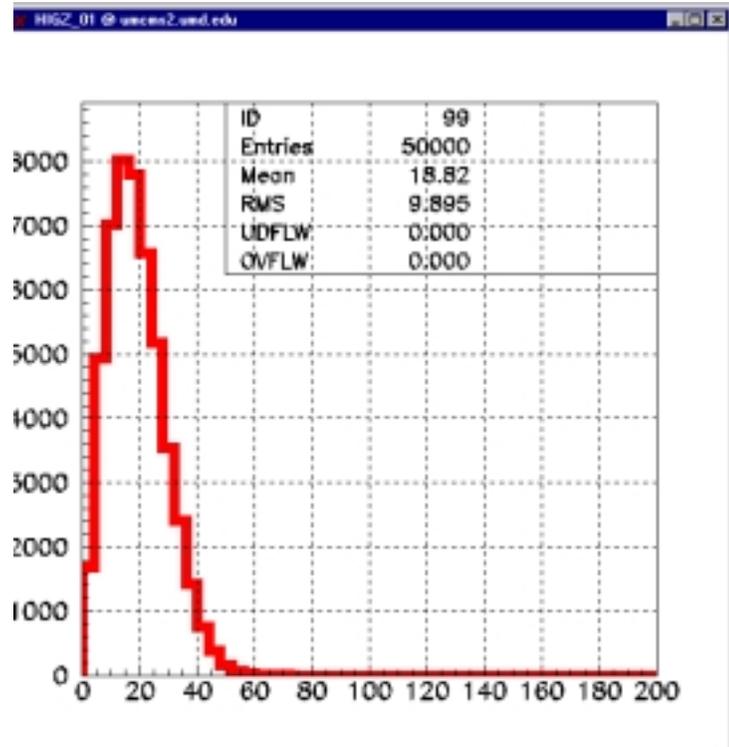


Effect of Recycling Events on MET results

use a toy Monte Carlo to try to understand the effect that the recycling of min bias “pileup” events has on the MET results.

start with ORCA3-type recycling (sequential, not random, reading of pileup file) (results for ORCA4-type recycling are at the end of the talk)

create a signal distribution by choosing MET_x and MET_y according to a gaussian with an RMS of 15 GeV for 50000 events

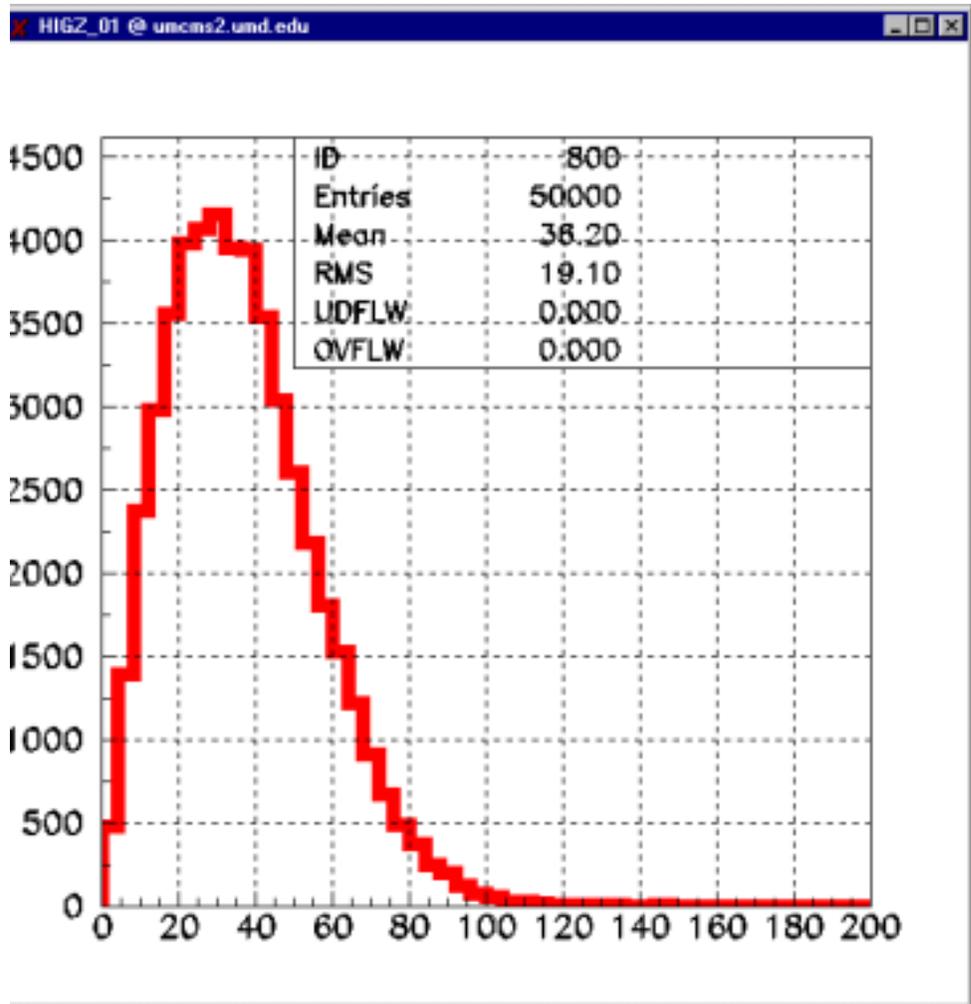


MET distribution for
“signal” sample

create min bias events by picking their MET_x MET_y from a gaussian with an RMS of 6 GeV.

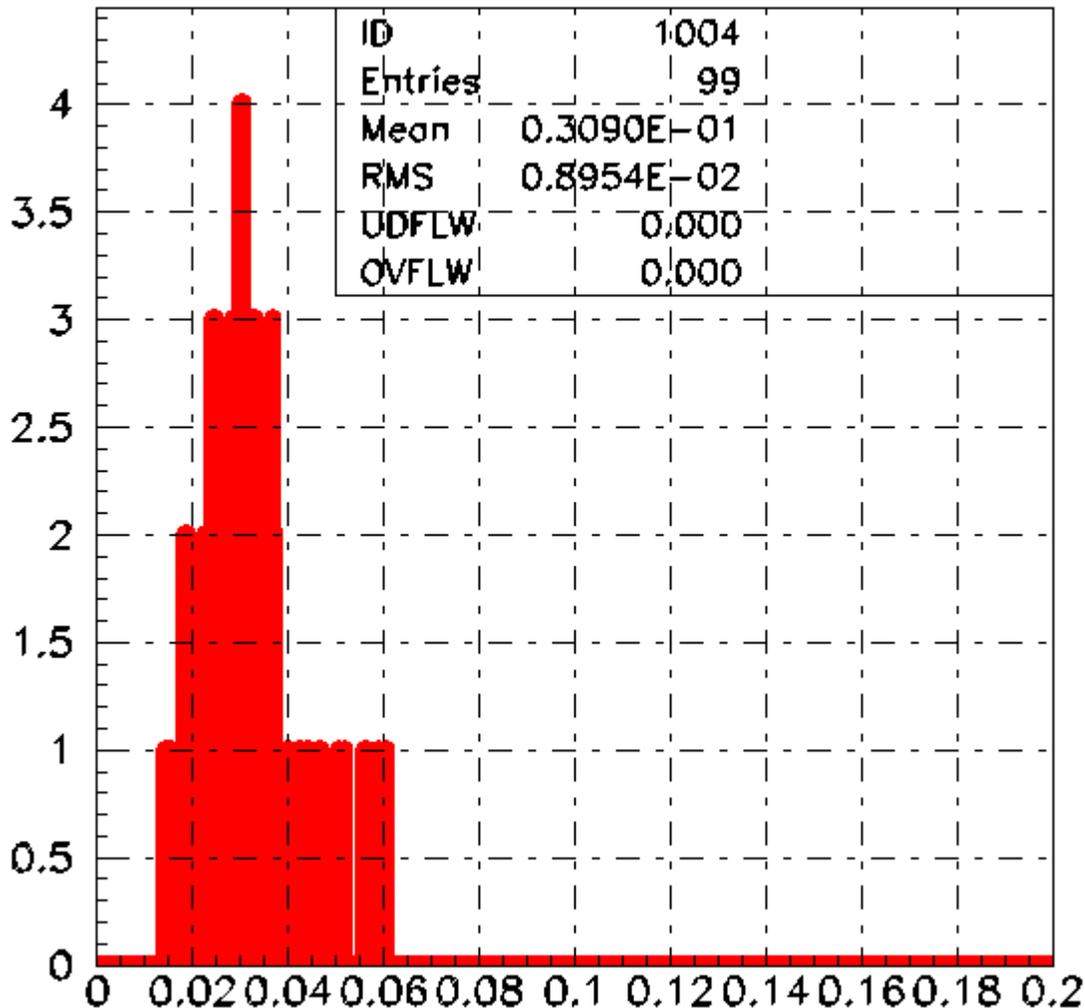
“overlay” 17 min bias events onto the signal without any recycling

(50000x17 = 850000 min bias events)



fraction of events with
MET > 80 is 0.0325
 ± 0.0008

now, instead use a 1000 event min bias sample, and overlay this onto the 50,000 event signal sample, using ORCA3-type recycling. do this for several 1000 event min bias samples, and plot the pass fraction obtained each time

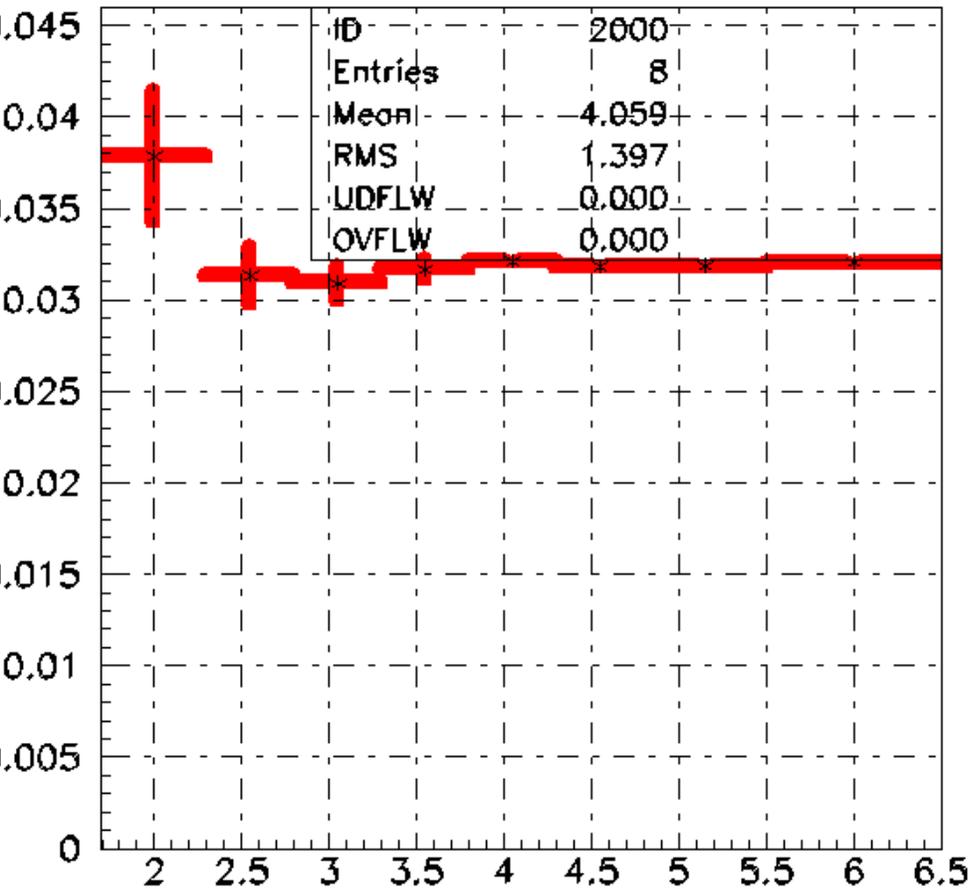


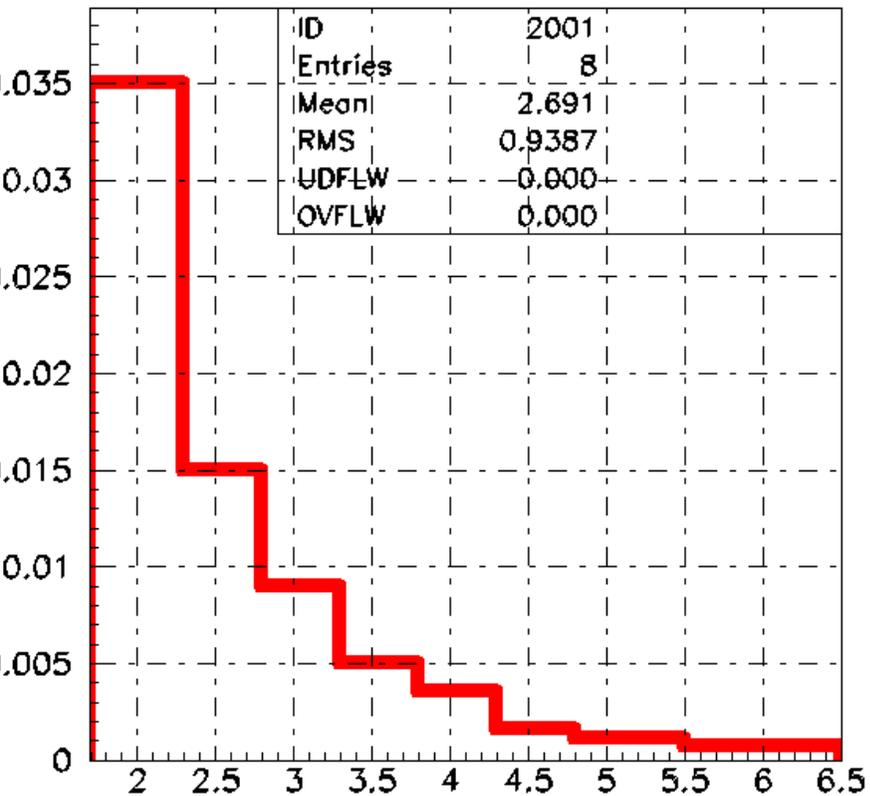
you get an error from recycling that is equal to the RMS of this distribution = 0.009

so, % error is $0.009/0.0325 = 28\%$
error on pass fraction

x-axis: log base 10 of the number of events in the min bias file.

y-axis: mean of distribution of % of events with MET>80

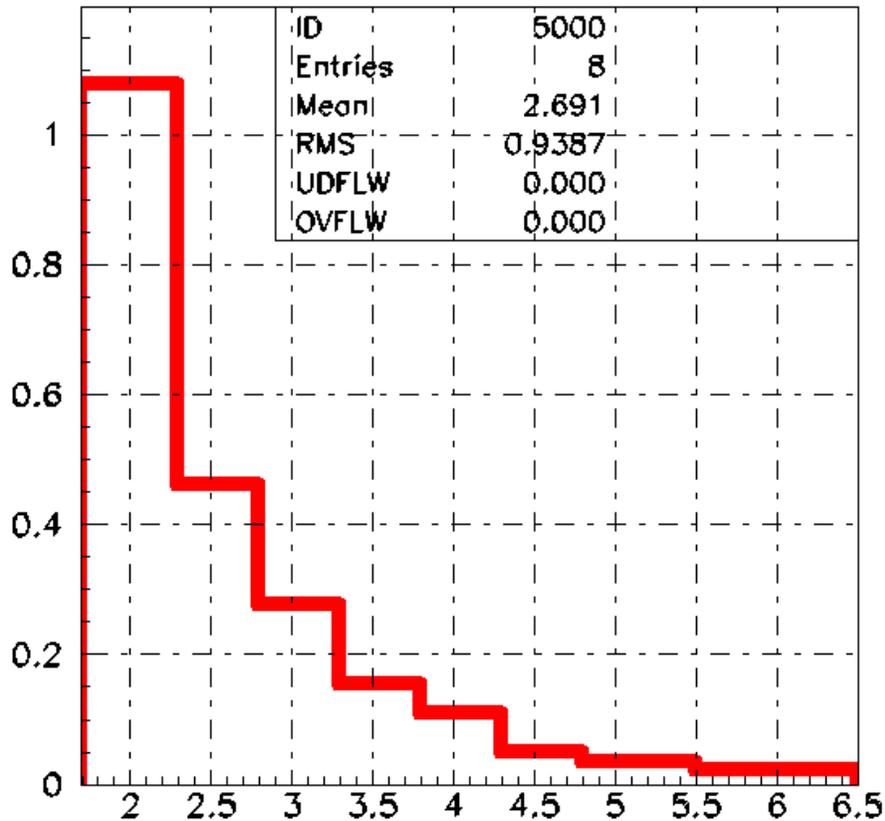




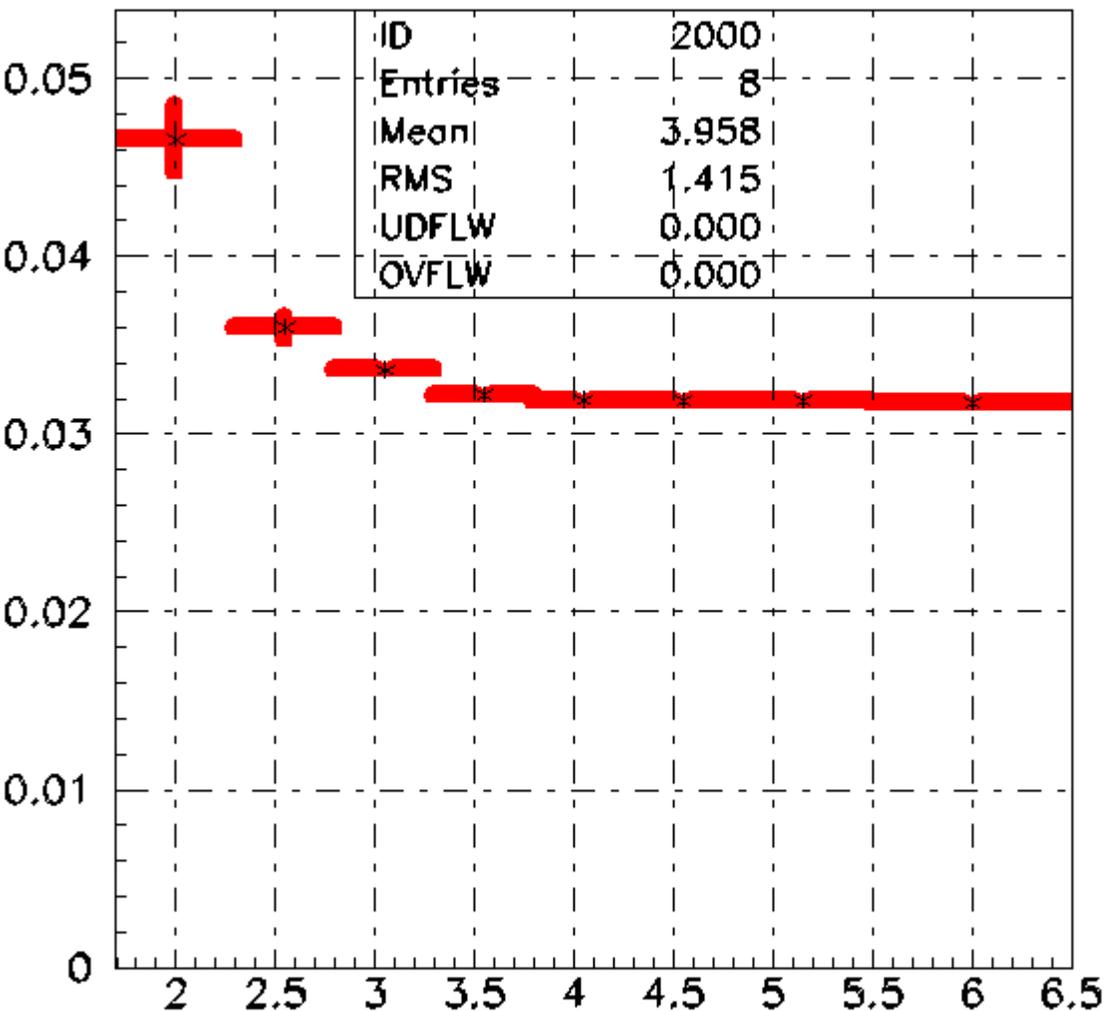
x-axis: log base 10 of the number of events in the min bias file.

y-axis: rms of % above 80 distribution

ditto, except y-axis is divided by the mean (so, it's the % error due to recycling)



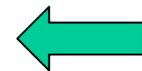
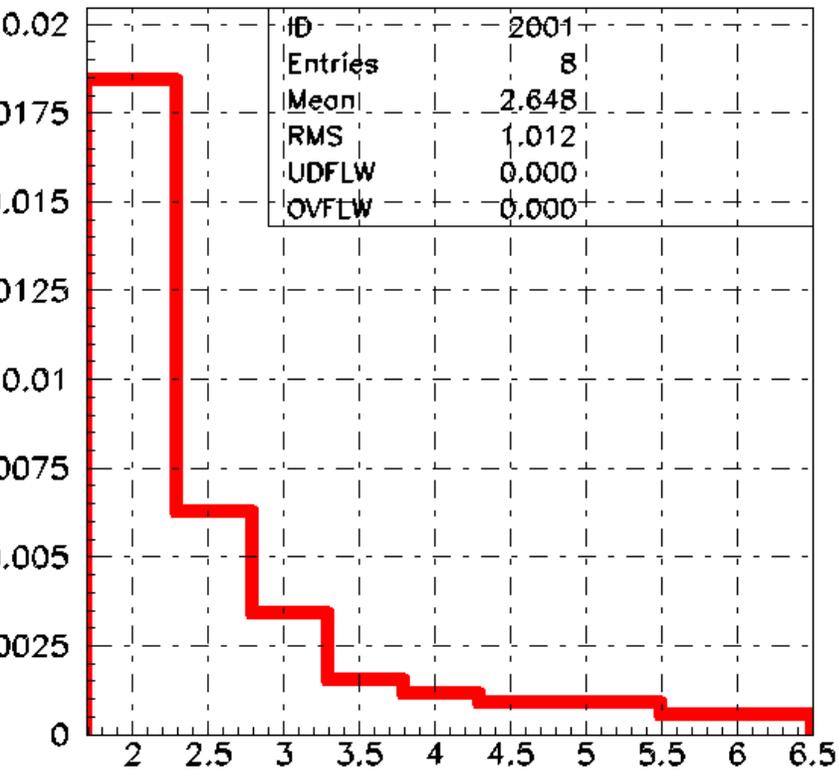
same plots, but with ORCA4-type recycling



x-axis: log base 10 of the number of events in the min bias file.

y-axis: mean of distribution of % of events with MET > 80

the mean increases with small min bias samples in this case, because when you do random selection, it is possible that the same min bias event is overlaid more than once onto a signal event. if I prevent this, this distribution becomes flat again...



x-axis: log base 10 of the number of events in the min bias file.

y-axis: rms of % above 80 distribution

ditto, except y-axis is divided by the mean (so, it's the % error due to recycling)

