

DchSim Status and Wish List (Contains Corrections since the original talk)

Simulation Workshop
SLAC, February 25, 2006
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This Talk has been corrected since the Presentation

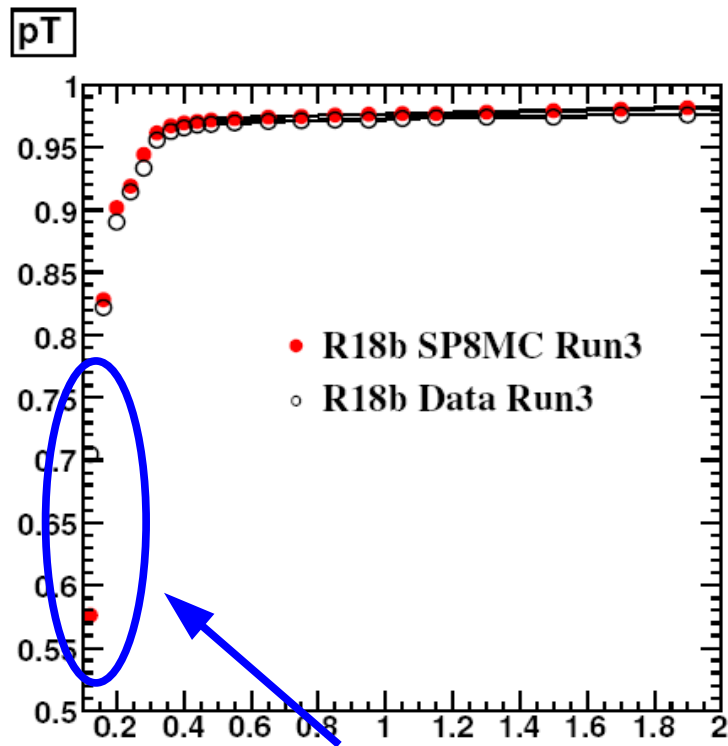
- I incorrectly identified the pseudo efficiency plot for MC from Run 3 as containing the result of the G4 bug fix.
 - Actually, it contains the G4 bug and shows how large the problem was before being corrected.

DchSim in SP8 MC

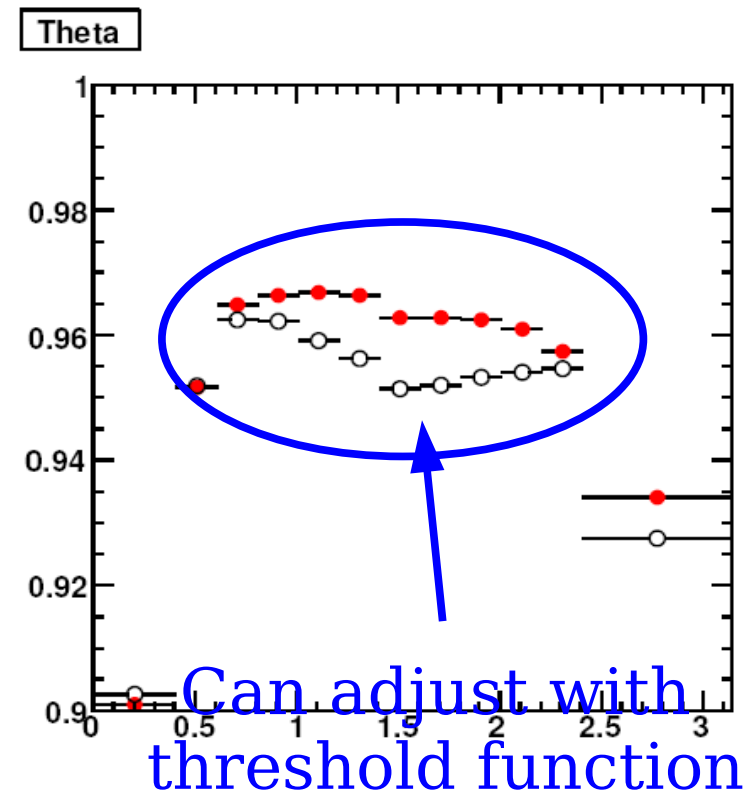
Overall, good agreement with data, but some issues:

- Integrated pseudo efficiency about .5% too high for MC compared to data.
 - MC efficiency in low P_t bin is very low.
Correction: this was true for G4 Buggy data, see Kenji's talk in the later session for the correct plot.
 - Should pseudo efficiency be trusted at .5% level?
- Tau samples give good agreement... but, tau is higher P_t .

Pseudo Efficiency in G4 buggy data



Problem was fixed

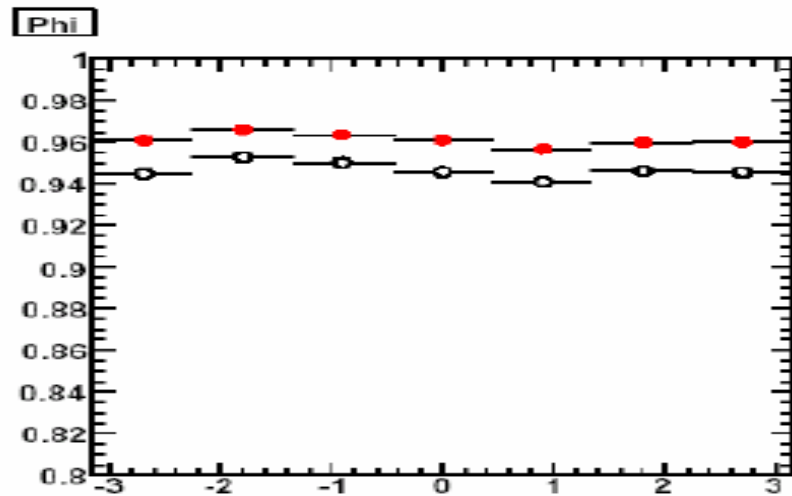
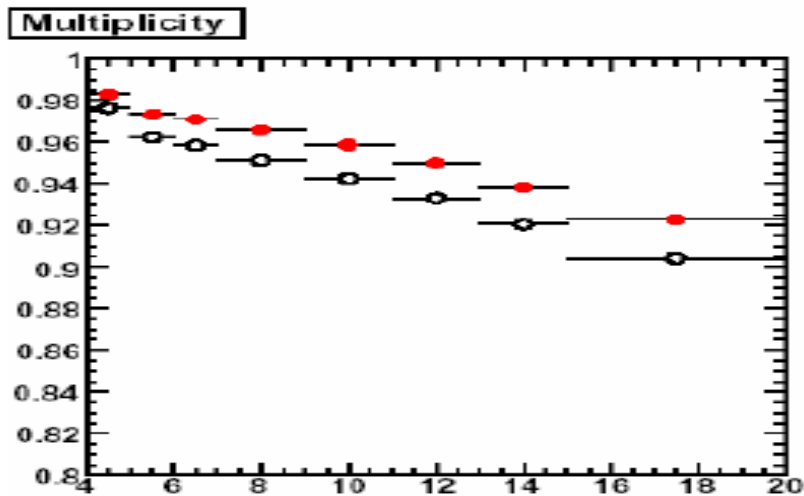
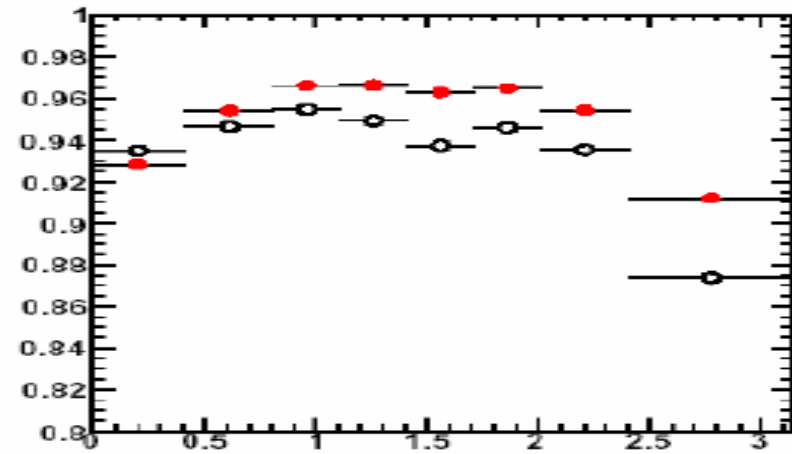
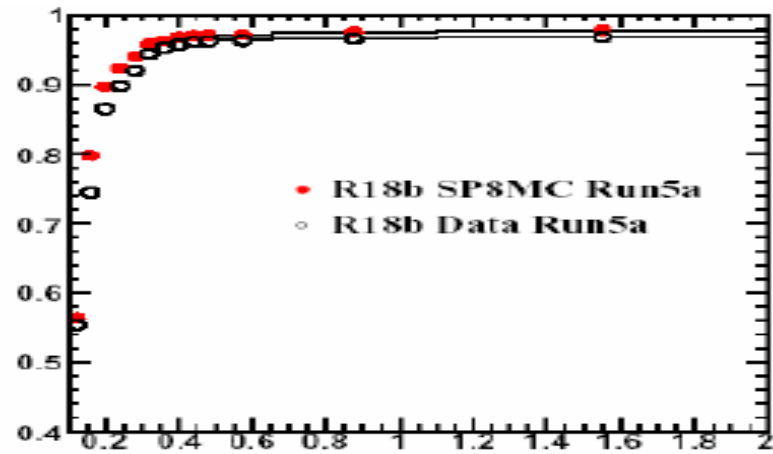


Can adjust with
threshold function

This plot was originally identified as showing pseudo-eff after the fix.

(ref: http://particle.phys.uvic.ca/~khamano/TrkEff/trkeff_r18b.html)

This is the correct plot



Comments about the previous Plot (not in original talk)

- There does not appear to be an efficiency problem in the low Pt region.
- Efficiency for MC is too high overall- I believe this illustrates the error in the FEX bug correction.

Previous Efficiency Studies

- Efficiency was studied quite extensively by the tracking group
 - Hit quantities (vs. P , θ , also dE/dx for π 's from K s)
 - Track quantities (vs. P , P_t , θ , ϕ , multiplicity)
- Most iterations were done with B^+B^- , final confirmation done with mixed modes (very slow).

Did We Choose Optimum Settings?

- Physics analysis may tell us how close we are, just not quick enough to use in the tuning process.
- **Is this worth revisiting for SP9?**

FEX Bug

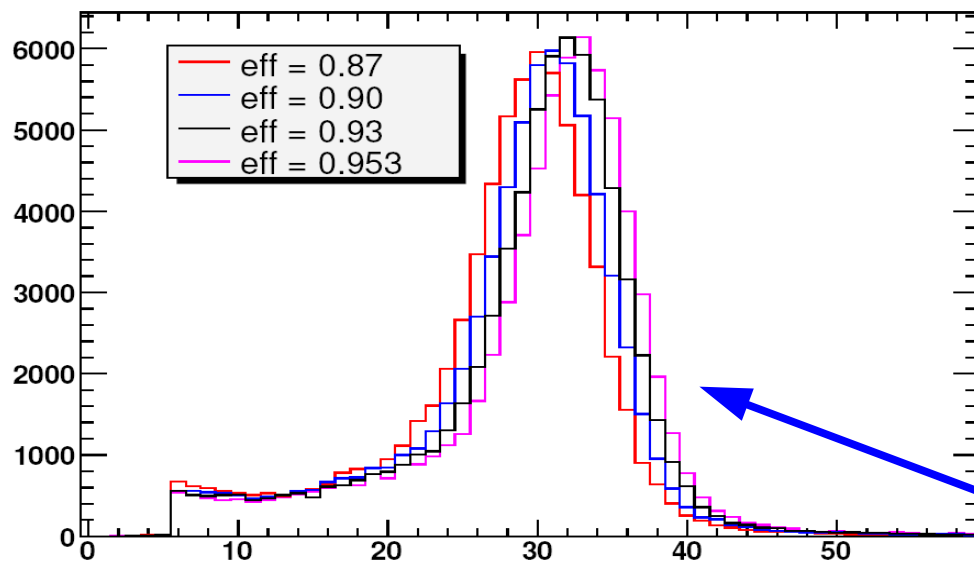
- Emulated the effect by reducing the plateau efficiency.
- Choice of parameter done by looking at the fraction of digis corrupted.
- This appear to not match the effect on reconstructed hits (in MC)
- Need a better value in SP9.

FEX Bug not properly Simulated

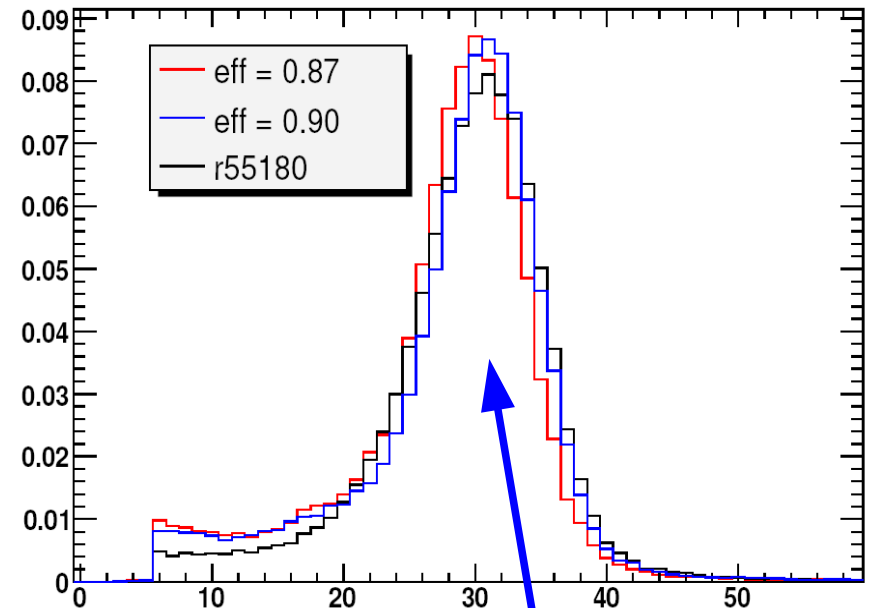
Plateau Efficiency

.953 = current MC

.900 = better MC!



Active HOTS/Track : FEX Eff - Mix2



Active HOTS/Track : FEX Eff - Mix2 & Data

Overlay w/Data

MC scan

New Validation Tool

Advertisement

Simple script to generate groups of cross-section weighted collections.

This command line is all that is needed to produce a cross-section weighted mix of about 20K events:

```
“moose-mix.pl jobrootnam 2 xlong”
```

Producing collections:

/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_uds.a.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_uds.b.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_ccbar.a.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_ccbar.b.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_B+B-.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_B0B0.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_1_tautau.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_uds.a.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_uds.b.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_ccbar.a.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_ccbar.b.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_B+B-.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_B0B0.moose
/work/users/jwilson/fexbug/work/users/jwilson/fexbug/filerootname_2_tautau.moose

The script also saves the hbook and log files with similar names.

- **Internally adjustable parameters:**
 - Destinations of all files.
 - Total number of events in each “group”.
 - Cross-section weights.
 - Exact decay files used to generate the sub-components.
 - User tcl file(s) called.
- Currently meets my needs, probably easily modified to suit other users.

Cross-sections Used

Mode	Cross-section	Events per group
Uds	2.09 nb	4000
Cc bar	1.30 nb	2488
B+B-	.525 nb	1004
B0B0	.525 nb	1004
Tau tau	.89 nb	1703

- The perl script submits “n” groups of jobs.
- Each “group” consisted of seven jobs with event counts as shown in the table
- Each “job” receives a different collection of background events and random number seed.

Wish List

- Implement the proper values for efficiency during the FEX bug period (nearly done.)
- Re-examine the threshold function settings with mixed mode MC (very easy to do.)
 - But, does physics analysis support any adjustment?

Wish List (cont.)

- Collect up validation tools and put them in a form that an average user could use.
 - Script to generate standard MC collections (done.)
 - Script to do pseudo efficiency overlays.
 - Script to do standard track/hit distribution overlays.
- Detailed study of MC hit matching in the low P_t region (big job- does not appear to be necessary)

Wish List (cont.)

- Tune the Bethe-Bloch distortion parameters.
 - Learn how to select all the control samples. Requires Data + MC from each running period.
 - Determine the proper parameters- probably requires a simple linear fit.
 - Careful validation of all run periods (**big job!**)