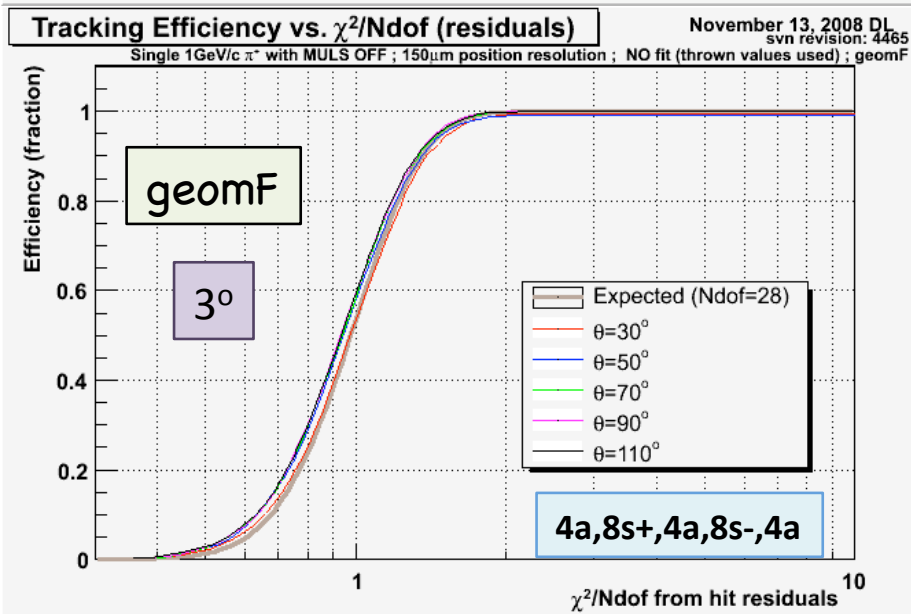# CDC Simulation Studies For Geometries C, F, H, & I
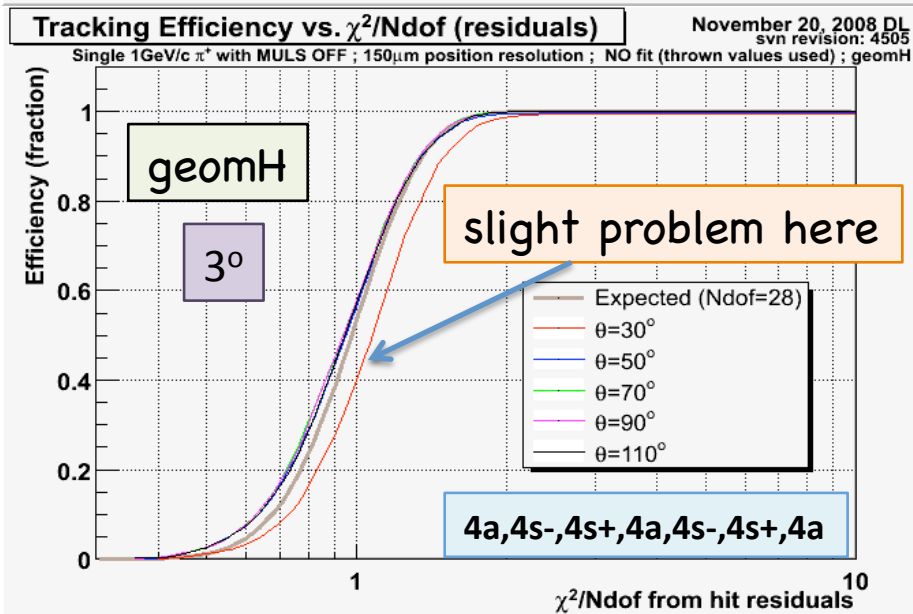
Nov. 20, 2008
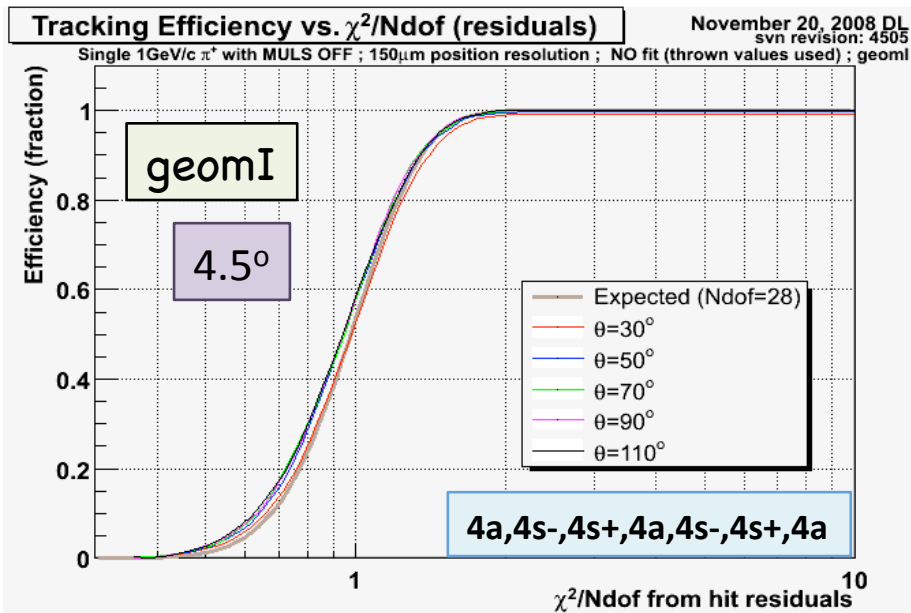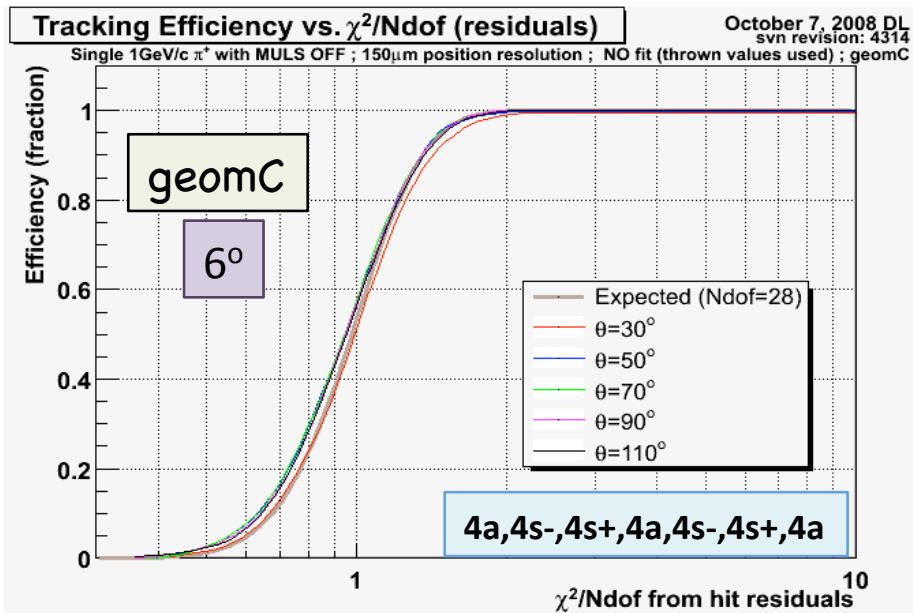
David Lawrence JLab

2 New Geometries Studied

geomH and geomI are the same as geomC but with 3° and 4.5^o stereo angles respectively

Geometry C	Geometry F	Geometry H	Geometry I
4 axial	4 axial	4 axial	4 axial
4 stereo $+6^o$	8 stereo -3°	4 stereo $+3^o$	4 stereo $+4.5^o$
4 stereo -6°	4 axial	4 stereo -3°	4 stereo -4.5^o
4 axial	8 stereo $+3^o$	4 axial	4 axial
4 stereo $+6^o$	4 axial	4 stereo $+3^o$	4 stereo $+4.5^o$
4 stereo -6°		4 stereo -3°	4 stereo -4.5^o
4 axial		4 axial	4 axial

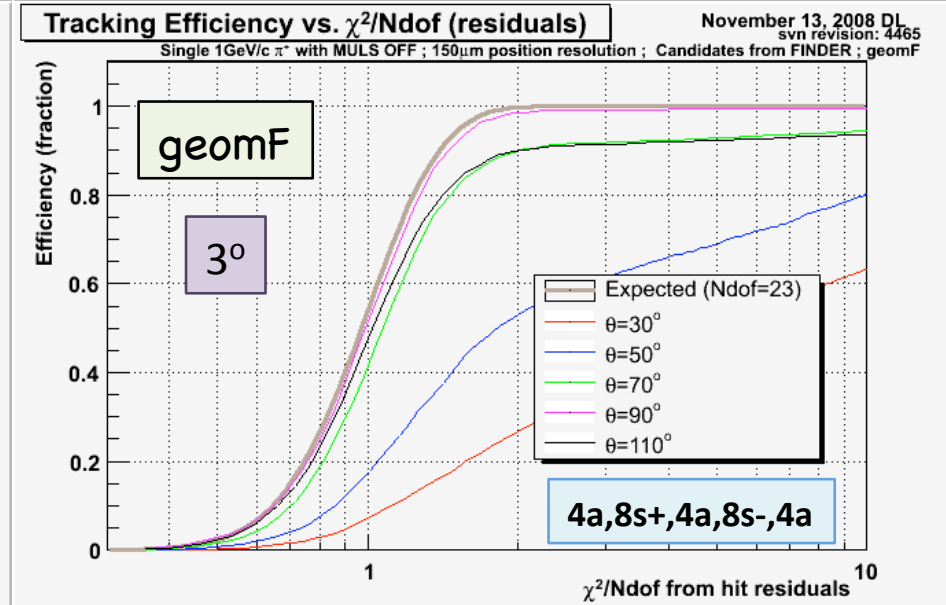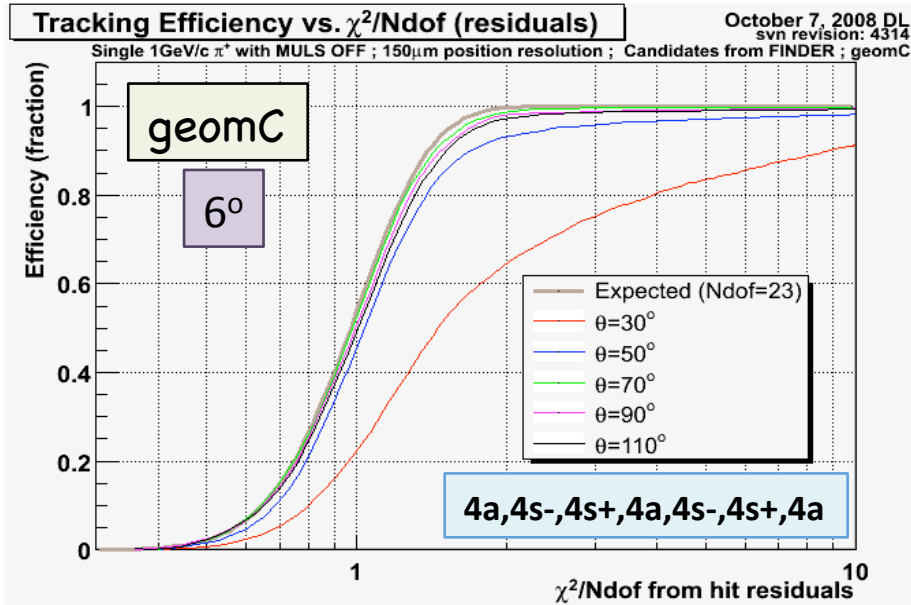# Cumulative χ^2/Ndof for "Truth" tracks

11/24/08

geomH: A small problem with layer 18
(effective σ=275μm instead of 150 μm)

resi_thrown:ring {abs(resi_thrown-0)<0.1}
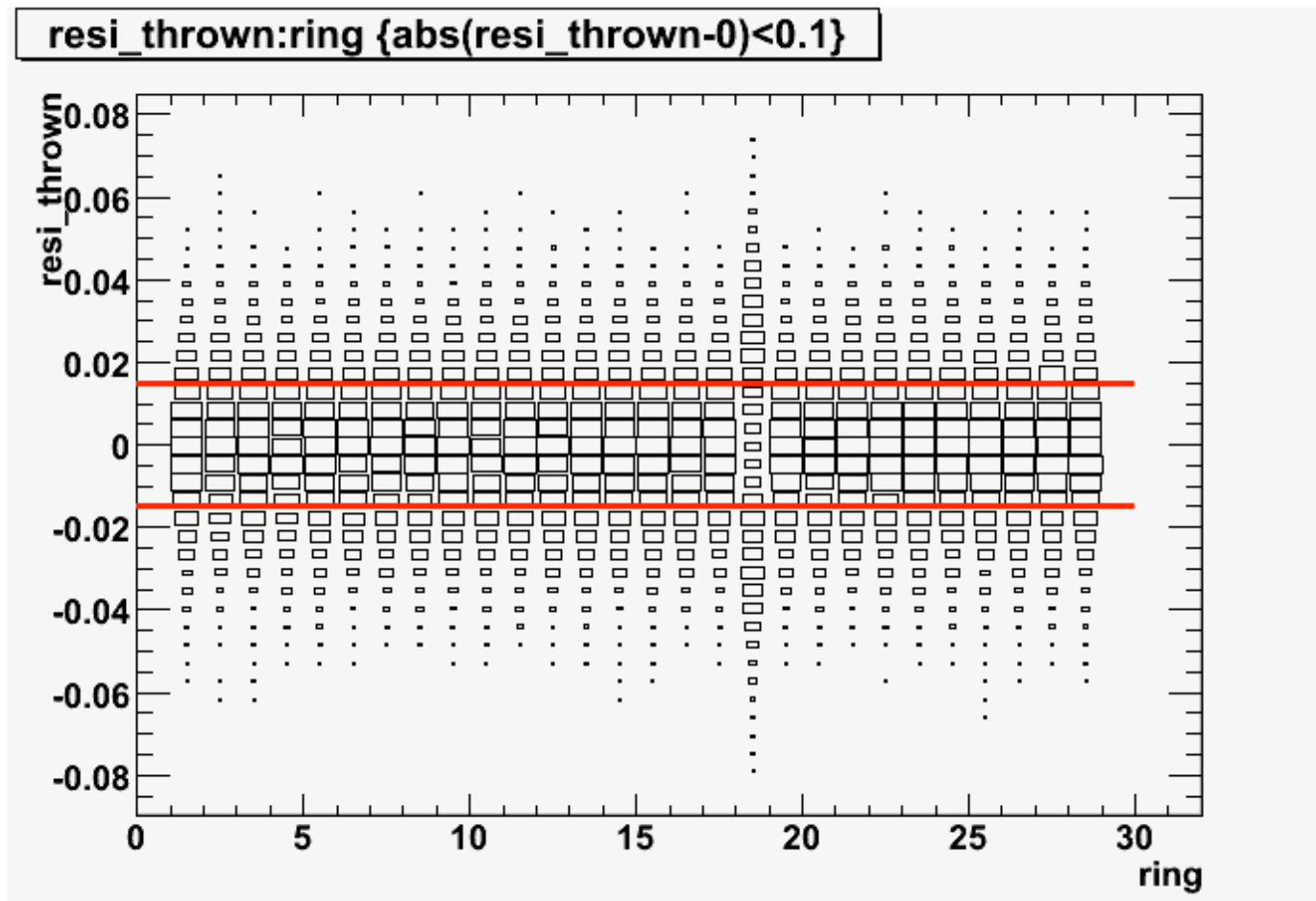
This may be due to an overlap of some of the straws. It does not appear to affect the number of hits per track so I don't think it drives the result much.
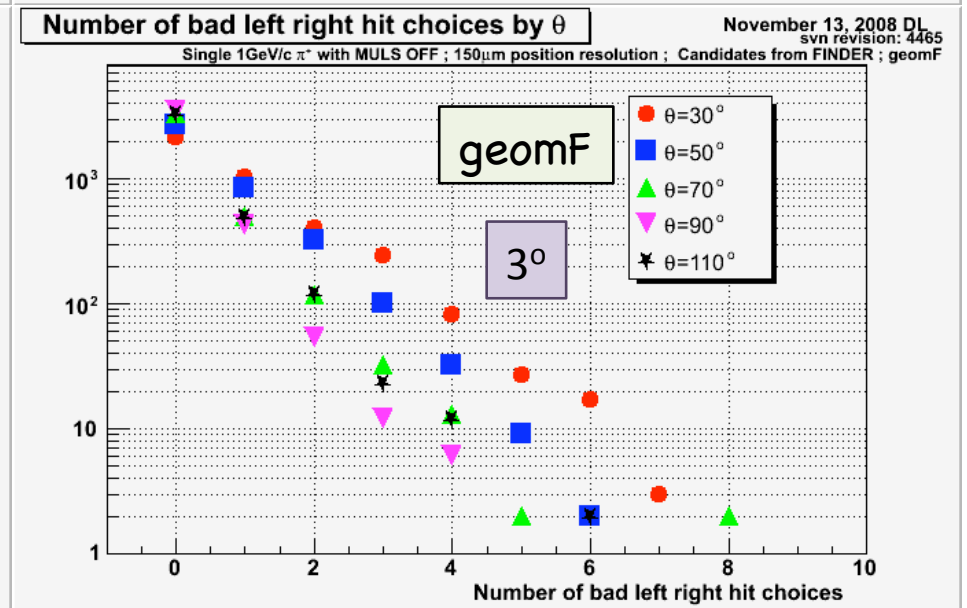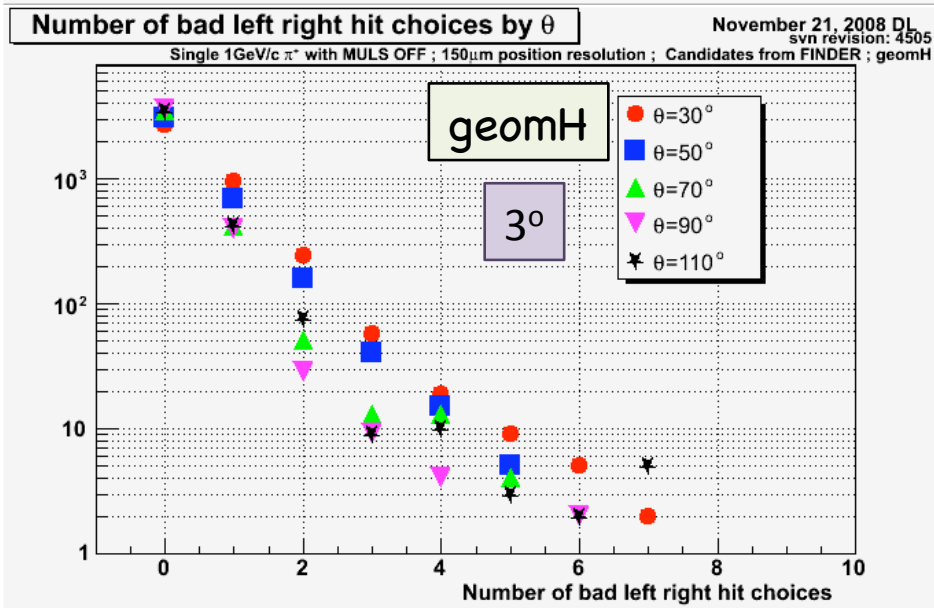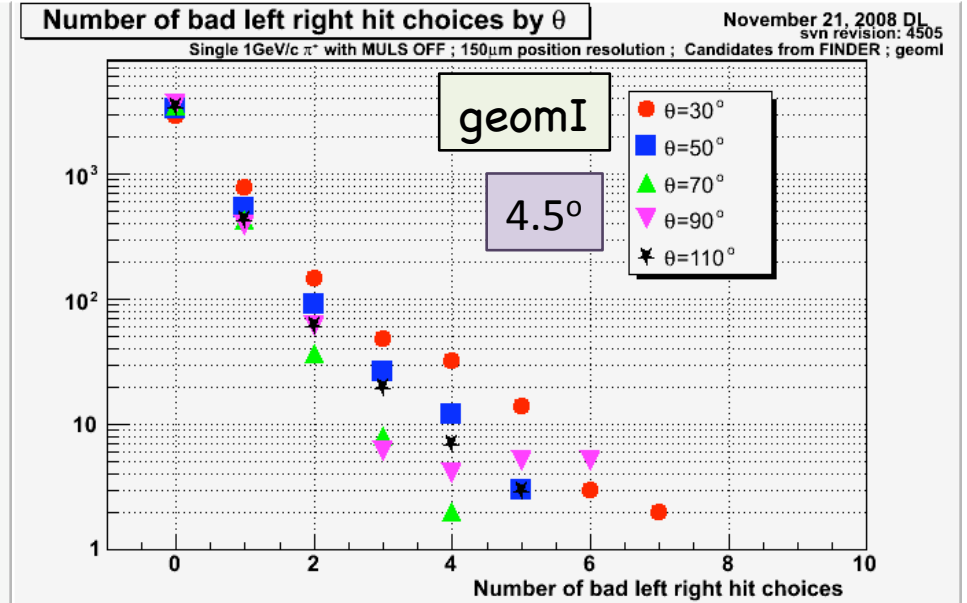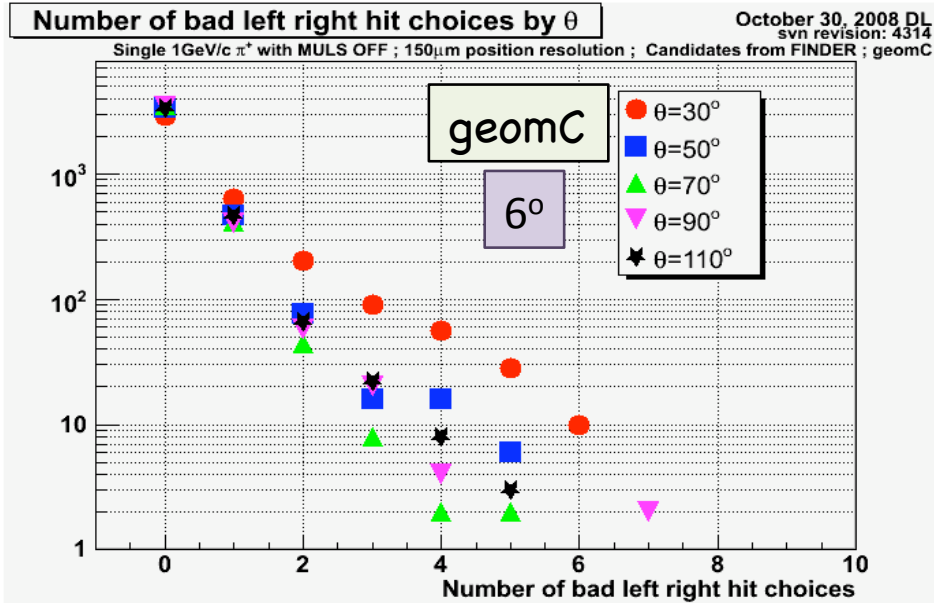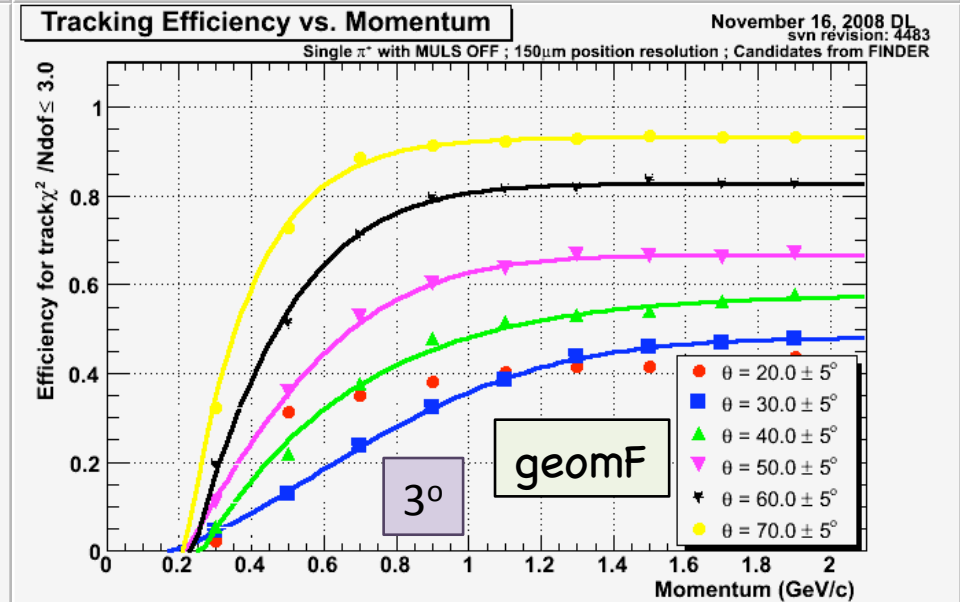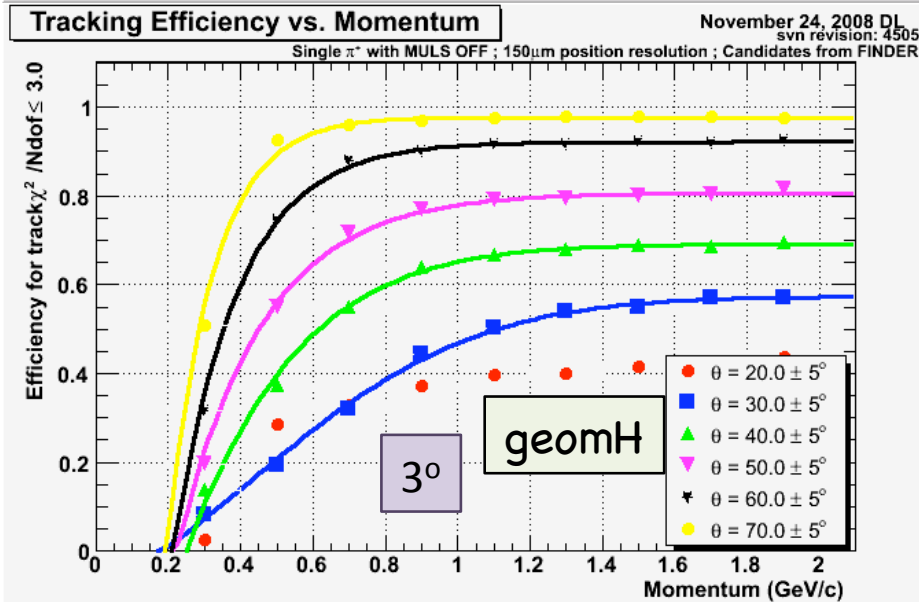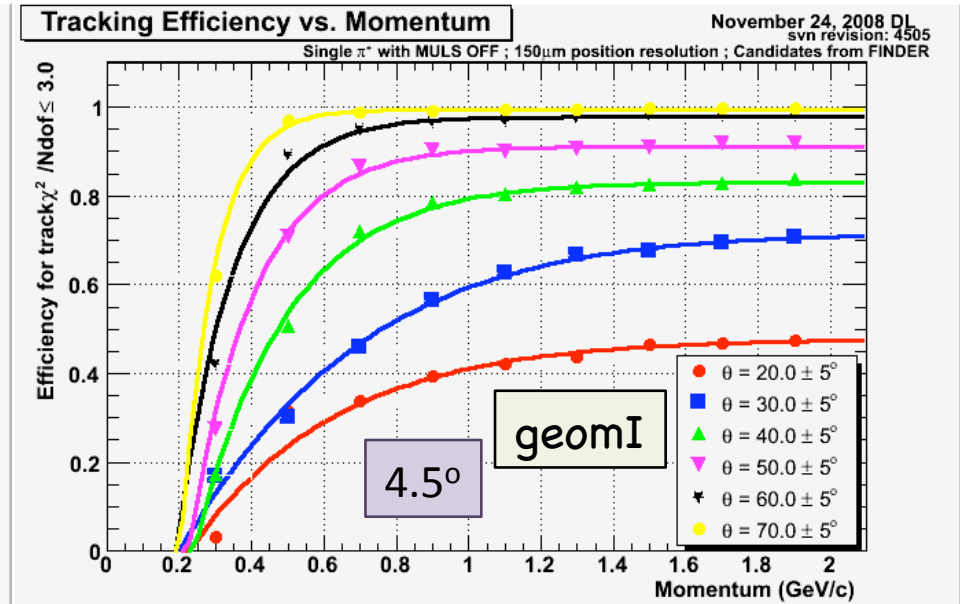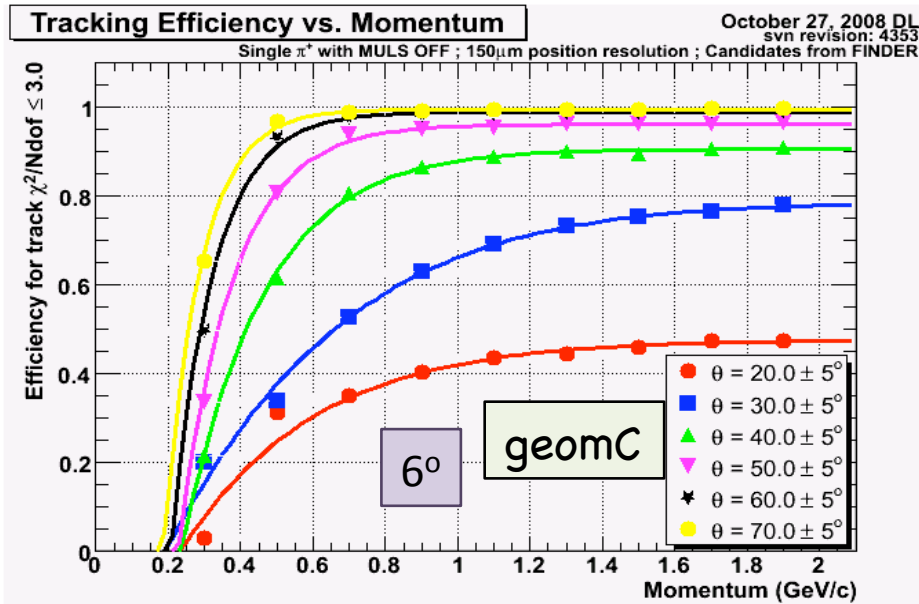
Full Reconstruction
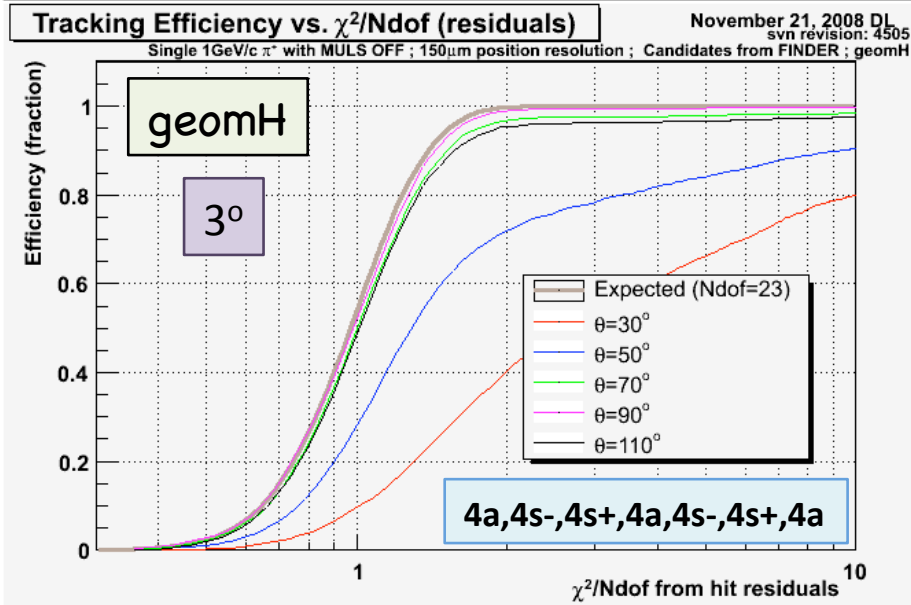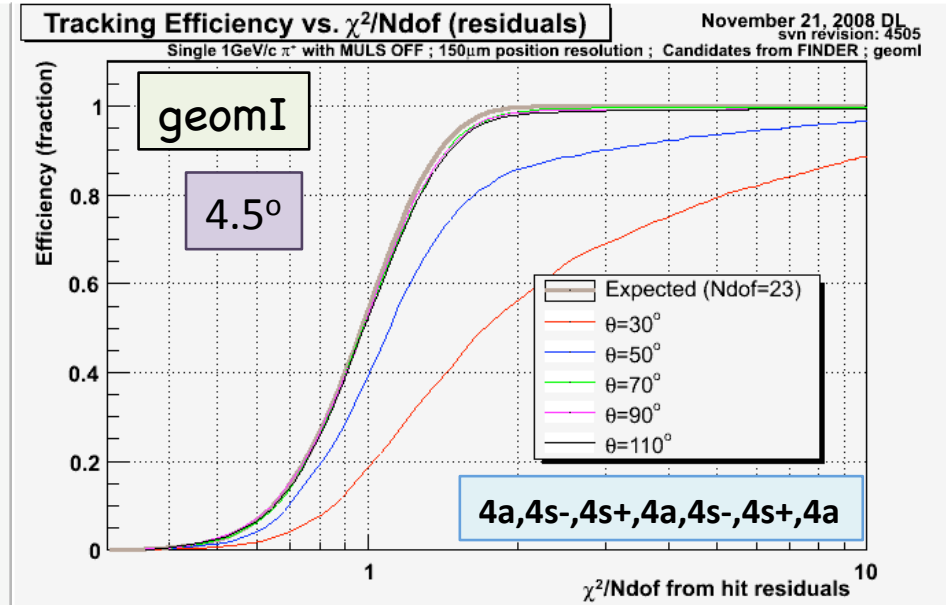
Tracking efficiency gets worse as the stereo angle decreases

Bad L-R Choice Rates

L-R choice efficiency actually seems better for smaller stereo angles!

Bad L-R choice rate IMPROVES as the stereo angle decreases!!

Tracking Efficiency vs. angle and momentum

Conclusions

- Overall Tracking efficiency is better with larger stereo angles (6° vs. 4.5^o or 3°)

- Left-right ambiguity resolution is better with smaller stereo angles

I believe this is because the resolving power for left-right of the axial wires increases as the stereo angle decreases, approaching the "all-axial" limit.

At the same time, the z-resolution of the stereo wires gets worse with decreasing stereo angle giving a poorer theta resolution resulting in a larger chi-sq/Ndof

In the end, we appear to lose more in z-resolution than we gain in left-right ambiguity resolution