curv

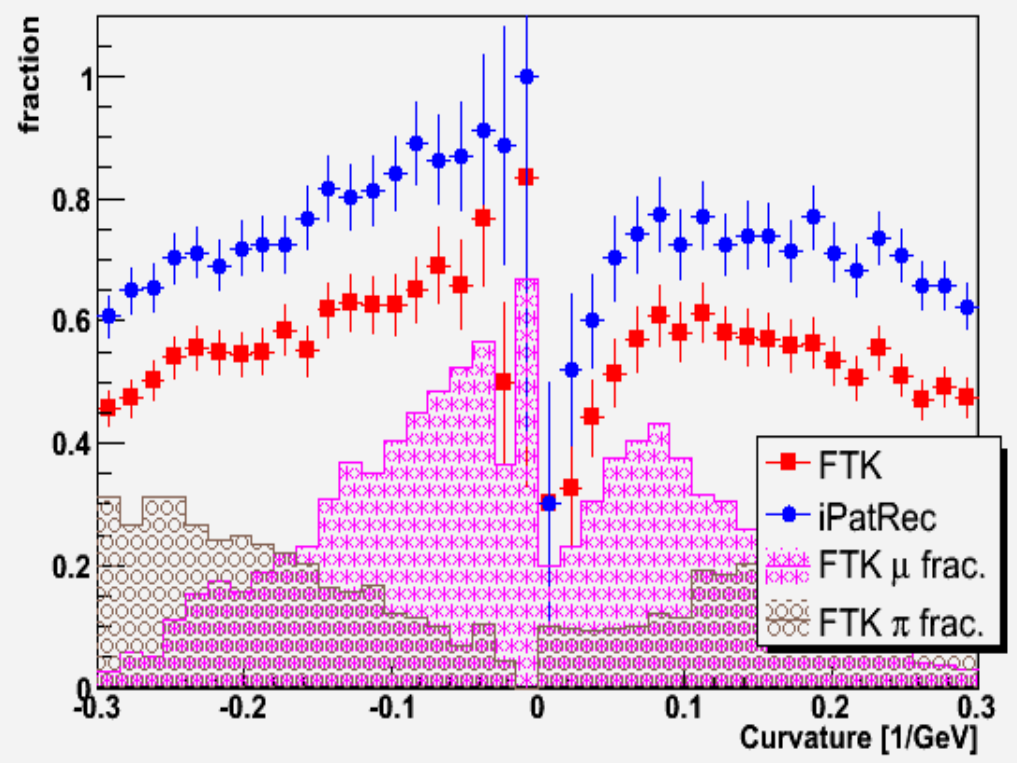
SP, 7L

RAW, 11L

Efficiency vs Curvature



Efficiency vs Curvature



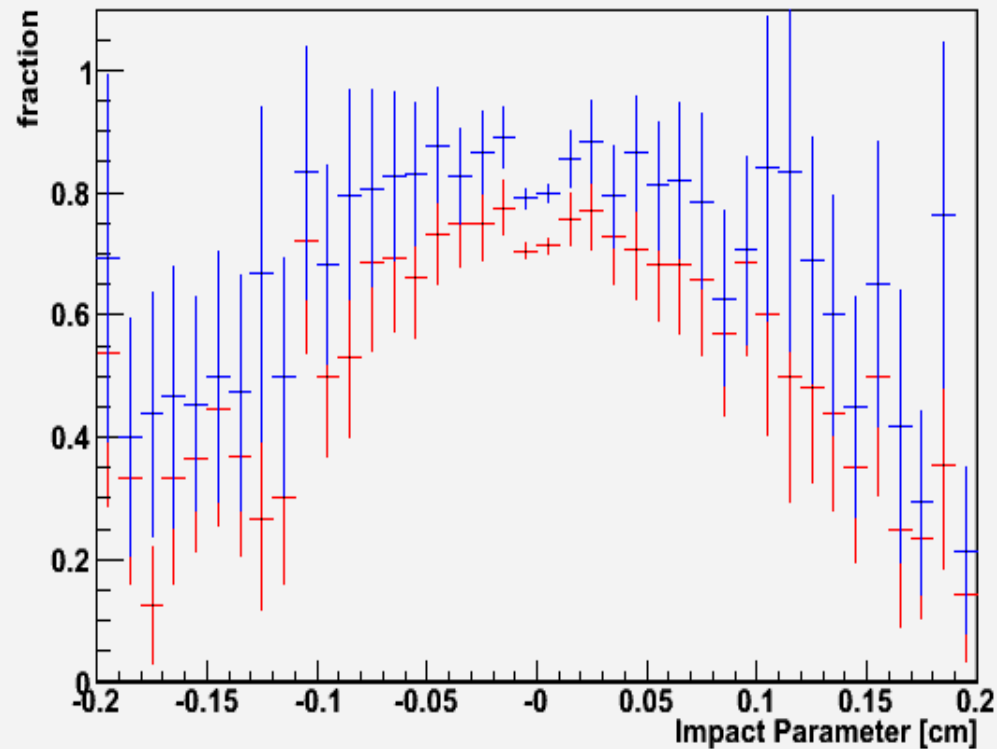
WEIRD structure, both in SP and RAW and IPAT!

bsmumu: efficiency vs IP

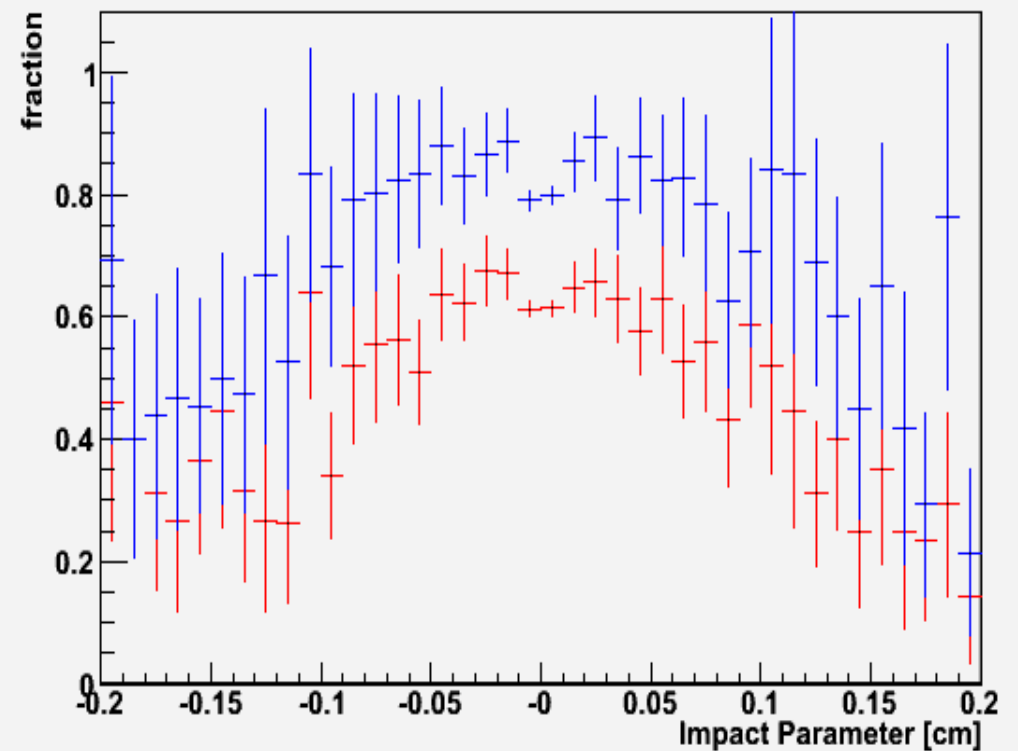
SP, 7L

RAW, 11L

Efficiency vs I.P.



Efficiency vs I.P.

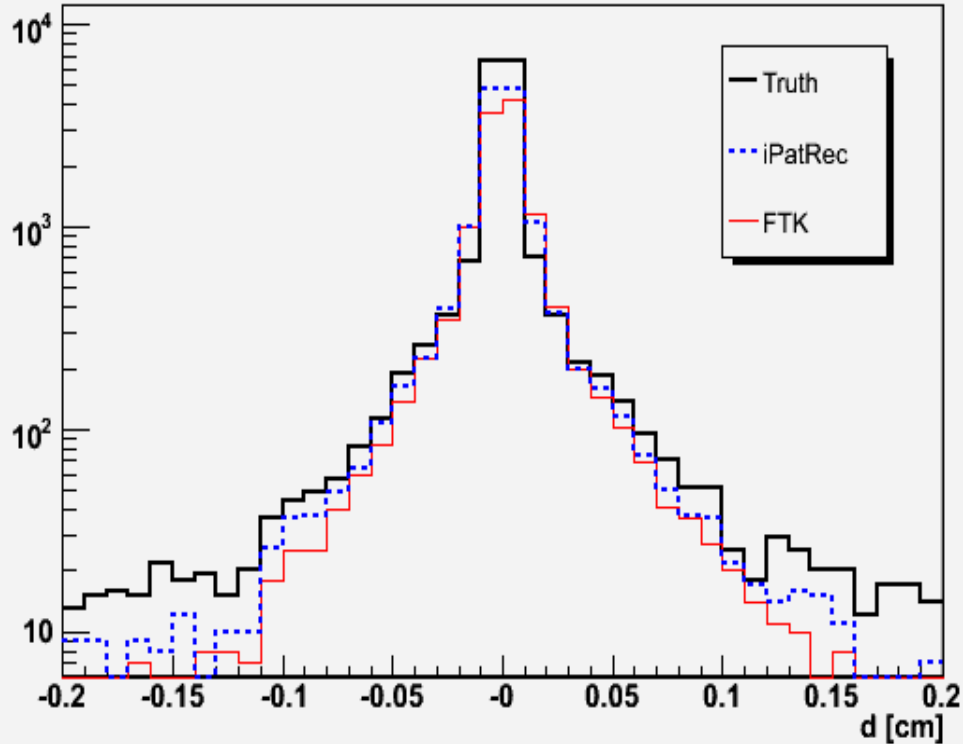


bsmumu: IP distribution

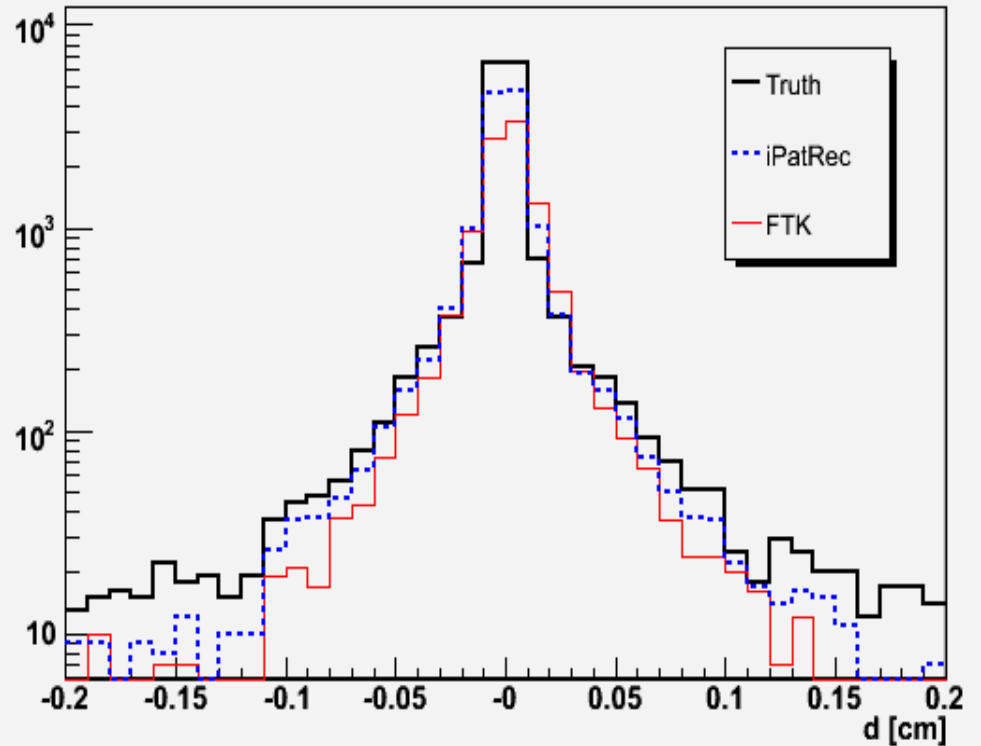
SP, 7L

RAW, 11L

Impact Parameter Distribution



Impact Parameter Distribution

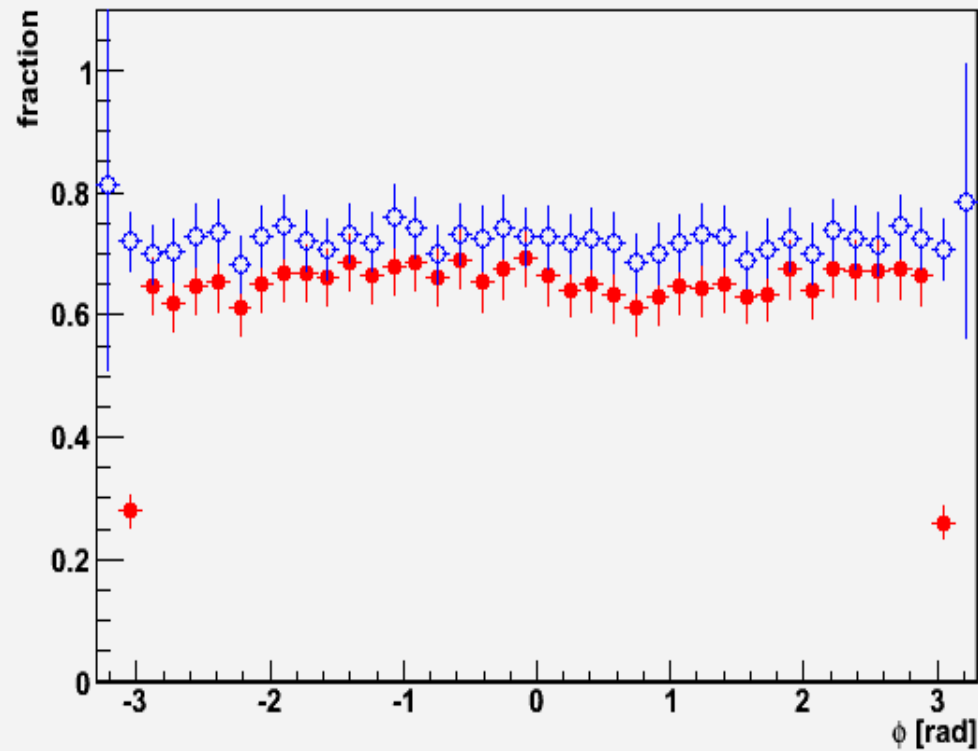


bsmumu: efficiency vs phi

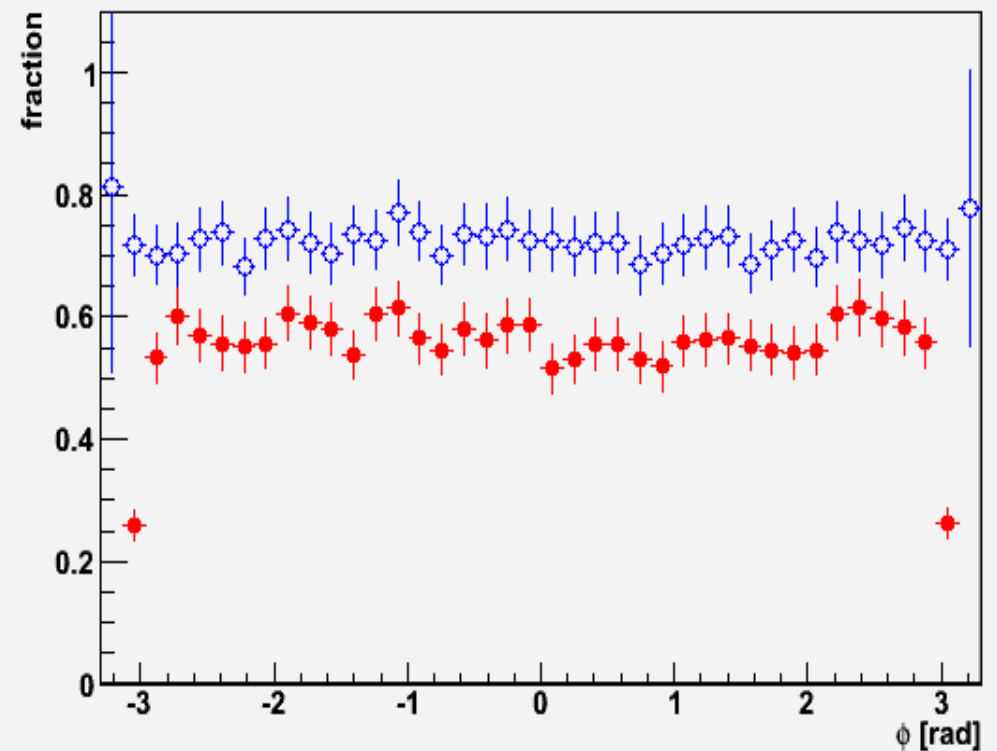
SP, 7L

RAW, 11L

Efficiency vs ϕ



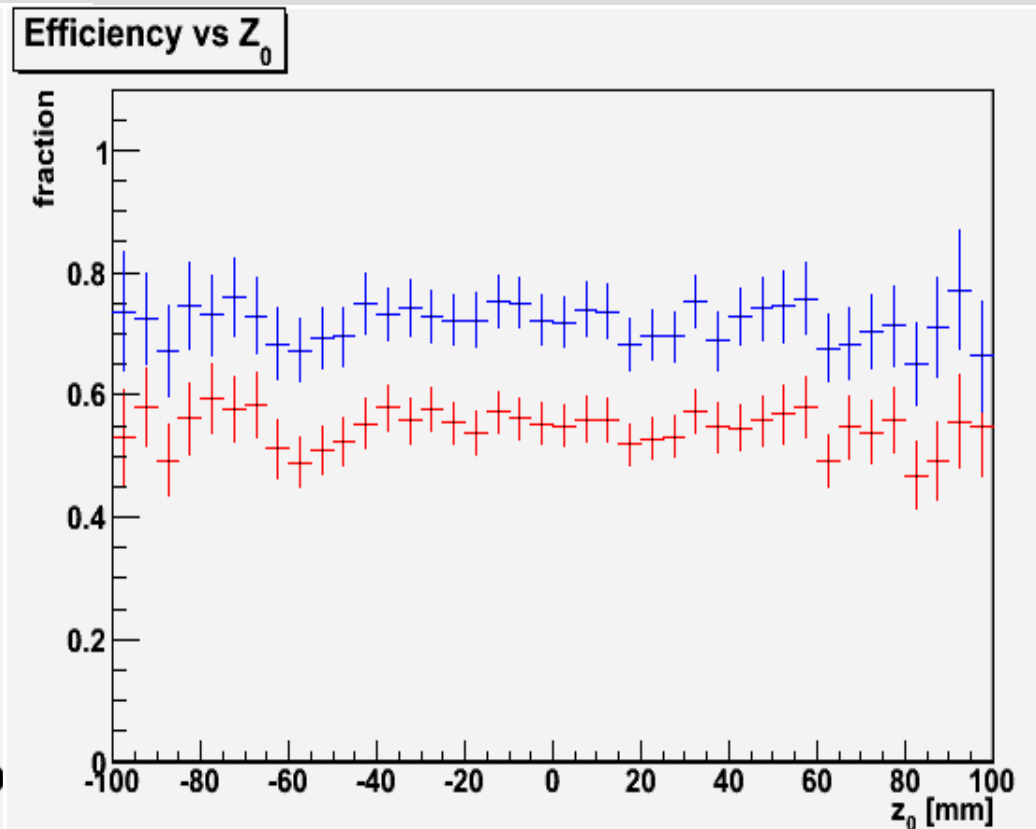
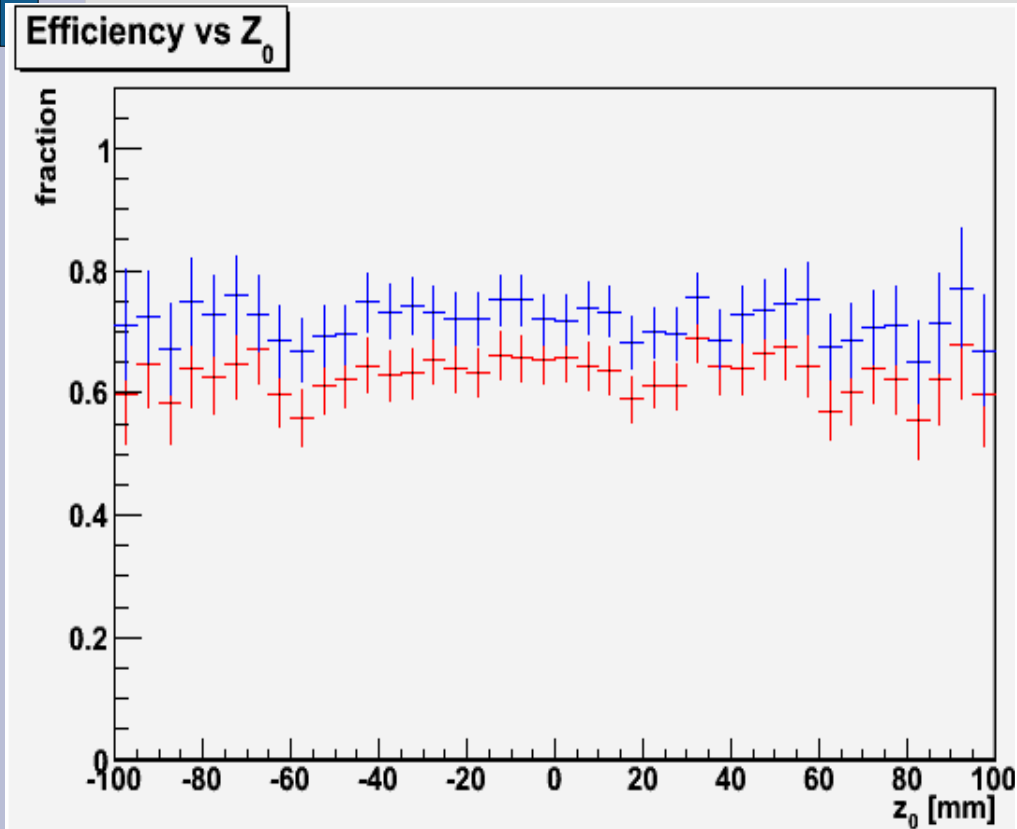
Efficiency vs ϕ



bsmumu: efficiency vs z_0

SP, 7L

RAW, 11L

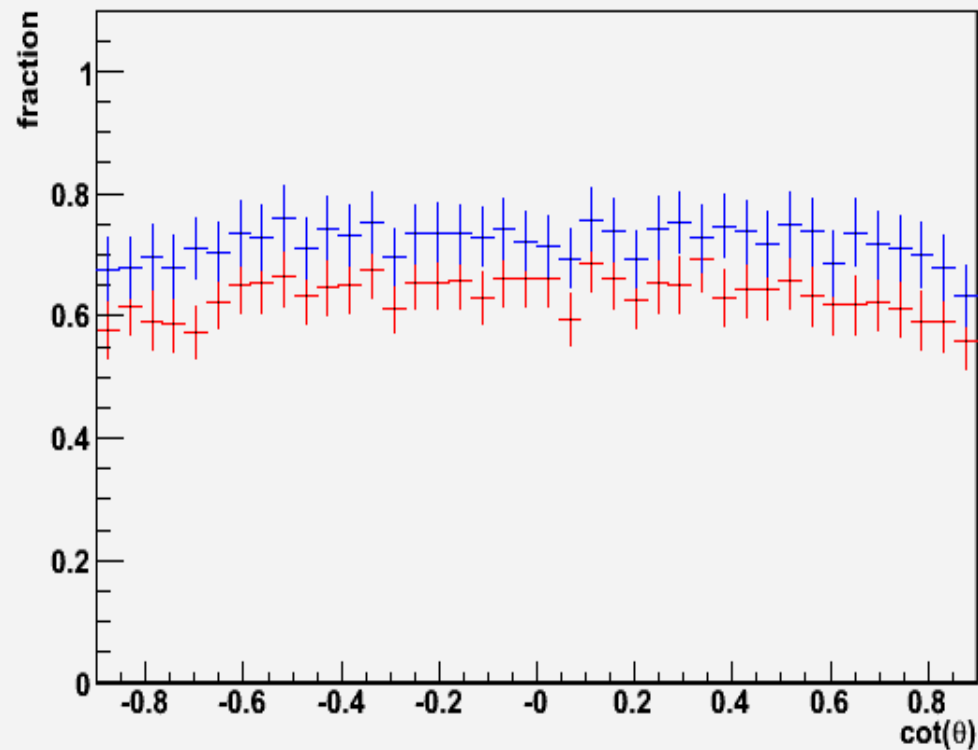


bsmumu: efficiency vs $\cot(\theta)$

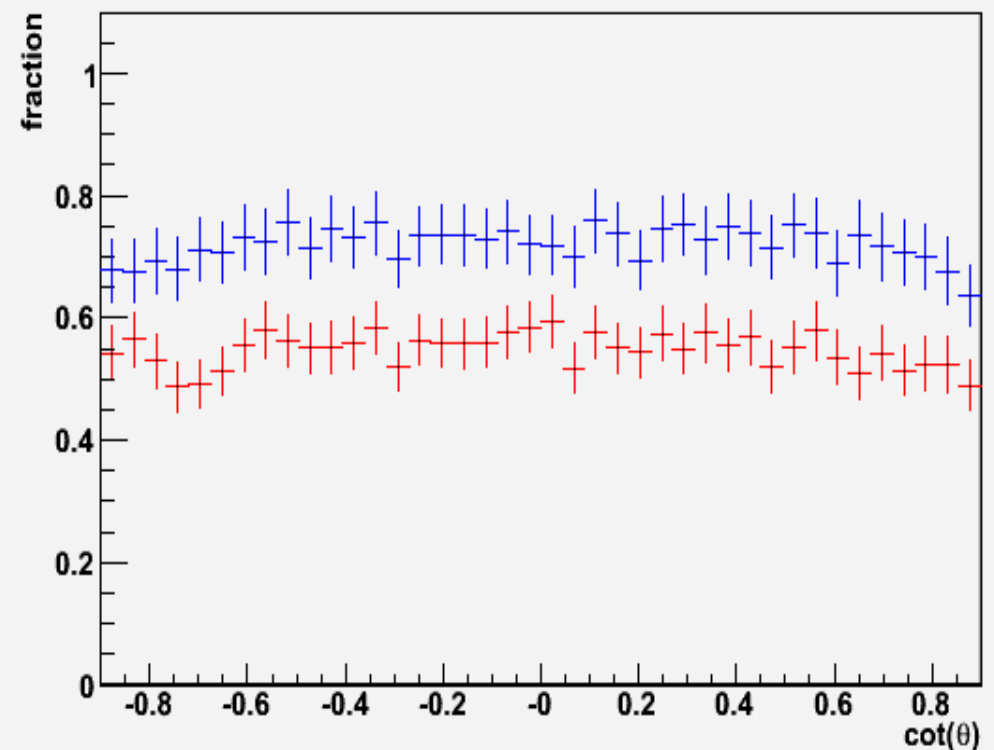
SP, 7L

RAW, 11L

Efficiency vs $\cot(\theta)$



Efficiency vs $\cot(\theta)$

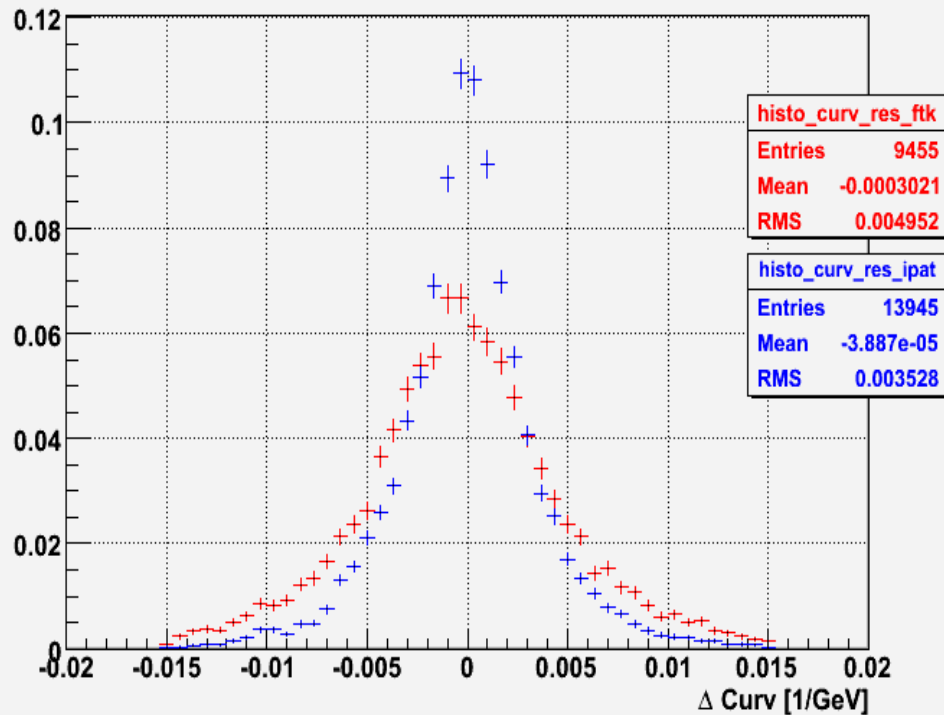


bsmumu: resolution of curv

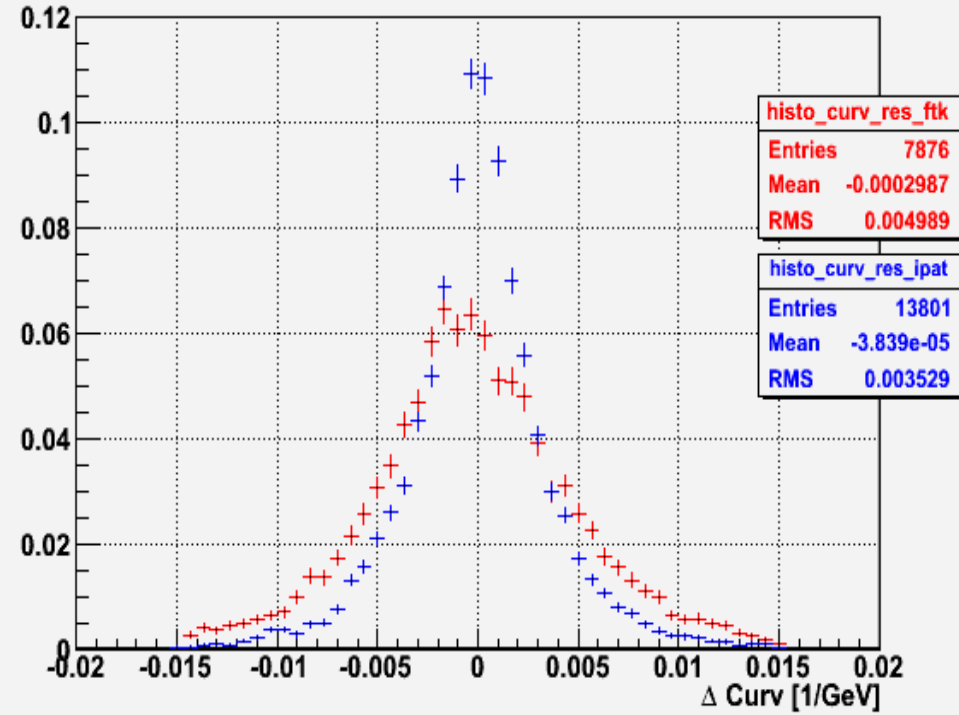
SP, 7L

RAW, 11L

Curvature resolution



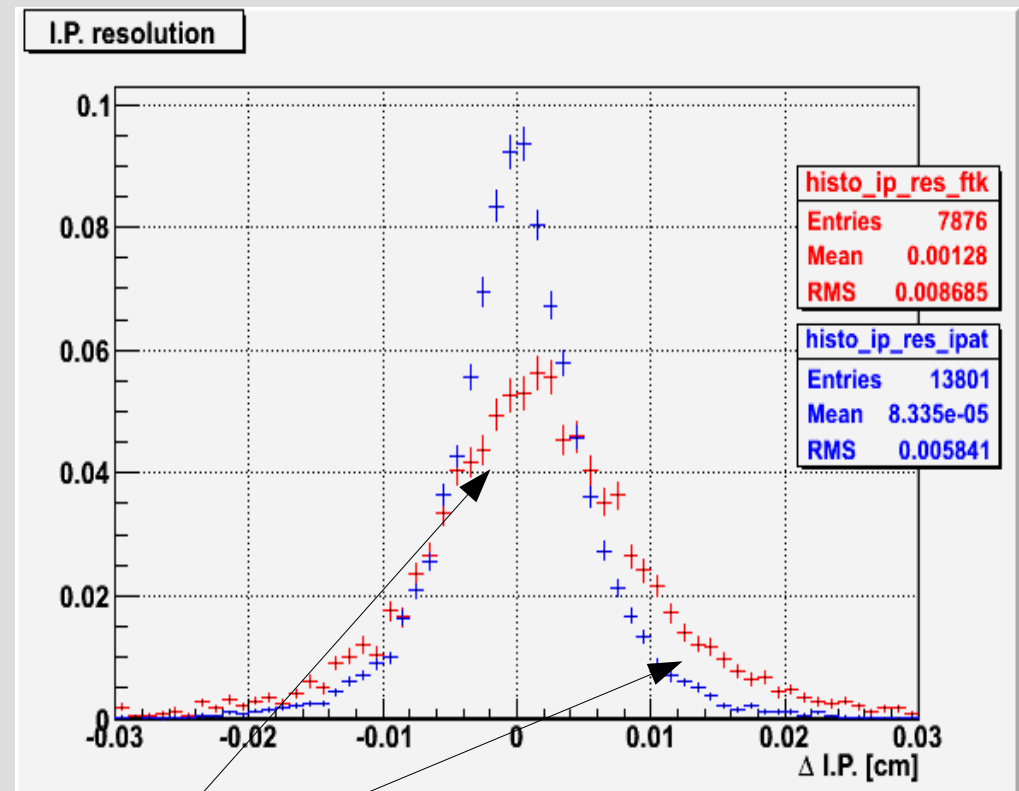
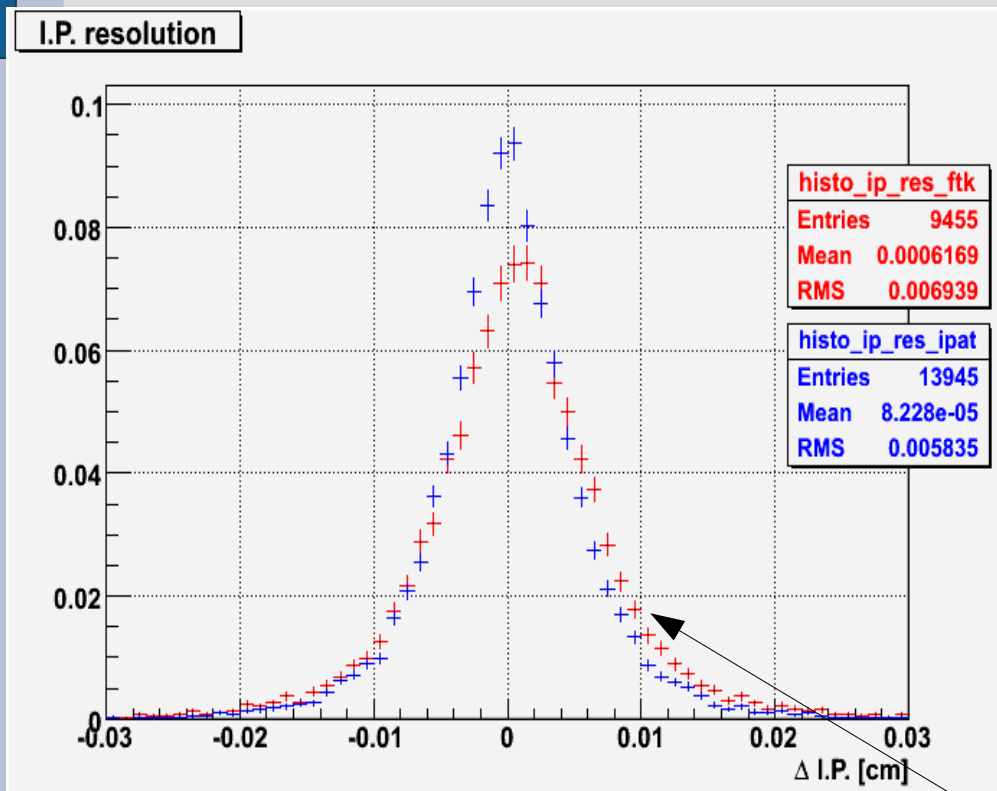
Curvature resolution



bsmumu: resolution of IP

SP, 7L

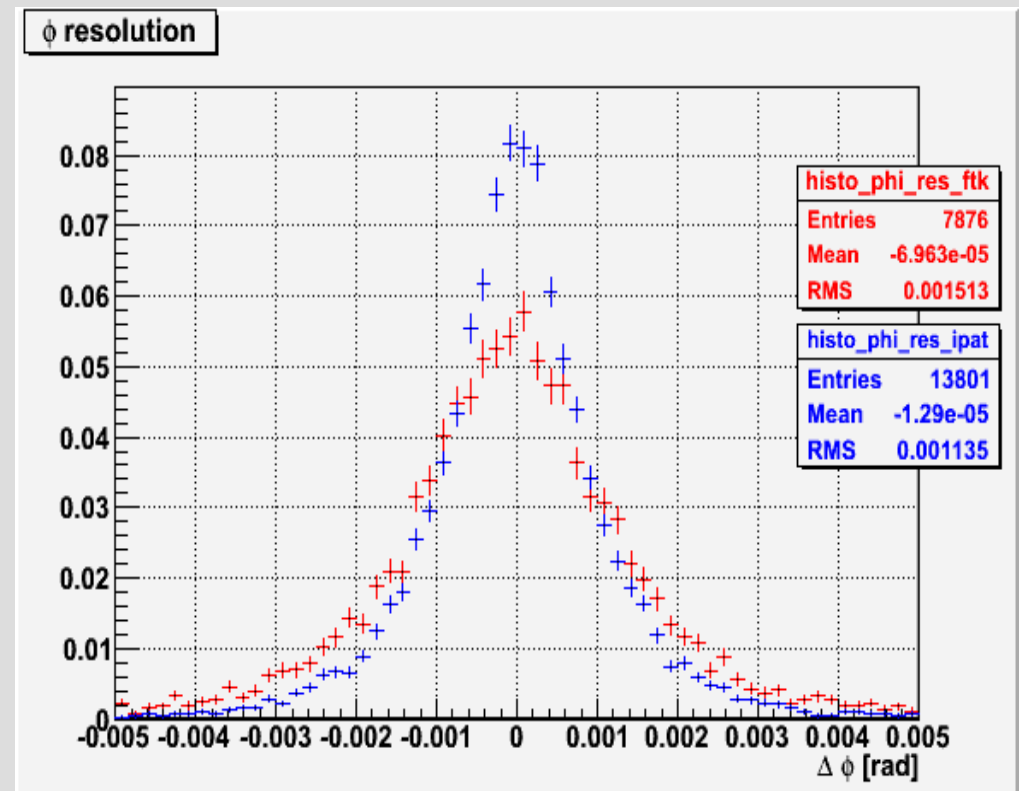
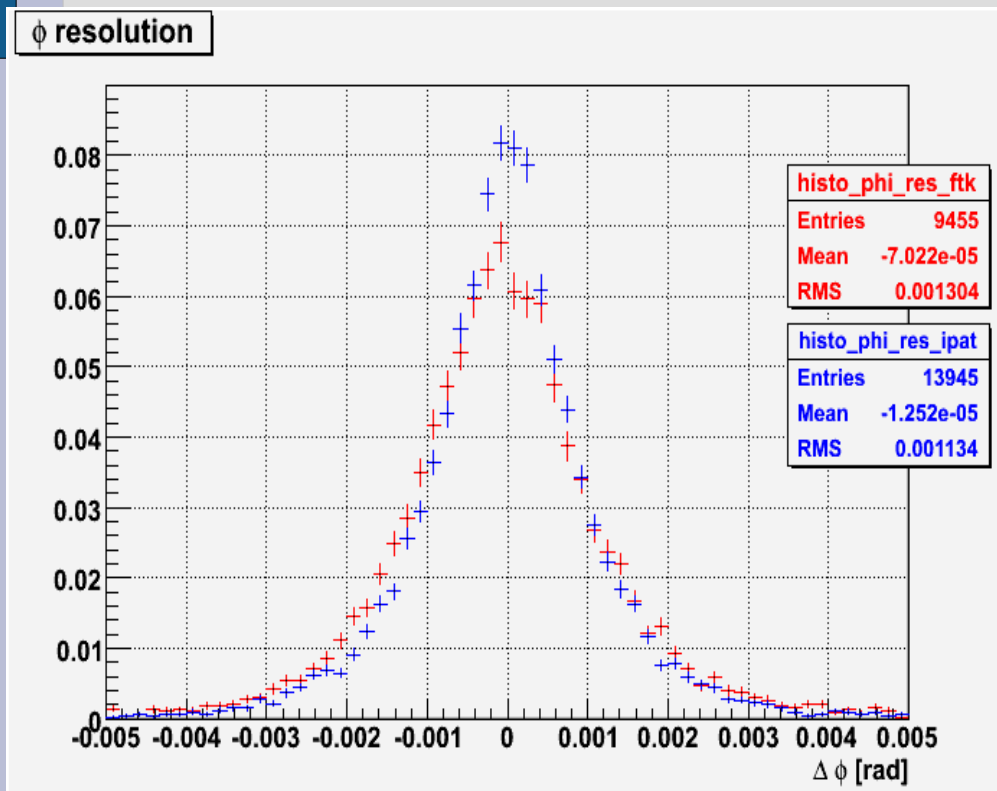
RAW, 11L



bsmumu: resolution of phi

SP, 7L

RAW, 11L

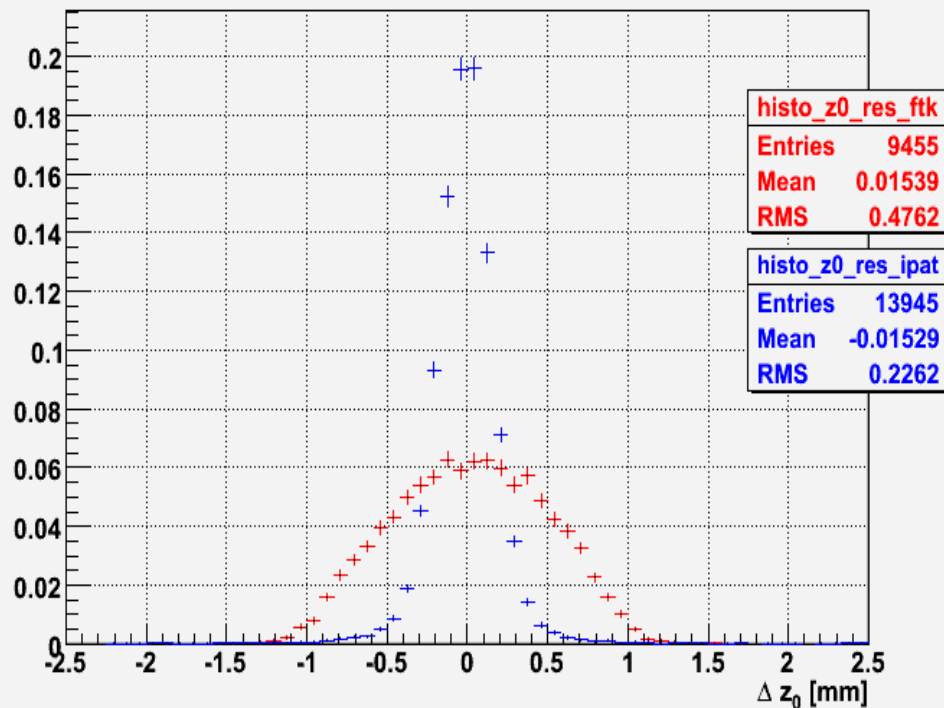


bsmumu: resolution of z0

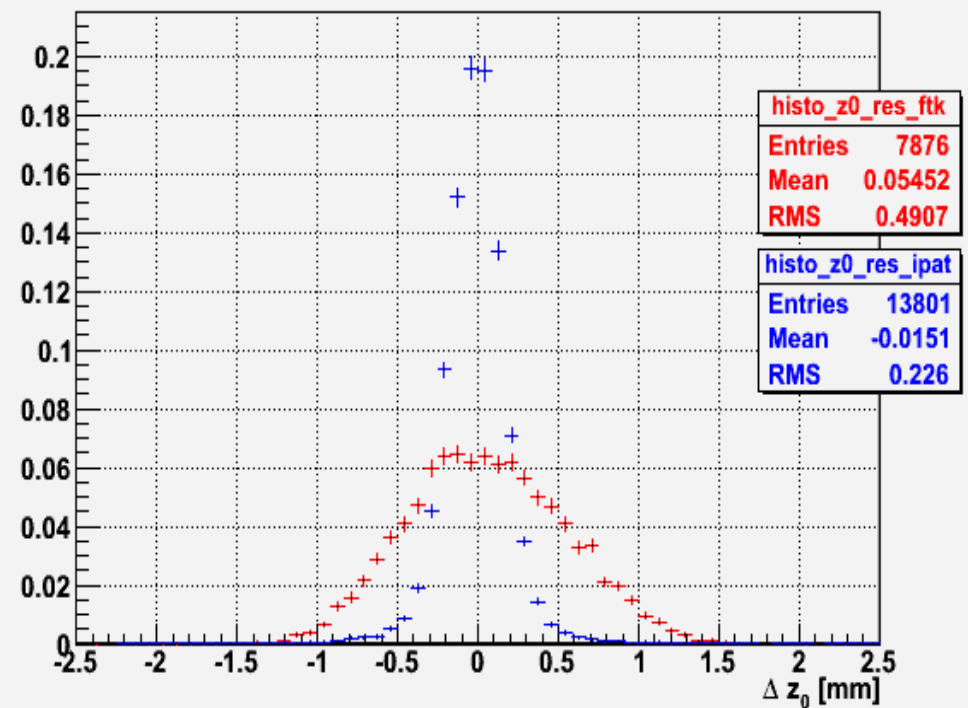
SP, 7L

RAW, 11L

z₀ resolution



z₀ resolution



Is z₀ supposed to be that bad? - both in SP and RAW cases!

Conclusions / TODO

- Estimate coverage of pattern banks
- Understand resolution curves (asymmetry)
- Run hilumi once other bugs are fixed
- Start merging with Corrinne's work?