



CSCTF improvements for 2011

CSCTF group

on behalf of CSCTF group:

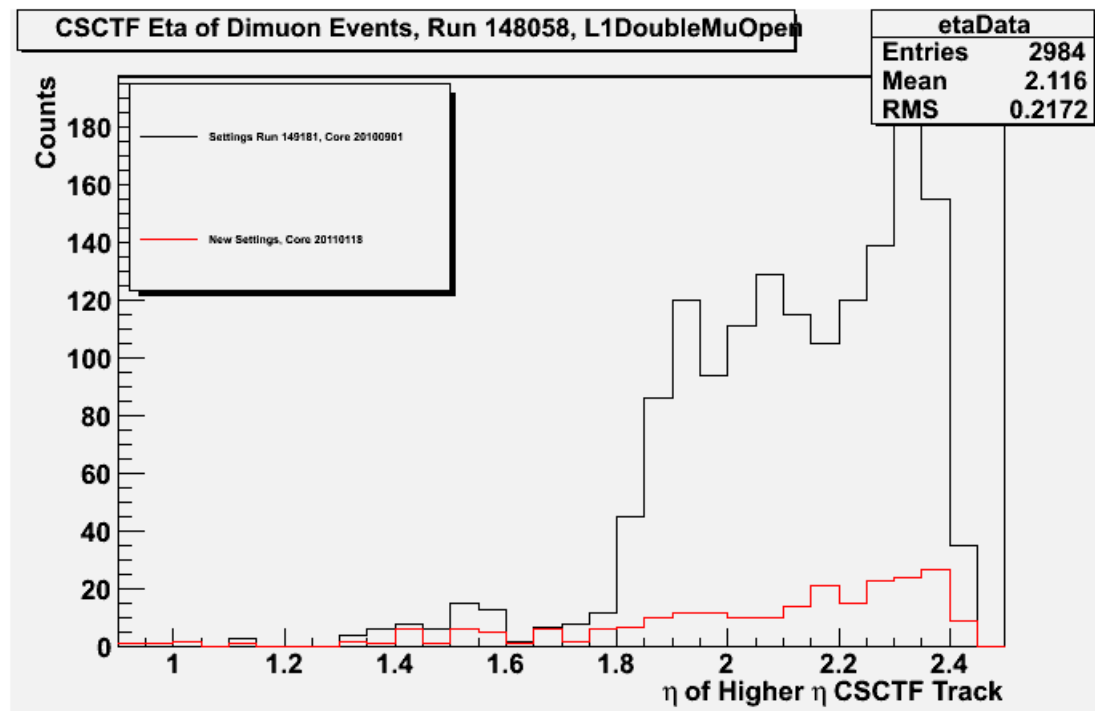
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- Ghost cancelation logic: high rate at $\eta > 1.8$ is suppressed
- High rate at η bin 1.5-1.6 is partially suppressed
- PT assignment: improvement in all η regions
- Extra zero suppression logic

Ghost Cancellation News

New Ghost Cancellation logic:

The ghost cancellation logic compares track segment numbers of each candidate with all other available candidates. Candidates that share at least one segment are considered to be ghosts, and in such case the track with lower rank is removed. So we didn't use mindphi and mindeta cuts anymore.



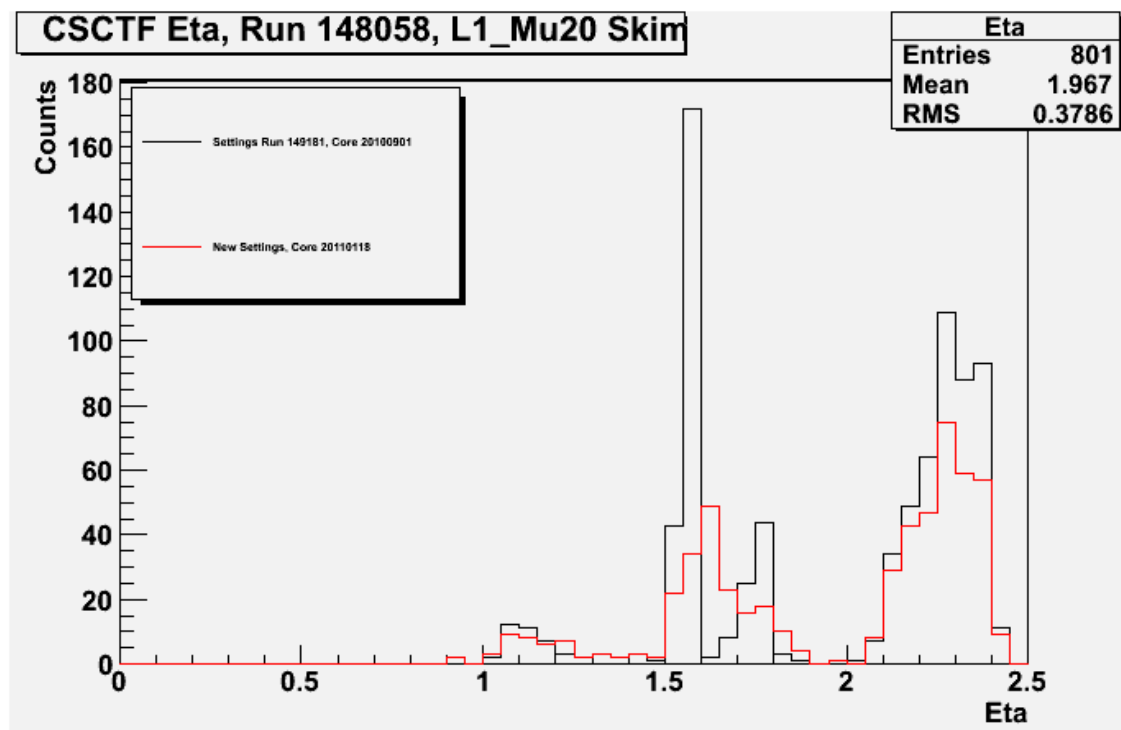
Cut Dimuon Rate by 86% Overall

-> ghost problem at high eta is solved

-> we didn't lose in efficiency of dimuon trigger with new logic

High rate in eta 1.5-1.6 bin

- Tight eta window from 6 to 4 to suppress contribution of low pt tracks
- Use CLCT pattern information to suppress contribution of low pt tracks
- Stop make shift in eta region 1.5-1.7 to separate ME1/1 and ME1/2



Cut Rate by 42% in eta 1.5-1.7
(We estimate rate in 2 bins because
now we didn't make any shift in eta for ME1/2 station)

PT assignment

- PTLUTs:

- overlap region:

- use all possible combination on track with DT stubs

- 2 and 3 station tracks with DT have Quality = 3 and we use DT phiBend information for PT assignment

- CLCT pattern for mode 6, 7, 13 (ME1-ME2, ME1-ME3, ME1-ME4 tracks):

- rate in eta ~1.4-1.8 could drop by factor ~2 for Quality = 2 tracks

make pt assignment using dphi12 and after:

if ($|\text{CLCT patter}| > 1$ && $\text{pt_csctf} > 5 \text{ GeV}$) $\text{pt_csctf} = 5 \text{ GeV}$

- high eta region:

ME2-ME3-ME4, ME2-ME3, ME3-ME4 and ME3-ME4 have Quality = 1 in new PTLUTs

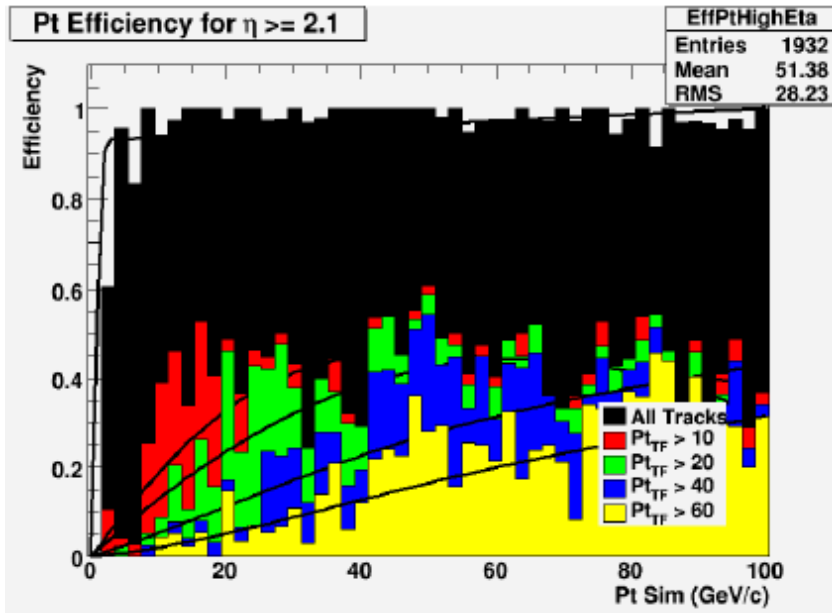
Use max pt solution from 3 links to get efficiency to ~80% for high pt tracks

CLCT patter definition:

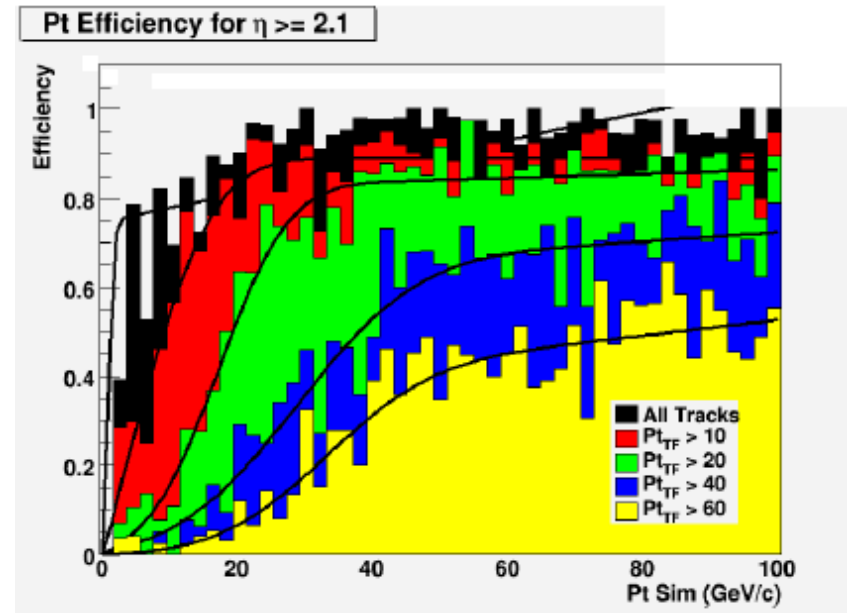
```
Hit pattern LUTs for 1 layer: - = don't care, xx= one hit or the other or both
Pattern      id=2      id=3      id=4      id=5      id=6      id=7      id=8      id=9      idA
Bend dir     bd=0      bd=1      bd=0      bd=1      bd=0      bd=1      bd=0      bd=1      bd=0
             |        |        |        |        |        |        |        |        |
ly0  -----xxx xxx----- -----xxx- -xxx----- -----xxx- -xxx----- -----xxx- -----xxx-----
ly1  -----xx----- -xx----- -----xx----- -xx----- -----xx----- -xx----- -----xx----- -xx-----
ly2 key -----x----- -x----- -----x----- -x----- -----x----- -x----- -----x----- -x-----
ly3  ---xxx--- -xxx--- -xxx--- -xxx--- -xxx--- -xxx--- -xxx--- -xxx--- -xxx--- -xxx---
ly4  -xxx- 4 -4 -xxx- -xxx- 3 -3 -xxx- -xx- 2 -2 -xx- -xxx- 1 -1 -xxx- -xxx- 0
ly5  xxx- 4 -4 -xxx- -xxx- 3 -3 -xxx- -xxx- 2 -2 -xxx- -xxx- 1 -1 -xxx- -xxx- 0
             |        |        |        |        |        |        |        |        |
// Extent   0123456789A 0123456789A 0123456789A 0123456789A 0123456789A 0123456789A 0123456789A 0123456789A 0123456789A
// Avg.bend - 8.0 hs   + 8.0 hs   -6.0 hs   +6.0 hs   -4.0 hs   +4.0 hs   -2.0 hs   +2.0 hs   0.0 hs
// Min.bend -10.0 hs  + 6.0 hs   -8.0 hs   +4.0 hs   -6.0 hs   +2.0 hs   -4.0 hs   0.0 hs   -1.0 hs
// Max.bend  -6.0 hs   +10.0 hs  -4.0 hs   +8.0 hs   -2.0 hs   +6.0 hs   0.0 hs   +4.0 hs   +1.0 hs
```

Improvement in high eta region ($\eta > 2.1$)

Old Core/ Old Settings



New Core/ New Settings



$P_T > 20 \sim 80\%$ eff

Due to Quality redefinition in this region
we could improve efficiency without increasing of the rate

Extra Zero Suppression

we are testing firmware with extra zero suppression at Point 5:
we still have problem to read new data format with unpacker
we are are trying to solve this problem