

# Testing TrkFixup on Physics Reconstruction



Marco Battaglia, Dave Brown, Gerry Lynch,  
David Lopes Pegna and Kerstin Tackmann

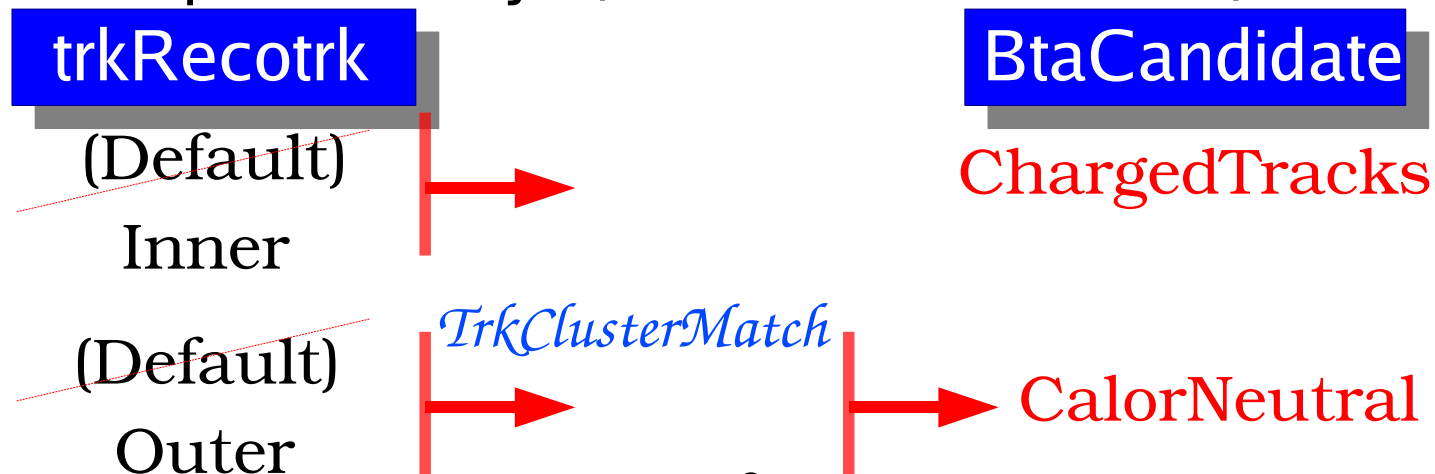
Analysis Tools Workshop, 1 October 2005

# Outline

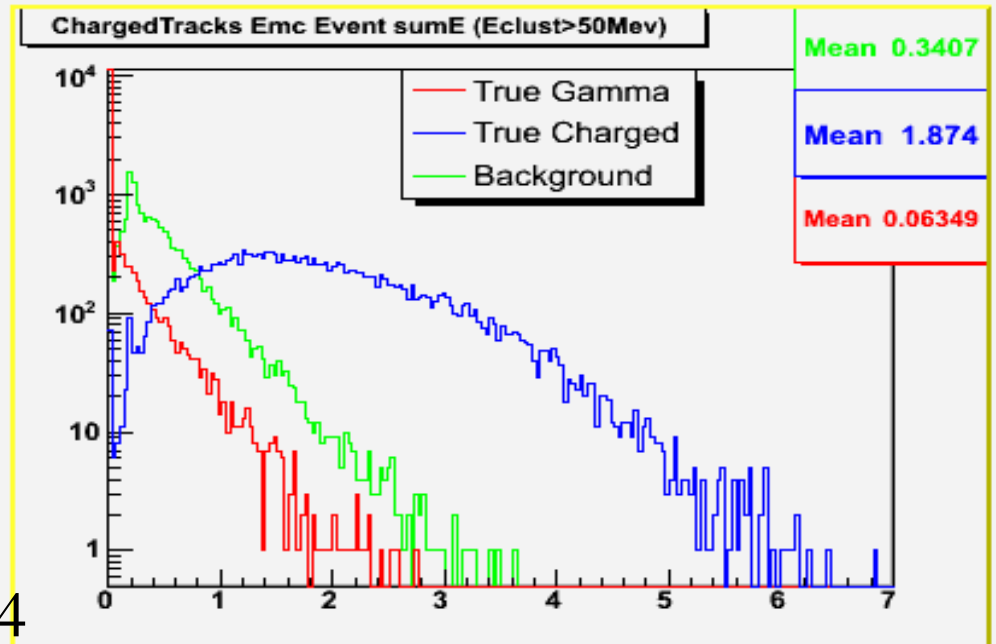
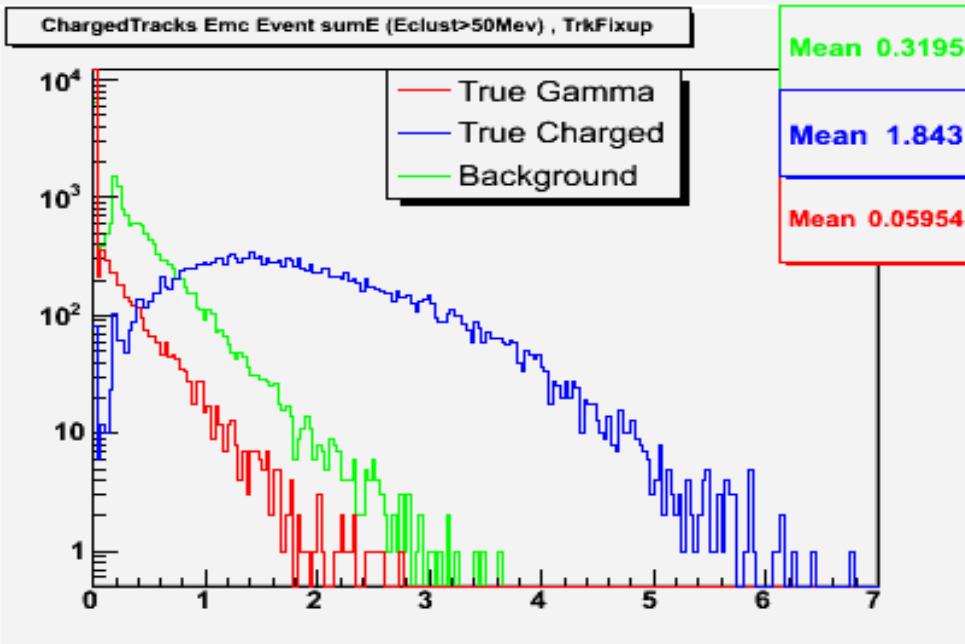
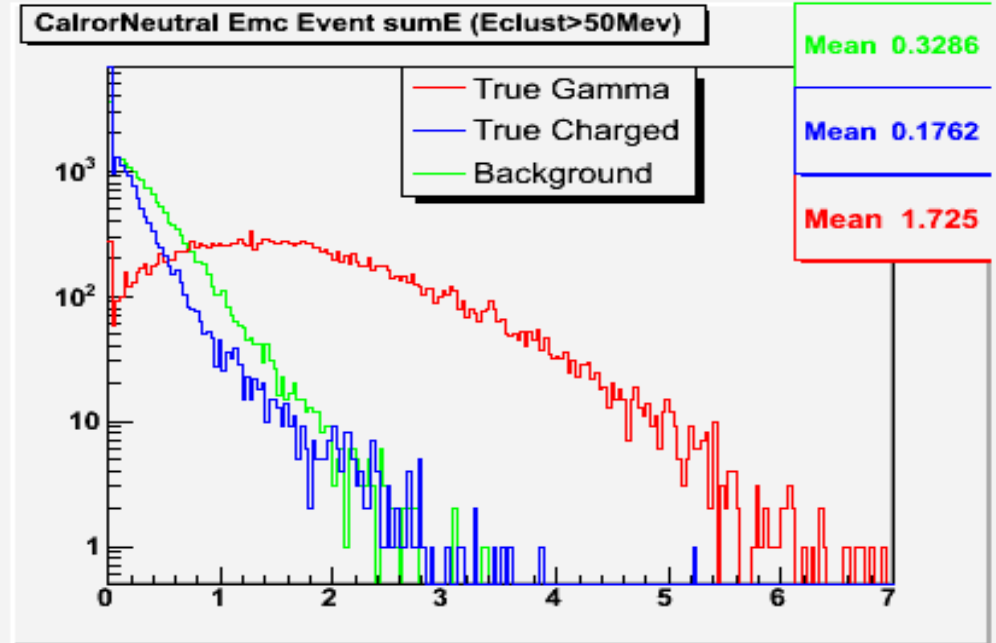
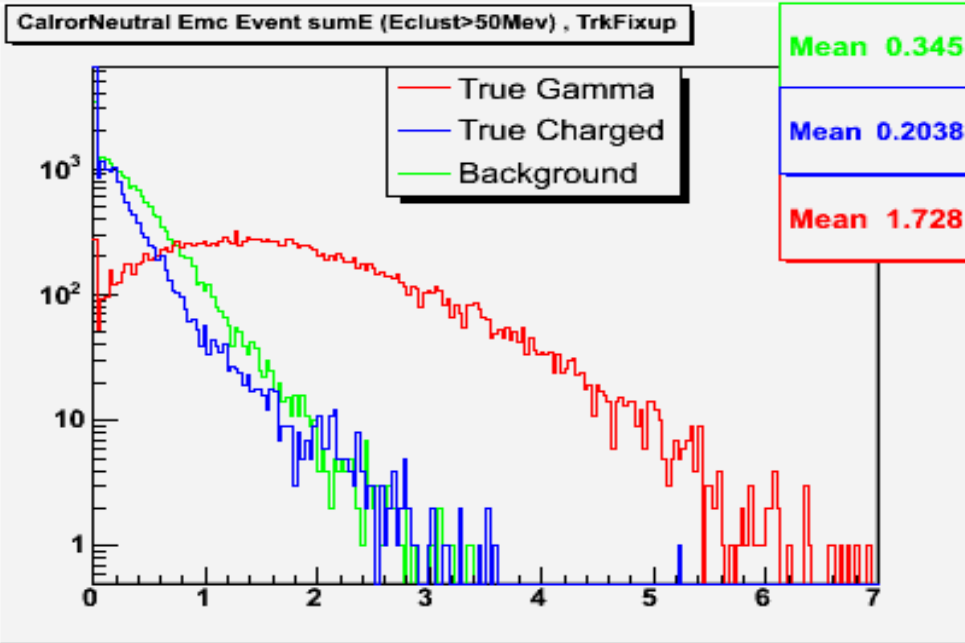
- ▶ Today reporting on very preliminary analyses and plans for future tests and tuning
- ▶ Need to tune and test TrkFixup and monitor effects on Physics observables
- ▶ Analysis tools have been setup for Semileptonic decays and hadronic SemiExclusive reconstruction
- ▶ Discussion on open questions

# Tests performed: reconstruction

- Full analysis chain has been setup for using release 18.3.1b
- Generated dedicated Monte Carlo samples with Geant Bogus bug fix
  - Monte Carlo samples: 30k  $B^0 \rightarrow D^{*+} e \nu_e$ ,  $B^+ \rightarrow D^{*0} e \nu_e$   
30k  $B \rightarrow D^{(*)} n_1 \pi^\pm n_2 K^\pm n_3 \pi^0 n_4 K_s$
- Substitute ChargedTracks with Inner in BetaMiniSequence  
Neutral reconstruction starts from Outer
- Construct standard charged tracks list from Inner using existing algorithms : GTL, GTVL etc.
  - ➔ This is still preliminary! (see discussion later)

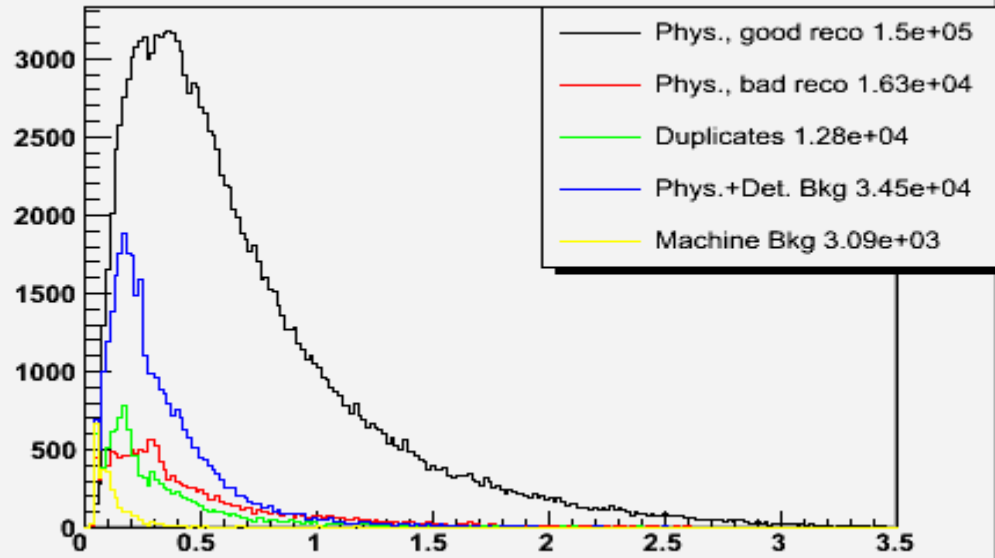


# Cluster - Track Lists Comparison

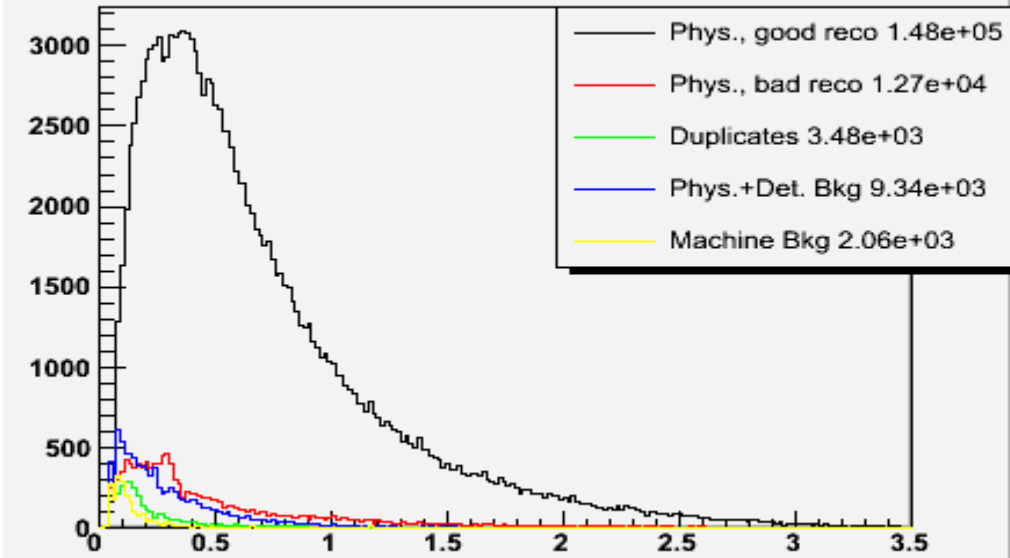


# Cluster - Track Lists Comparison

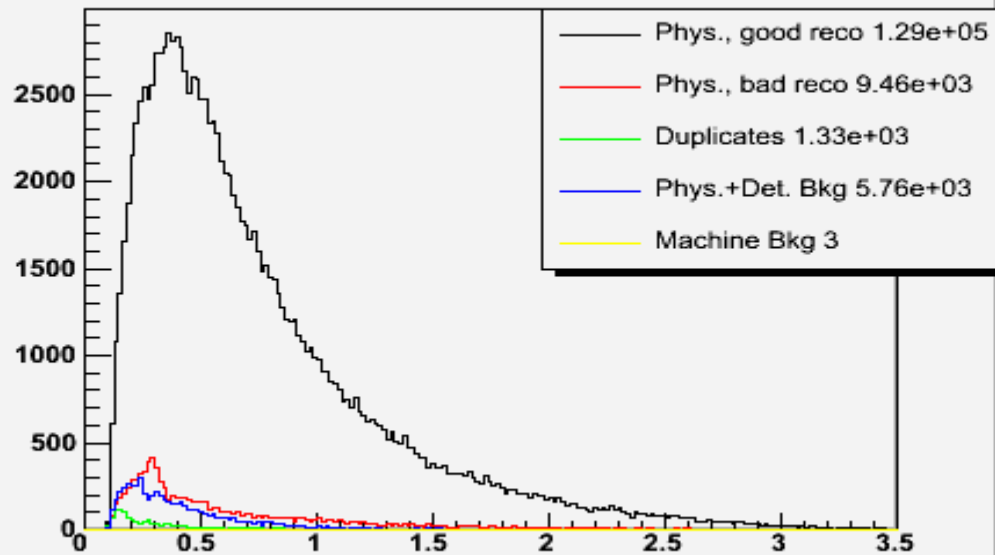
Momentum ChargedTracks



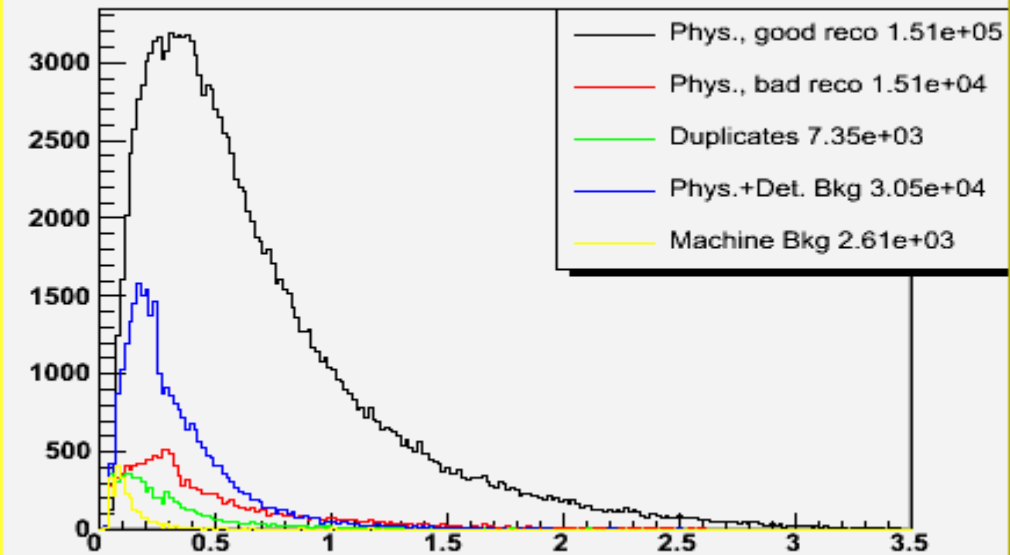
Momentum GTVL



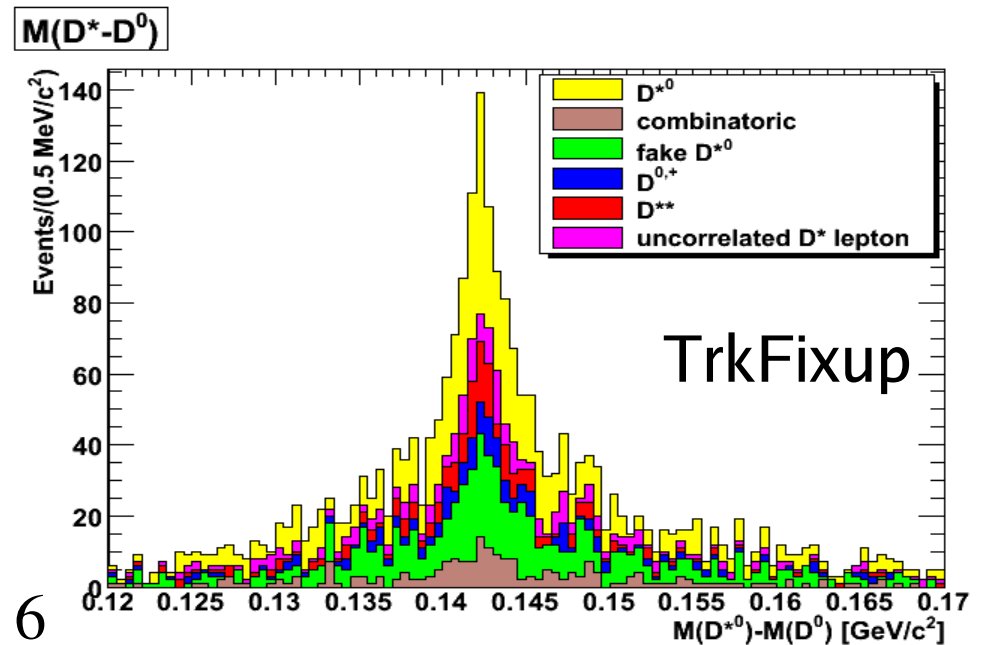
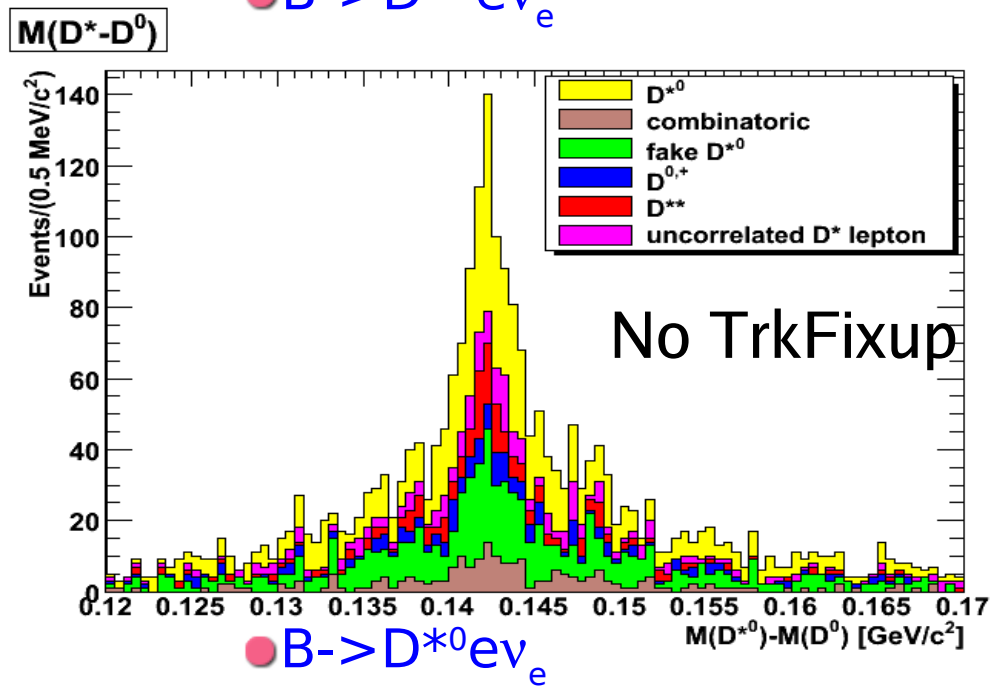
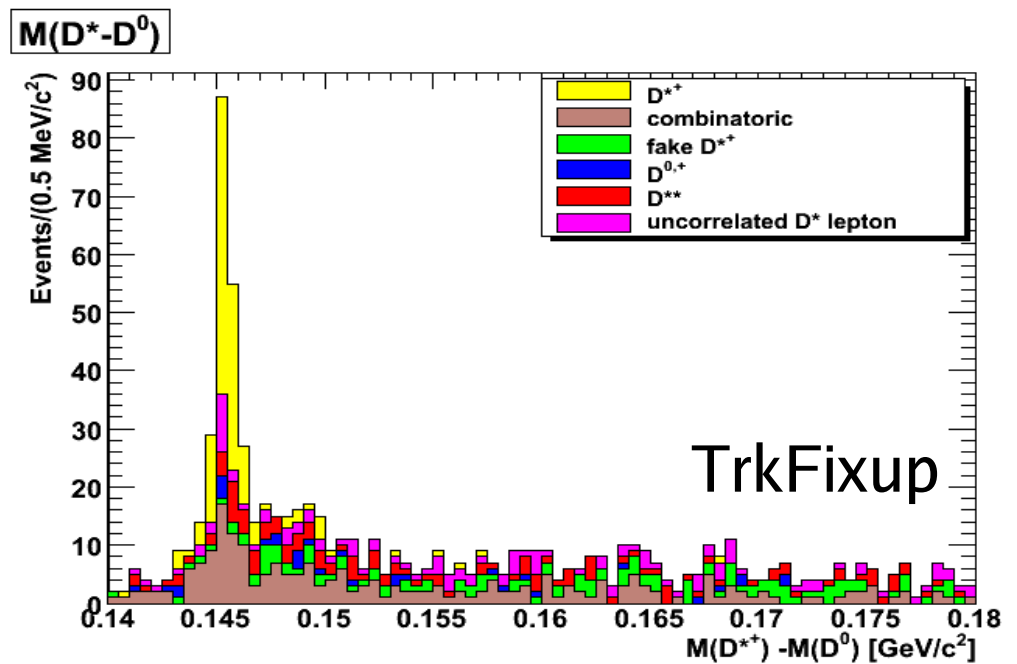
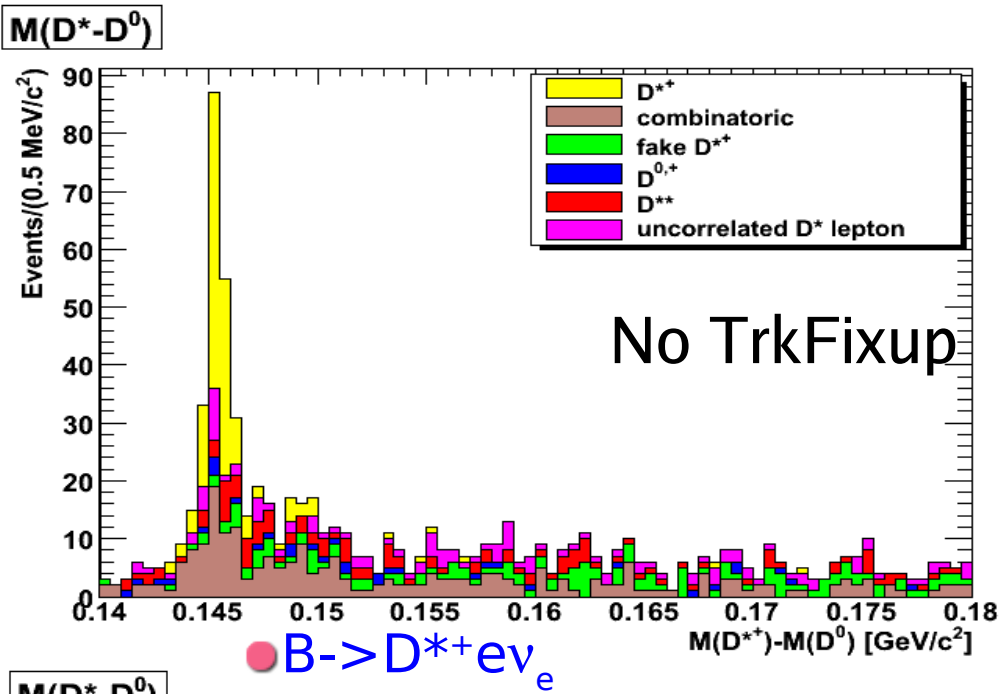
Momentum GTL



Momentum Inner



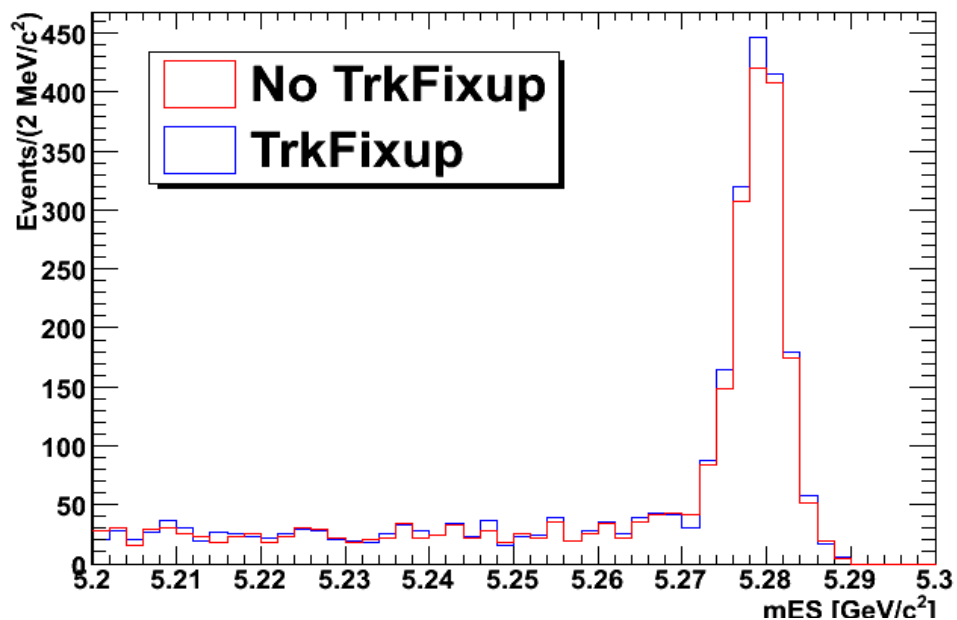
# Examples of Physics Observables



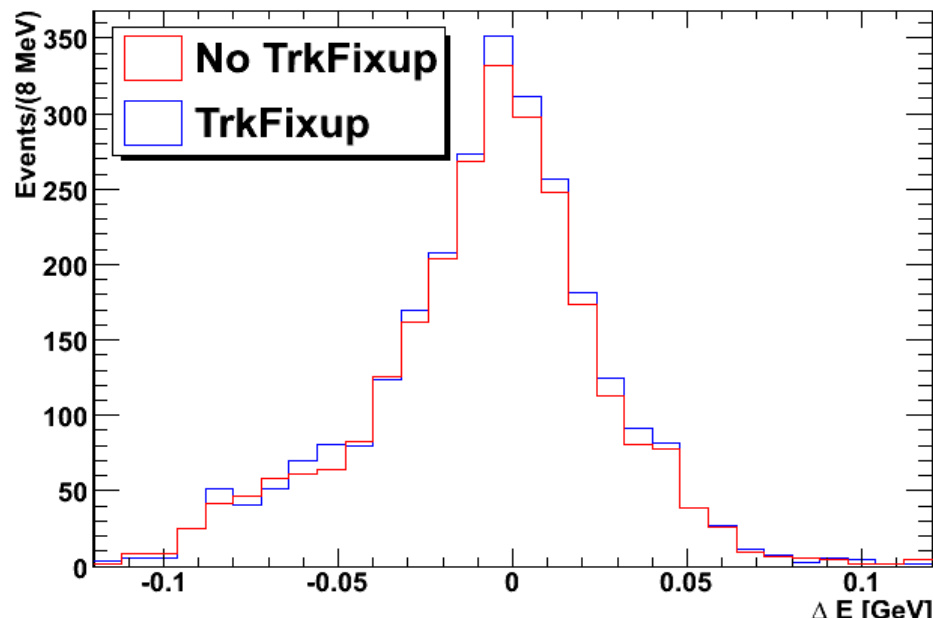
# Examples of Physics Observables

MES and  $\Delta E$  distribution from BsemiExcl reconstruction

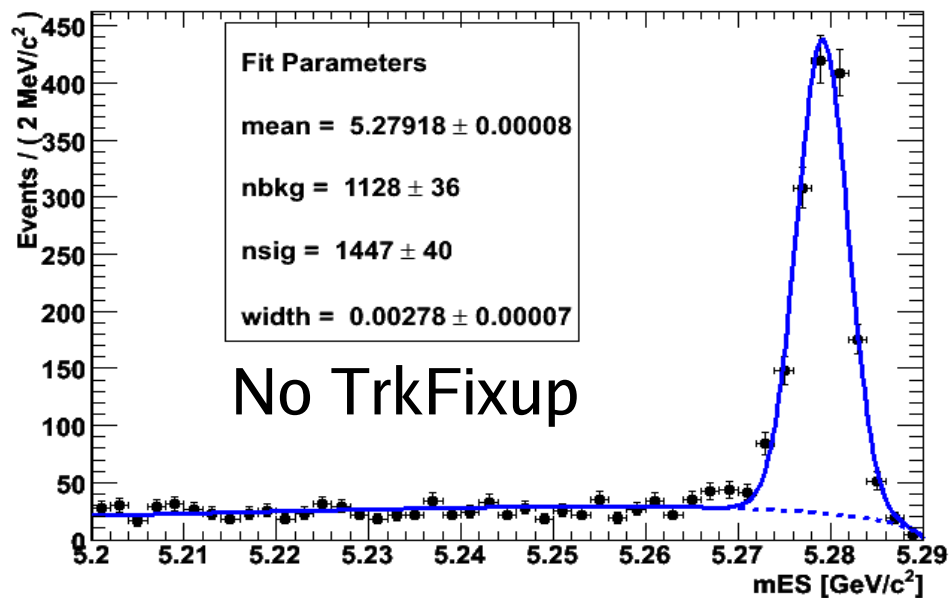
M(B)



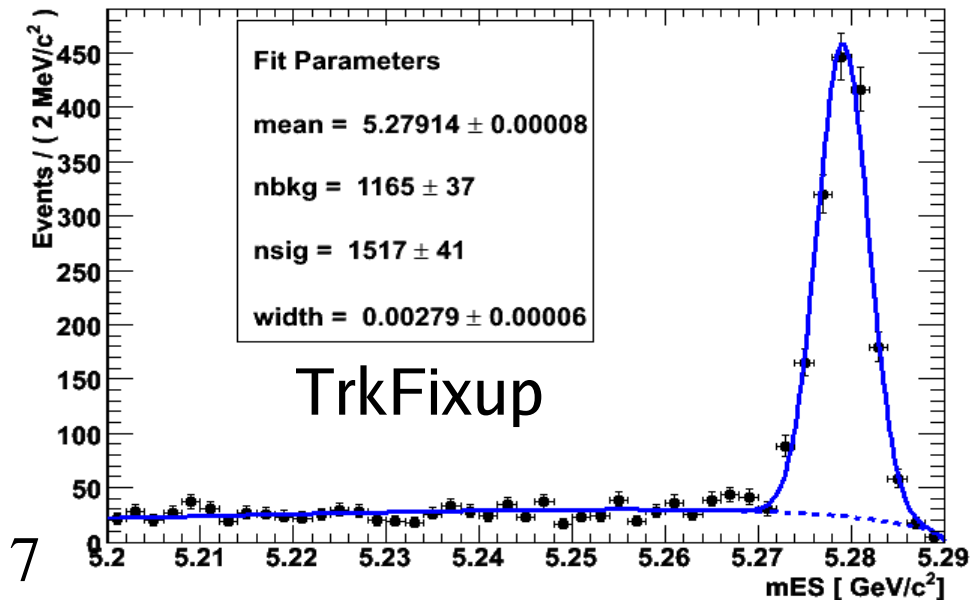
DeltaE



A RooPlot of "mES"



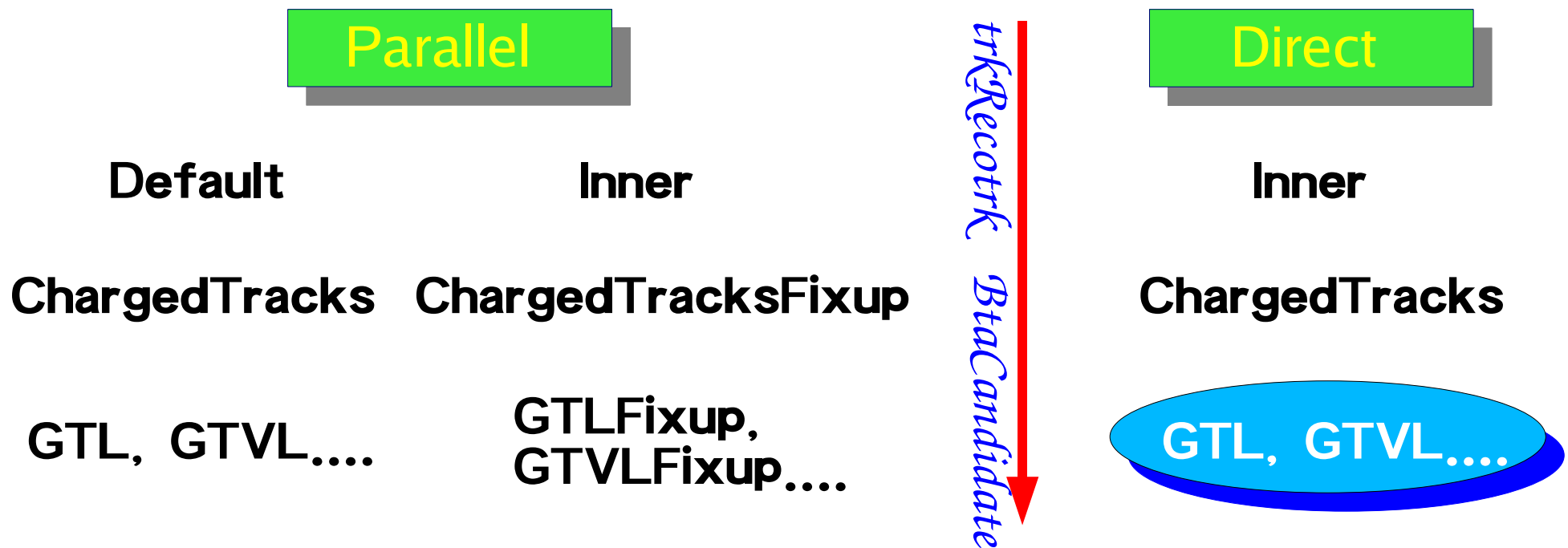
A RooPlot of "mES"



# TrkFixup Direct vs Parallel

How we can implement TrkFixup?

- ▶ Two different possibilities: TrkFixup **Direct** or **Parallel**
- ▶ TrkFixup actually running in R18b Skim cycle in parallel mode
- ▶ Algorithms are already available to test performance



# From Inner to Physics Track Lists

- ▶ Starting from Inner could require different selection criteria or at least, need a retuning of standard selections
- ▶ **cut-based approach (a la GTL, GTVL )?**  
Some cuts (e.g. # of DCH hits) will become obsolete
- ▶ **Is any other approach possible?**  
Before building up BtaCandidates, trkRecotrkr informations can be exploited (e.g.  $V^0$  selection)  
Can we actually “measure” how well the reconstruction performs?  
Poorly reconstructed tracks can be kept or removed depending on the purity requested in the analysis  
Outer/Inner Mapping (decays in flight, etc.)  
Do not forget that PID Tables will be affected

# Conclusions and Next To Do

- Need feedback from Physics analyses to tune TrkFixup
- Started systematic program of comparison for Physics observables with and w/o TrkFixup
- Use of “old” quality cut (GTL, GTVL...) on charged tracks can limit the improvements within TrkFixup approach
- Project moving in two parallel directions:
  - Still lot to implement in TrkFixup (material interactions etc..)
  - Physics application of Inner/Outer
- Time schedule: December Collaboration Meeting  
Next Skim round

We are open to suggestions and encourage feedback from  
Physics groups!!!