

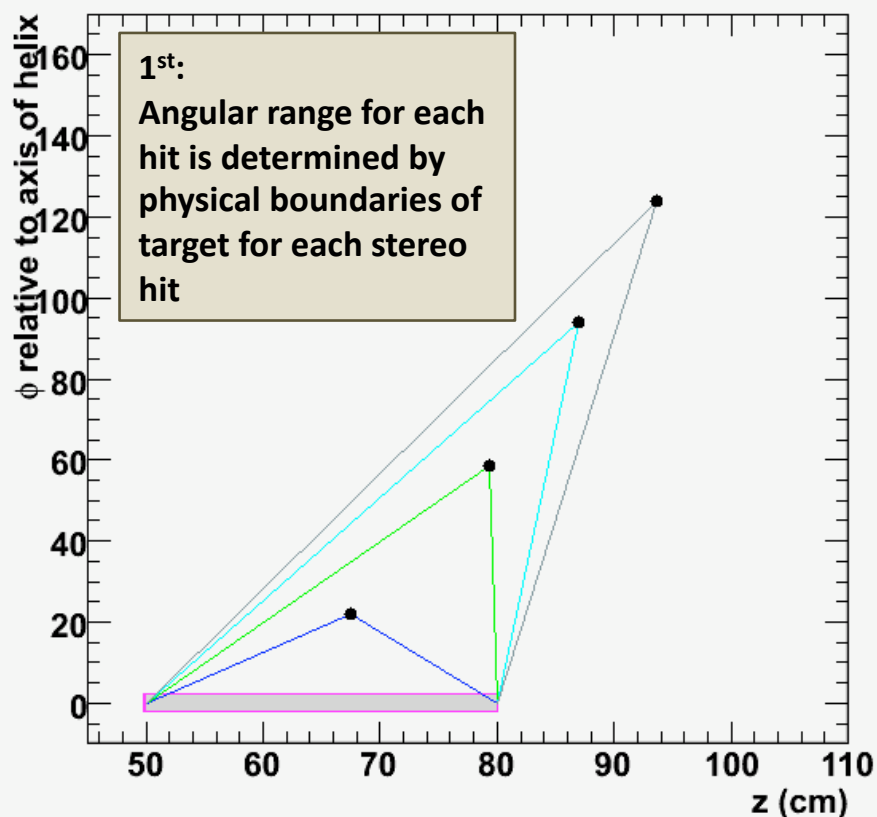
# CDC MC studies part VII

David Lawrence, JLab

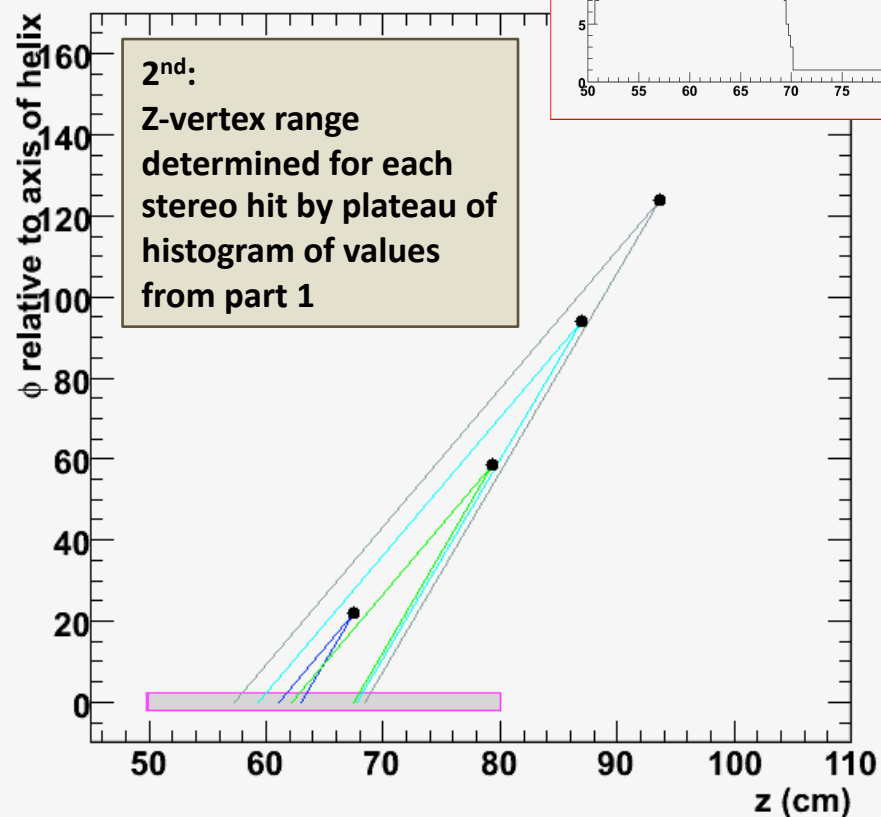
Dec. 15, 2008

# How vertex is determined for track candidates

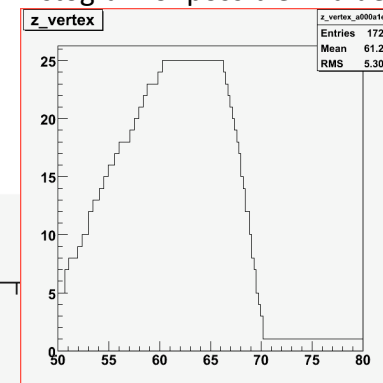
## Determining $\theta$



## Determining Z



histogram of possible z values

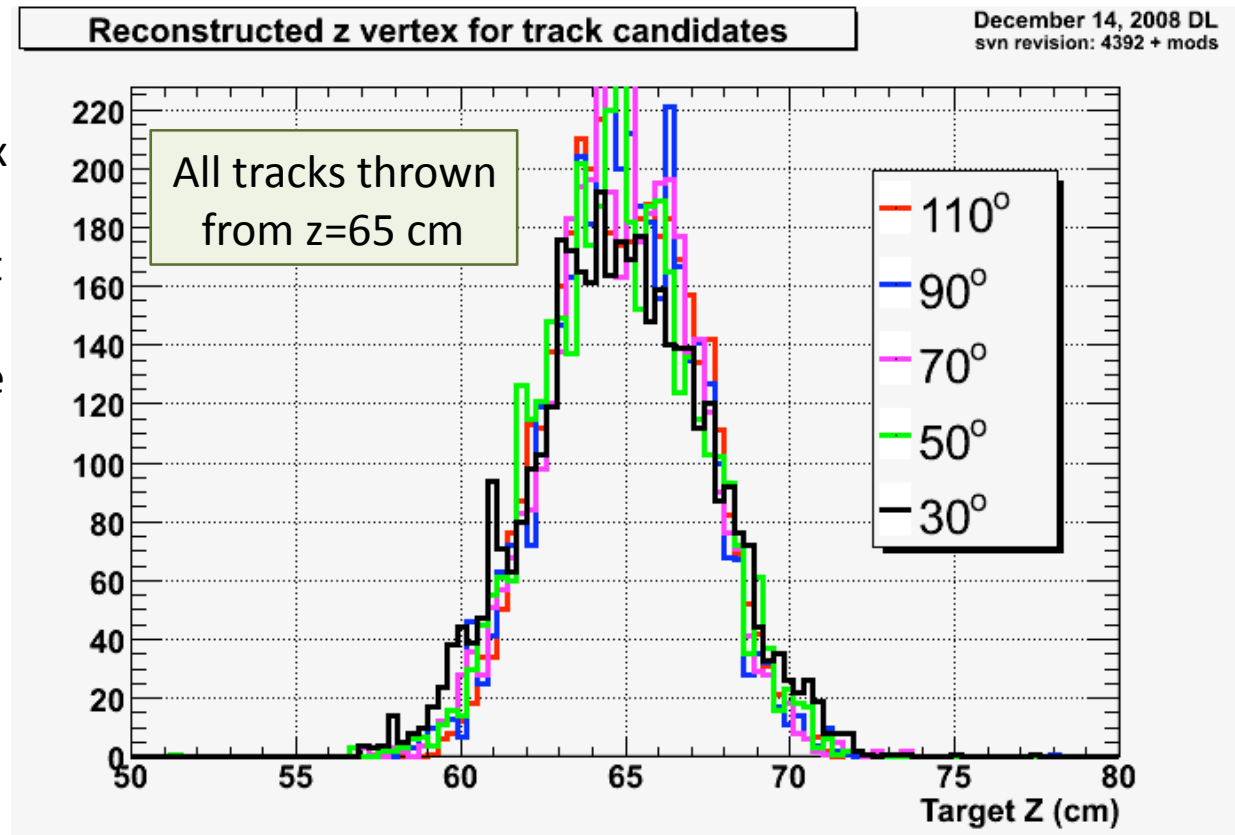


# Vertex resolution for track candidates

The “vertex constraint” used is based on a 3cm segment of the beamline centered on the  $z_{\text{vertex}}$  reconstructed for the track candidate.

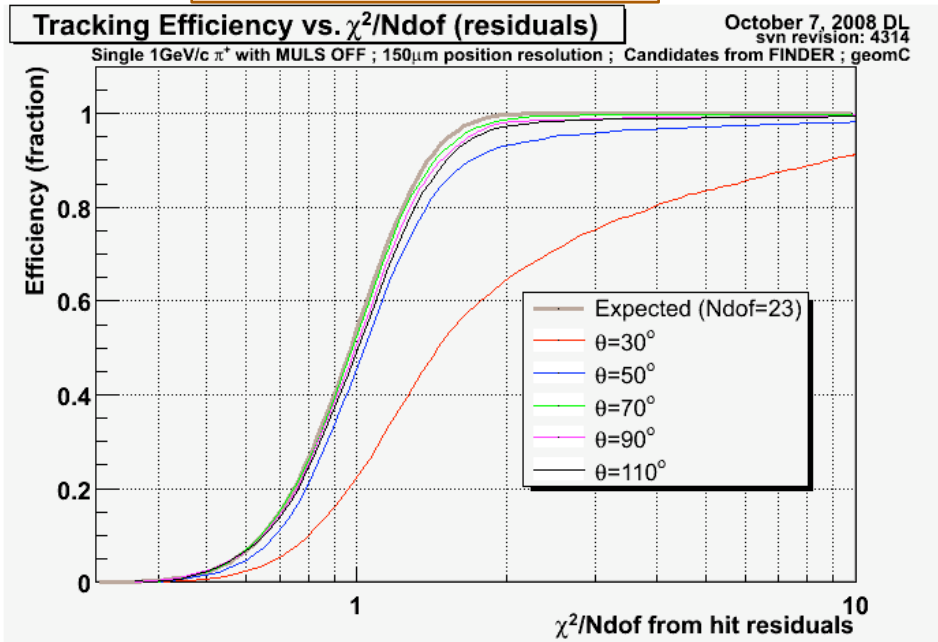
The way the candidate determines the  $z$  vertex is biased to finding it in the center of the target

This actually gave some benefit early on when developing the fitting algorithm, but now turns out to be a bias that hurts more than helps

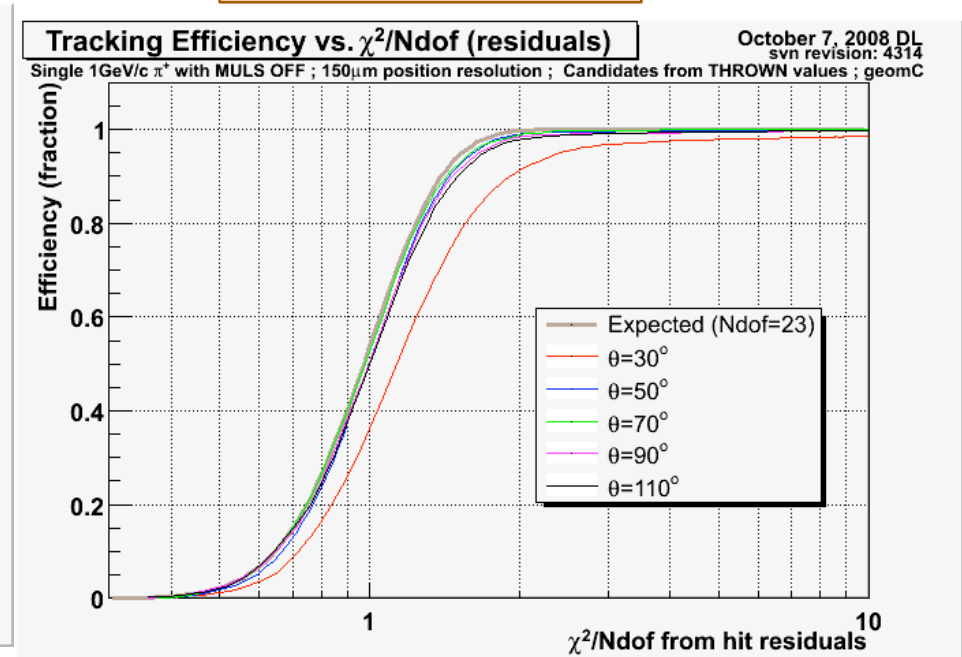


# geomC with and without a target constraint in the fit

with target constraint



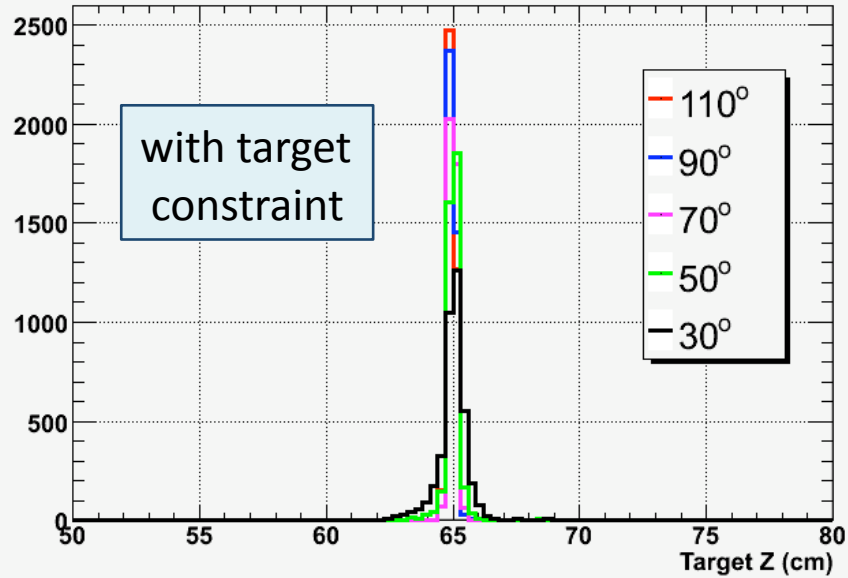
no target constraint



# Vertex Reconstruction

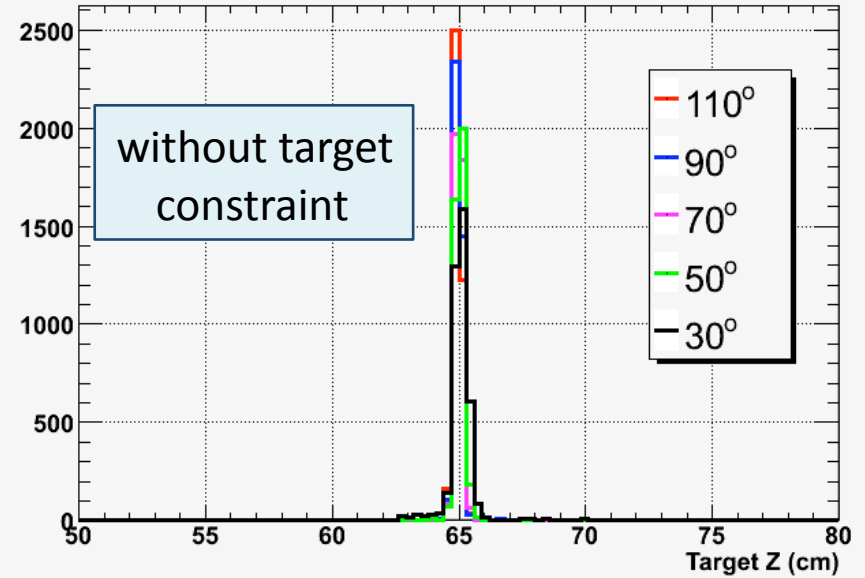
Reconstructed z vertex for track fits with target constraint

December 14, 2008 DL  
svn revision: 4392 + mods



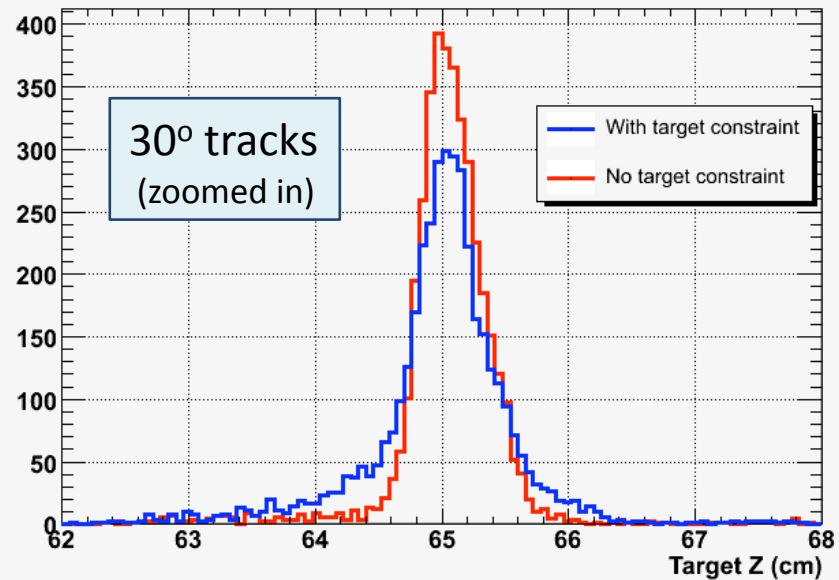
Reconstructed z vertex for track fits without target constraint

December 14, 2008 DL  
svn revision: 4392 + mods



Reconstructed z vertex for 30° time-based track fits

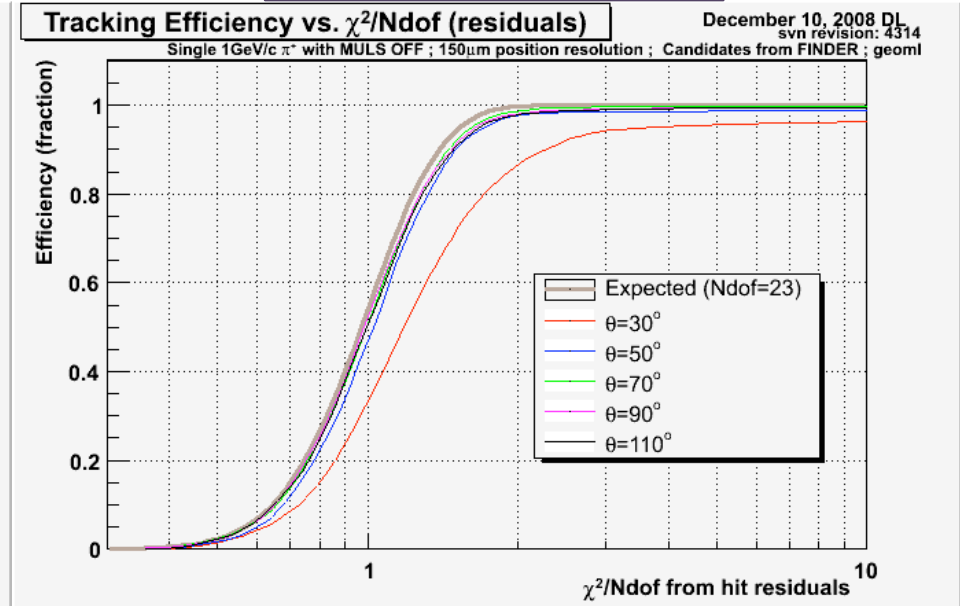
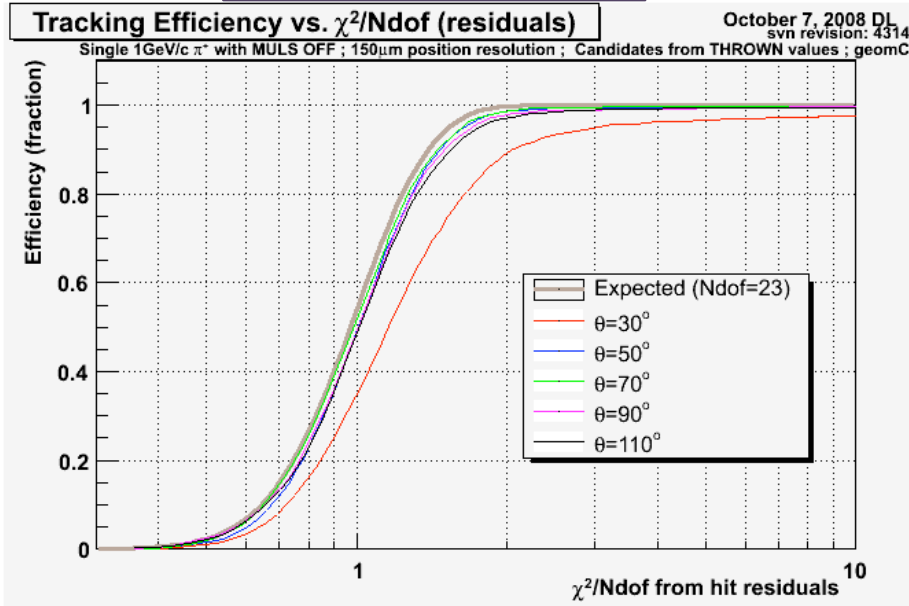
December 14, 2008 DL  
svn revision: 4392 + mods



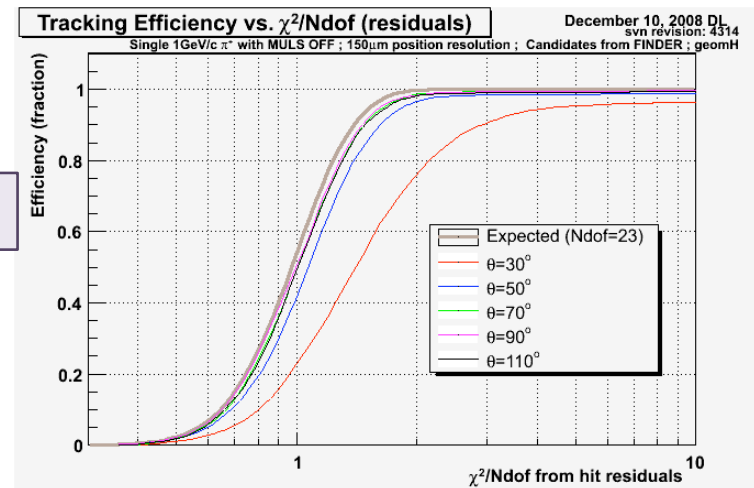
With no target constraint, *geom1* looks about as good as *geomC*  
 (but *geomH* is still a little worse)

*geomC* Stereo = 6°

*geom1* Stereo = 4.5°

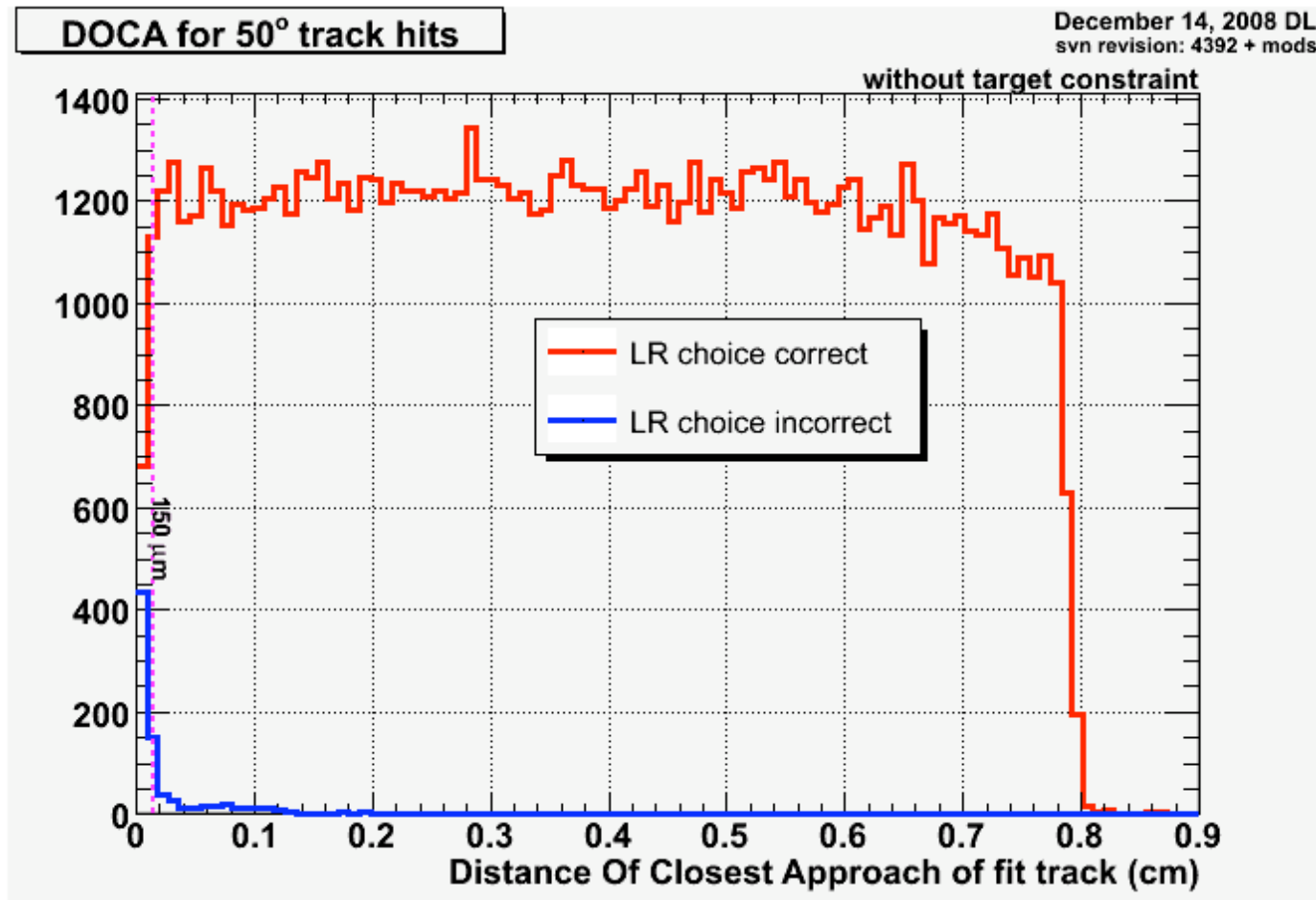


*geomH* Stereo = 3°

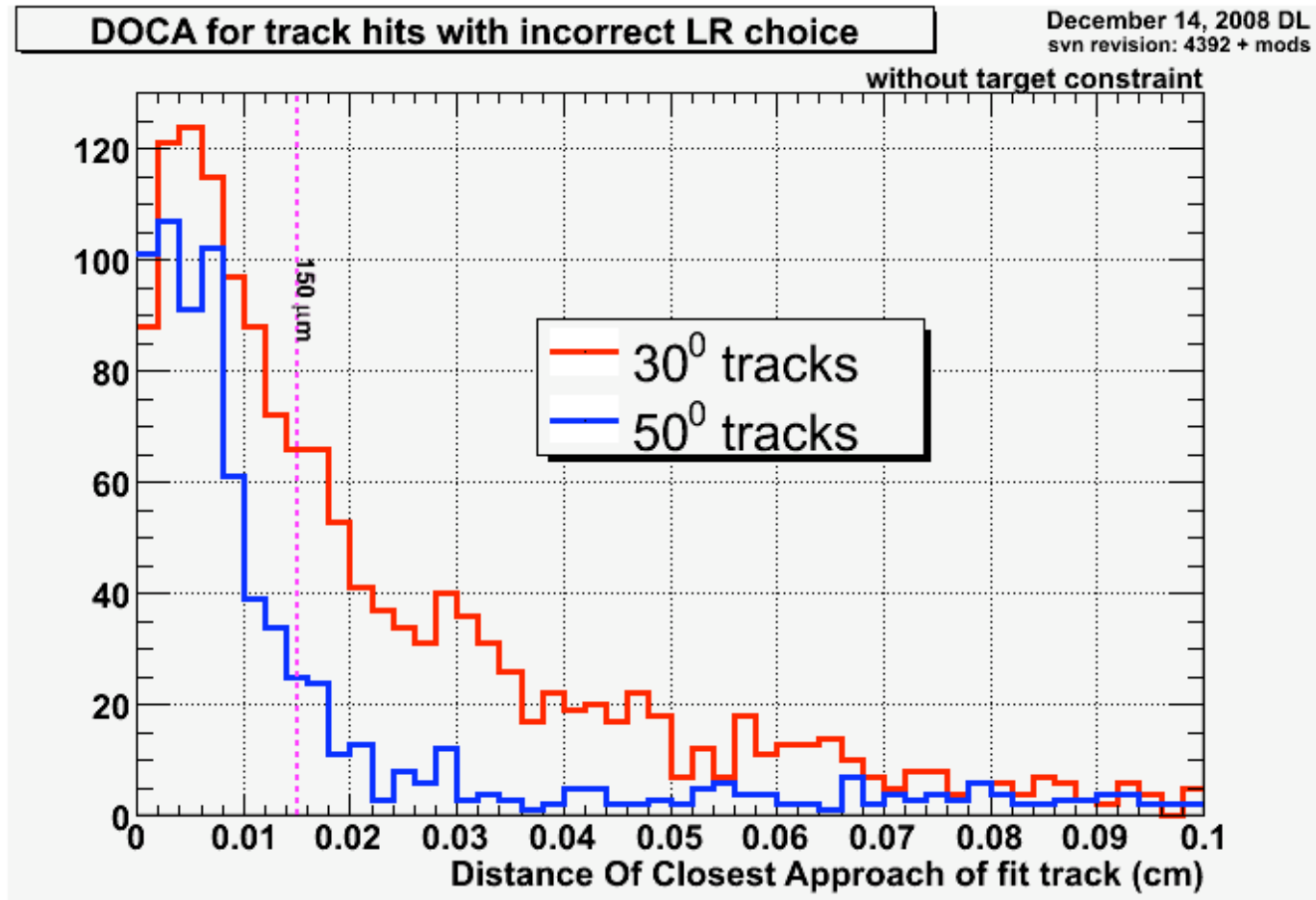


Note: All 9 geometries were refit without the target constraint, but *geomC* was still the clear winner

# DOCA values based on LR correctness



# DOCA for incorrect LR choice





# Summary

- Target constraint is not constraining to a region that necessarily contains the true track. It should be removed
- 30° still stands out as worse than higher angle tracks, but is looking much better without the target constraint
- *geomC* still looks like the best geometry