

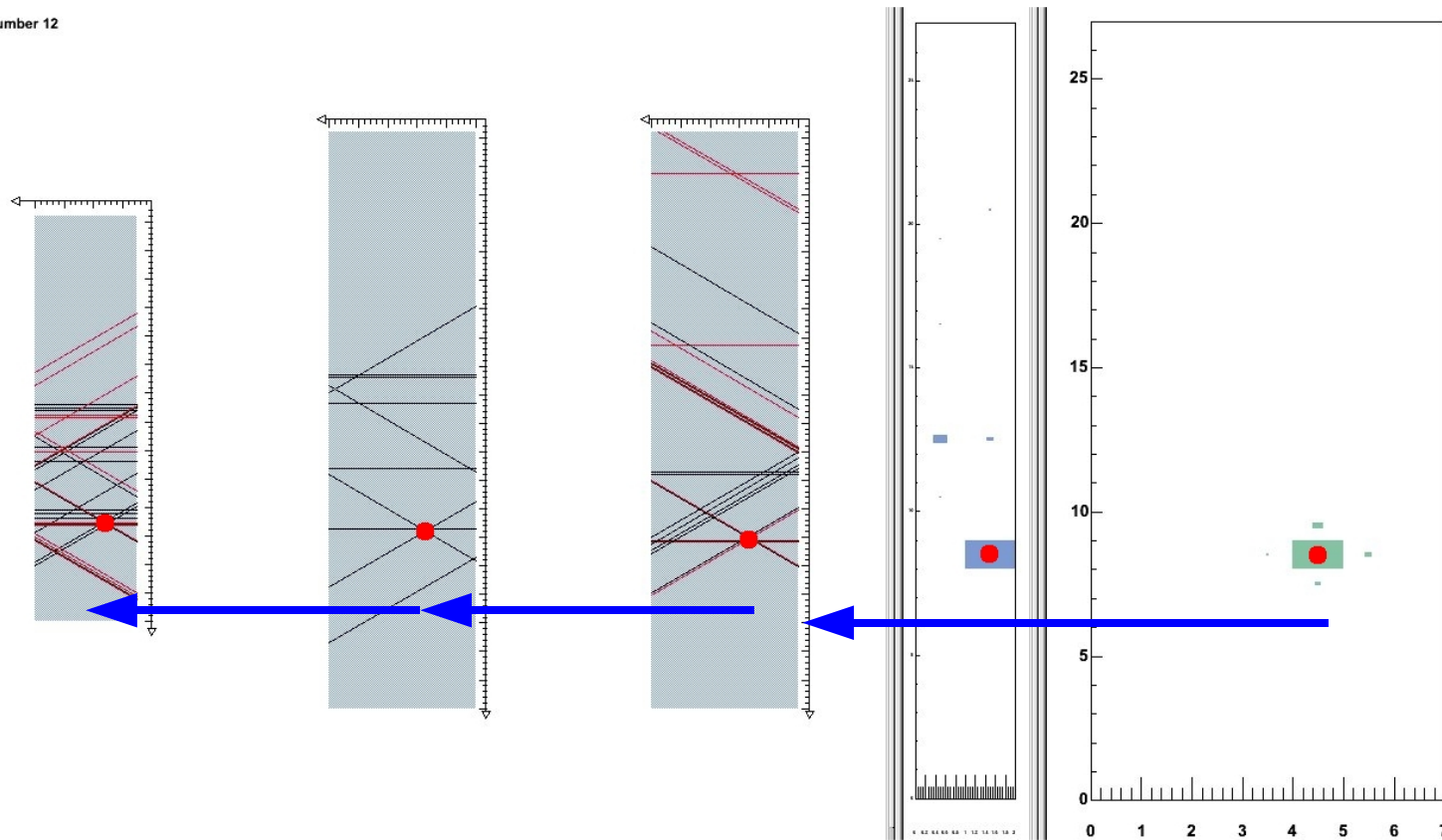
BB Tracking (for GEn)

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(*He gets the credit*)

BB Tracking Algorithm

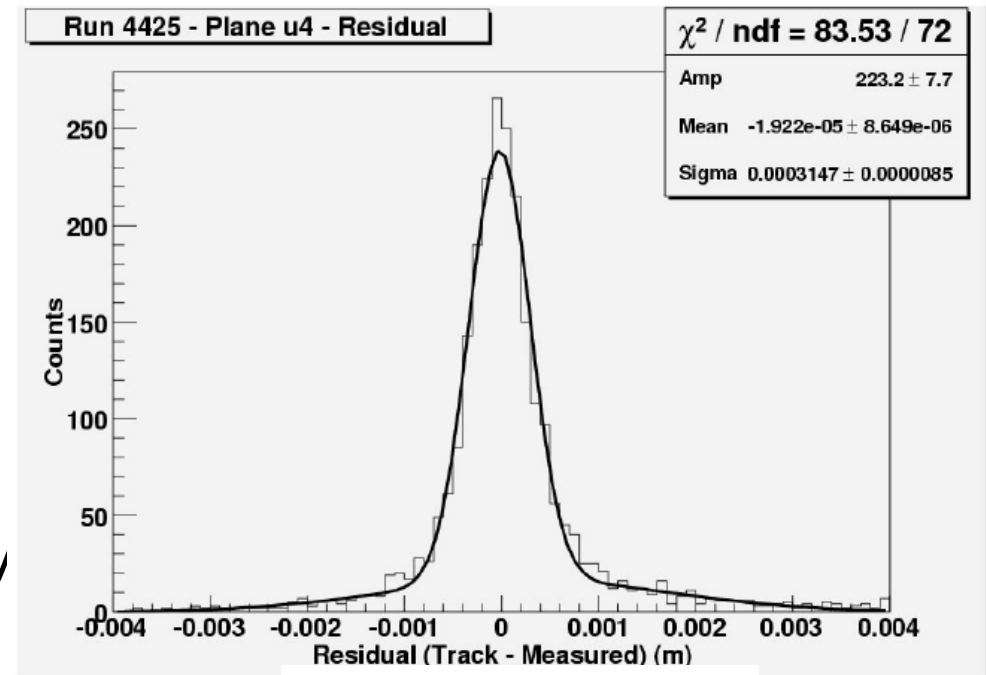
Event Number 12



- Identify the electron in the shower
- Look in “window” between shower and BB, projecting track onto planes
- All possible hits are included in cluster-finding (hundreds to tens-of-thousands of possibilities)

BB Tracking results

- Algorithm is general and works, but is slow. All possible combinations of down to N planes (N=13 for GNn) attempted.
- Improved prediction of tracking time has been used to trade-off tracking efficiency with analysis speed.

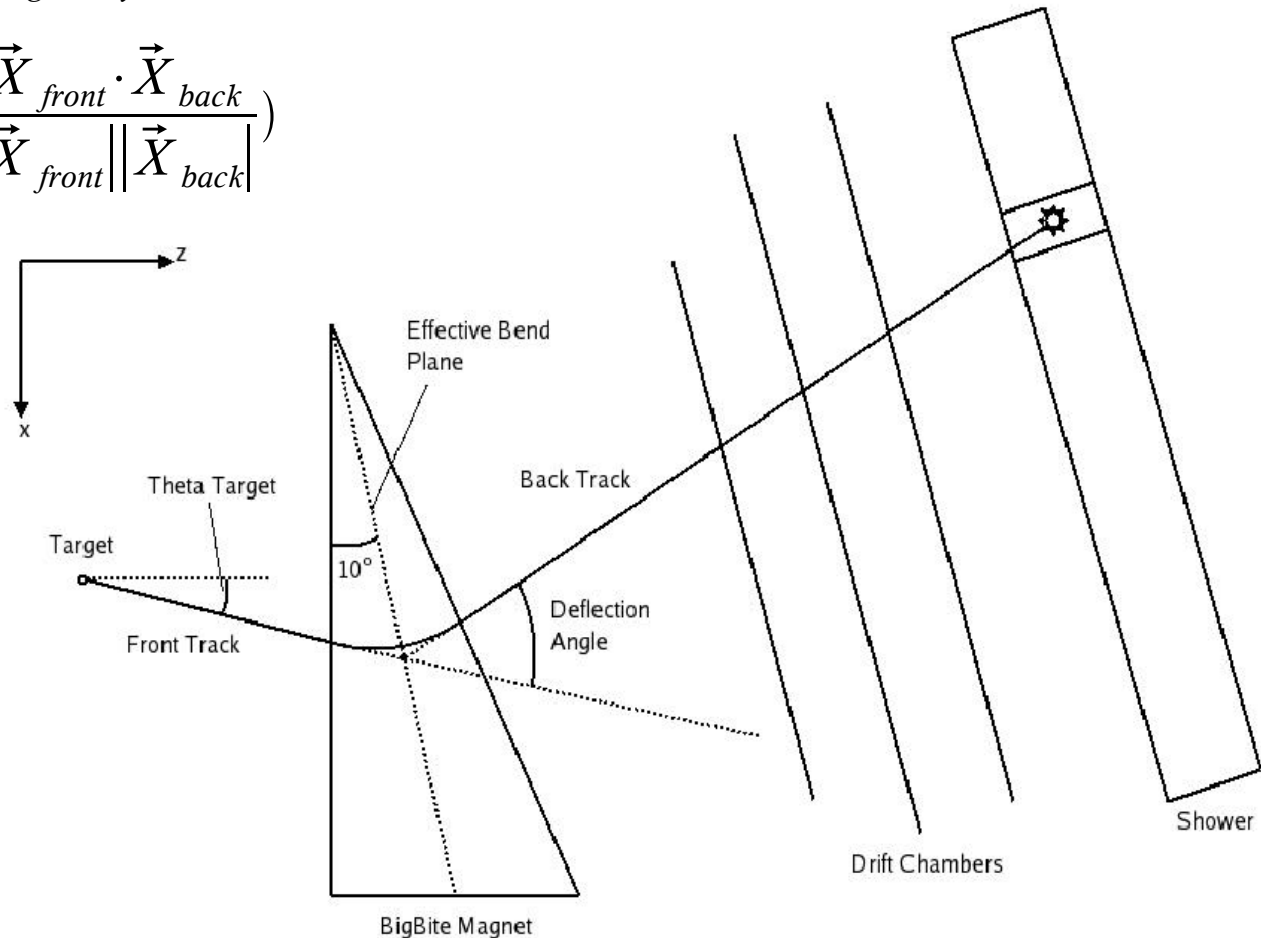


Reconstruction Resolution:	
σ_x	$130\mu\text{m}$
σ_y	$300\mu\text{m}$
σ_θ	0.3mr
σ_ϕ	0.7mr

BB Optics model (Dipole + Corrections)

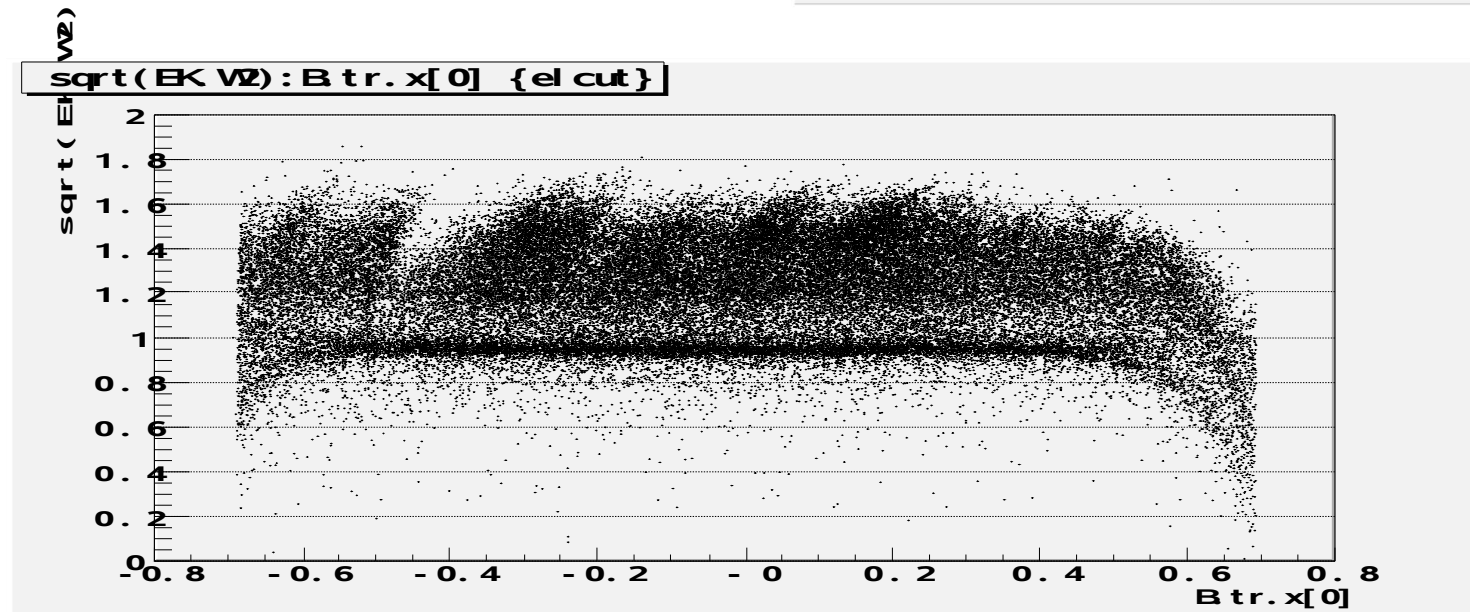
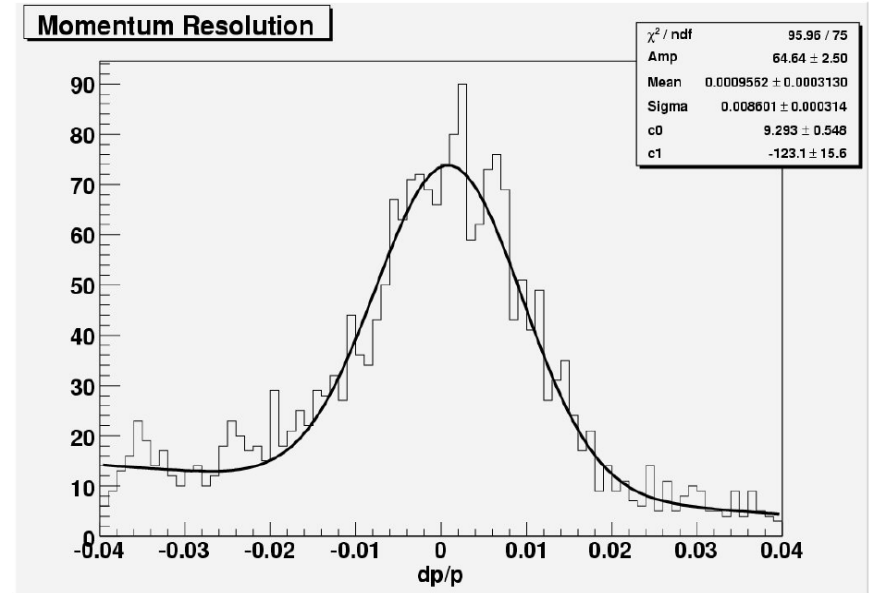
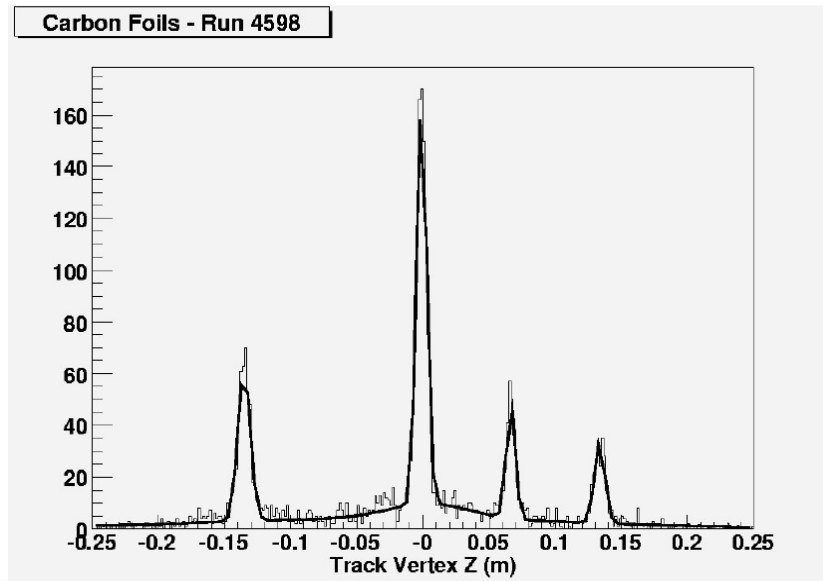
$$p = \frac{c_0 + c_x x_{bend}}{\theta_{defl}} + c_\theta \theta_{targ} + c_y y_{det} + c_\phi y'_{det}$$

$$\theta_{defl} = \arccos\left(\frac{\vec{X}_{front} \cdot \vec{X}_{back}}{|\vec{X}_{front}| |\vec{X}_{back}|}\right)$$

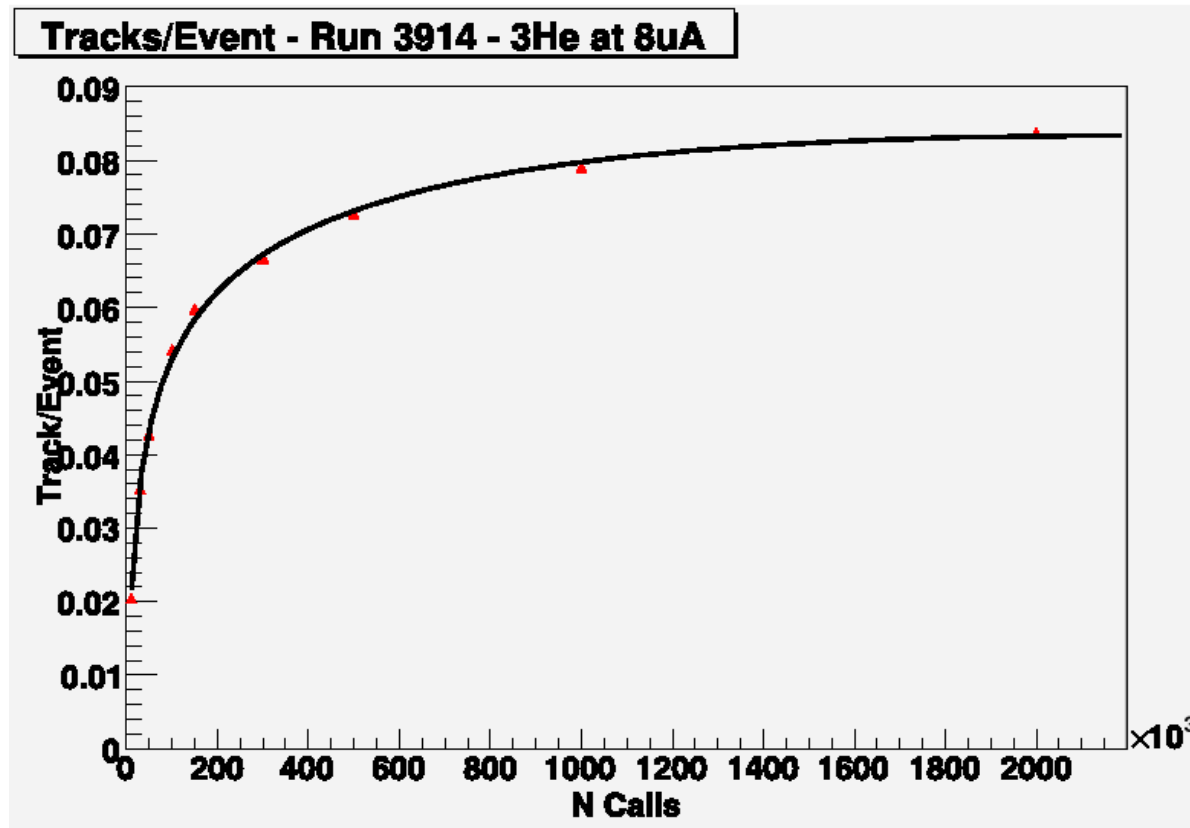


Likewise for the other quantities... (θ_{target} , ϕ_{target} , y_{target})

BB Optics Results



Ncalls vs. Ntracks found



The Gen analysis ran with a cut-off of $1000 \cdot 10^3$ calls, and a minimum of 13 planes.

The algorithm does NOT use the paired $x-x'$, etc. planes to build clusters or solve the L-R ambiguity. This is an improvement I would like to see.

Room for Improvement

Tracking Algorithm works but is slow. It can skip events that are too busy:

- Run 4490, 6uA on He3 ($L \sim 4e36$), T2 $\sim 2.2\text{kHz}$
12% had a track + 6.7% rejected as too busy
7 evts/sec OR 0.87 track-evts/sec
- Run 4427, 2.5uA on H ($L \sim 1e36?$), T2 $\sim 890\text{Hz}$
12% had a track + 2% rejected as too busy
17 evts/sec OR 2.1 track-evts/sec
- Better use of paired planes might help in speed and identification of 'clusters'
- The tracking efficiency is $\sim 90\%$.