

Tracking Refitting

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Tracking Meeting

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Current Status

Physics group refit procedures

- B Group
 - Use fast Kal fit option with passive material geometry tuned to estimate energy loss correctly for mass measurements
 - Also apply magnetic field correction in CTVMFT
 - Corrections on order 1-2MeV
 - Result is sub MeV level precision for mass measurements
- High pt groups
 - Top group follows B group procedure
 - Note that the Top group is interested in b tagging and primary vertex finding performance
Adding material at order 10cm from the vertex has negligible effect
 - Other high pt groups use Top groups TrackRefitModule
- W mass group
 - Make energy loss and curvature corrections to COT tracks
 - Independent method compared to all other groups
 - Would eventually like to demonstrate consistency in material added/subtracted by different methods

Action items?

- All groups using adequate procedures: no action was needed
 - Decided to make “official” recommendation in order to make sure all groups were using consistent method
 - Would ensure easy comparison of analysis at the level of individual events
 - Discussion of issue in the joint physics meeting led to an incorrect recommendation in an unexpected area: Simulation refit procedure
 - Recommendation was not sent to experts for vetting
 - Only negatively impacts B group physics program as only group sensitive to the issue
 - Lesson learned: don't let Matt go to physics conferences

Information on Tracking Fitting

Relevant information to understanding track fitting procedures

- Current material map is based on construction diagrams
 - Photon conversion map was used to check for problems
 - Some missing components were added - largest addition port card region cables
 - Some additional tuning was done
 - Resulting material map is good to 5% level(Manfred Paulini)
- Full material map only used with G3X, refitting done with Kal option
 - G3X, GEANT based material integrator far to slow to use: 50 times slower than Kal option
 - Kal option uses slightly simplified geometry proxy
 - Some objects with shapes where intersections cannot be analytically calculated are left out
Cooling infrastructure and some port card and other support structures
- 4 series vs. 5 series release
 - In 4 series release material added in refits was dominated by missing material in GEANT geometry
 - In 5 series release material added in refits is dominated by missing material in Kal simplified geometry - Amount of material added is fairly small
- What does this mean?
 - A subtle point: You should actually use the tuned material distribution for refitting data and MC

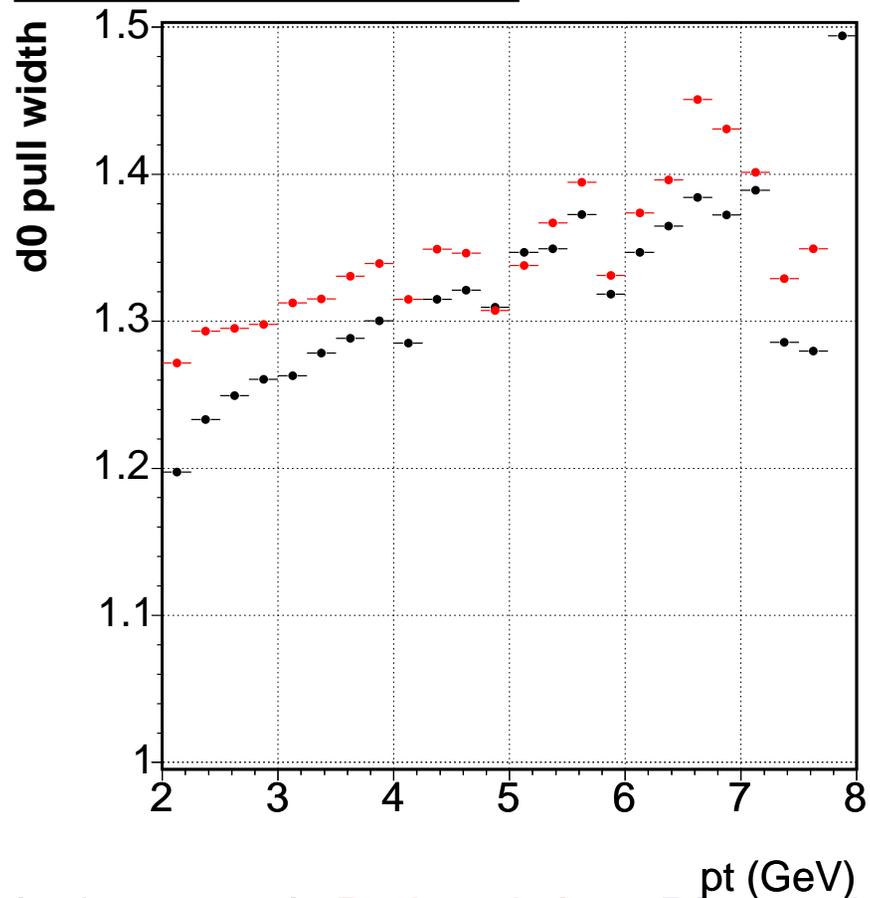
Other Issues

Are there issues that actually have physics impact?

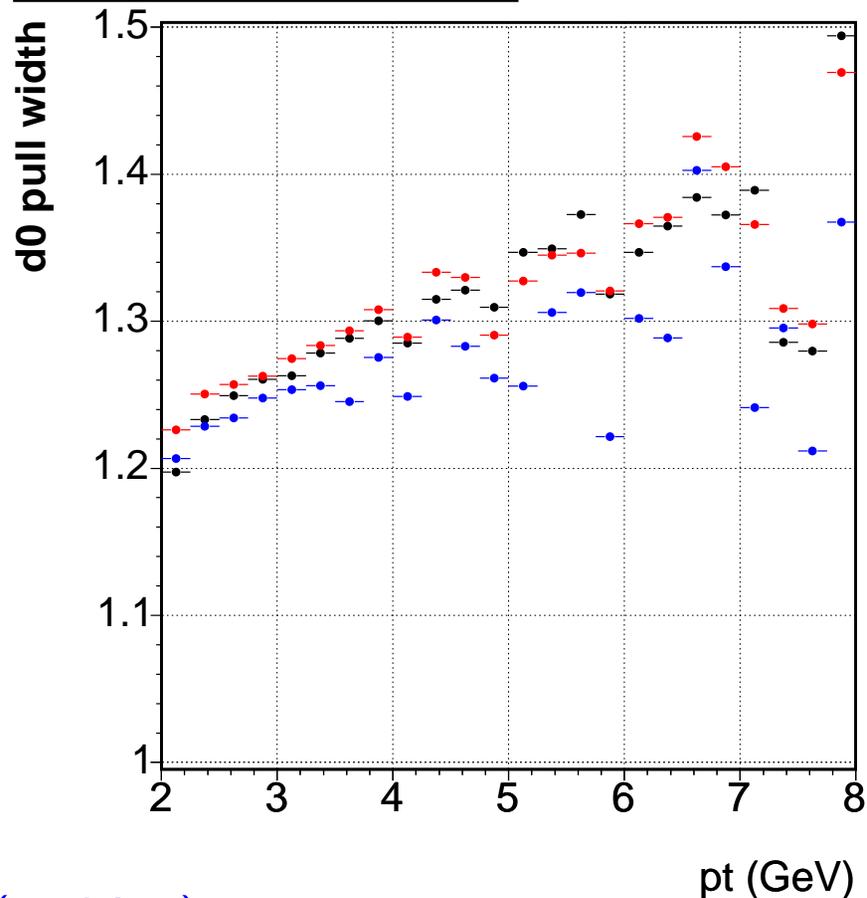
- Physics groups have decided to use L00
 - Resolutions assigned to L00 hits are underestimated
 - Resulting pull distributions are 5-10% too wide when L00 hits are added
 - Using new resolution measurements presented in silicon studies meeting fixes this problem (Bernd Seltzer)
- Many known bugs in 5.3.3 release
 - Read tracking page for complete list and fixes where available
- All of this is explained on tracking page
 - Track refitting, Using L00 Hits and Current known tracking problems links
Please read and comment! Includes full procedure and everything explained here
 - Recently updated will short statement on for which physics applications refitting is necessary

Pull vs. pt

d0 res width vs pt Profile



d0 res width vs pt Profile



Black: normal, Red with I00, Blue with PV (and I00)

Need to use measured L00 res to get better pulls (right plot)

Plans

How to get rid of the refits?

- Eventually tuning will be done before Production and refit will not be necessary
- Need to address L00 as well
 - Add L00 in Production
 - First need to demonstrate that L00 doesn't adversely impact any of the physics program
 - Not clear: Currently L00 slightly degrades resolution at high pt
 - At high pt resolution is alignment dominated rather than multiple scattering dominated
- What about the W mass group
 - Would like to use same material map and magnetic field corrections if not the same procedure
 - Working to understand any differences - mostly centered around electron vs. muon data
 - Would also like to use SiliMap fitting option for default refit.
 - Fast and can reproduce GEANT geometry more exactly