

# How to calibrate the Muon Alley

- For each trigger/pretrigger line, choose the *main* cut (i.e. the muon Pt for the Single Muon line)
- The other cuts can be adjusted by looking at the eff. vs. retention plots for some cut values (i.e. IPS > 0,1,2,3 or 4)
- The minimum bias retention as a function of the *main* cut value gives the range of the allowed BW
- Choose the desired min bias retention (for example 400 Hz)
- A fit gives the corresponding cut threshold (Pt>3000)
- Check that all BW and efficiencies are OK

# Code

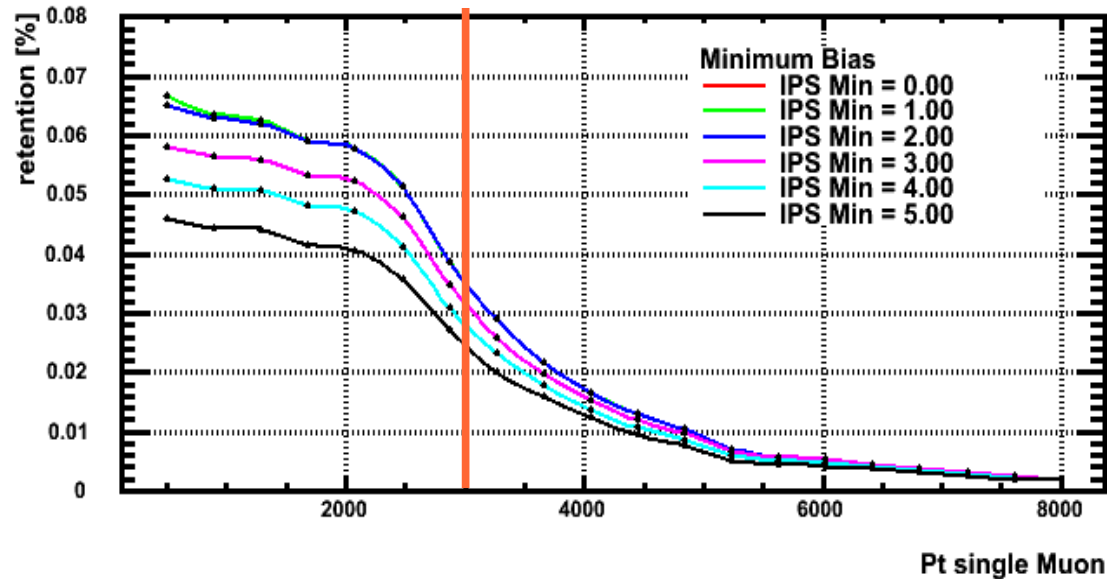
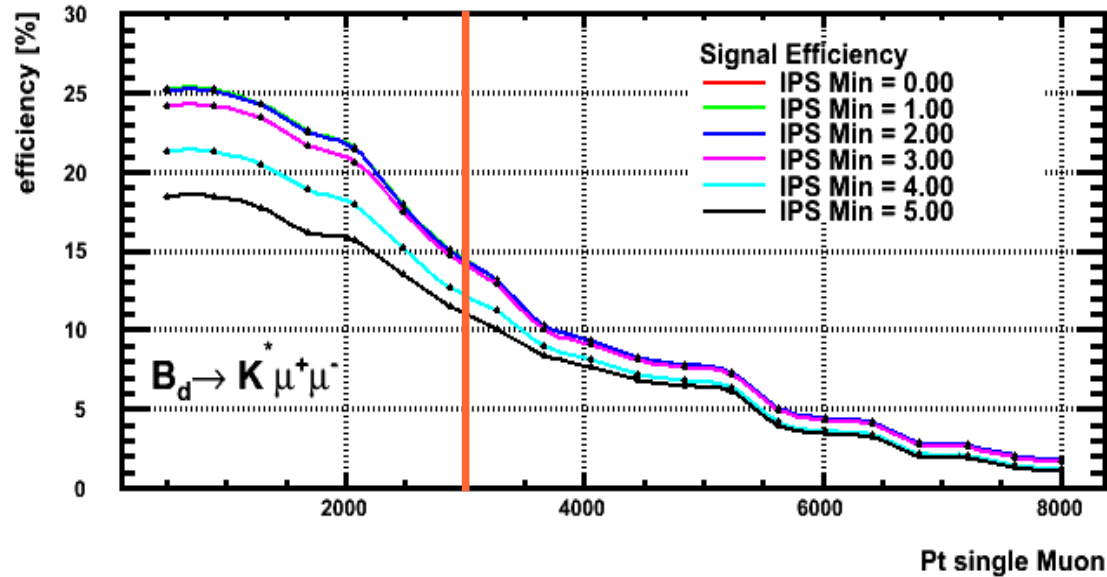
- DaVinci v14r5
  - options/DVCheckMuonLine.opts
- Hlt/HltMuonAlley v1r0
  - src/HltL0Check.cpp/h **new**
  - Read from Hlt summary box and fills ntuple
- ROOT macros
  - doc/HltMuEff.C, ... **new**

On lxplus      ~leggerf/cmtuser/...

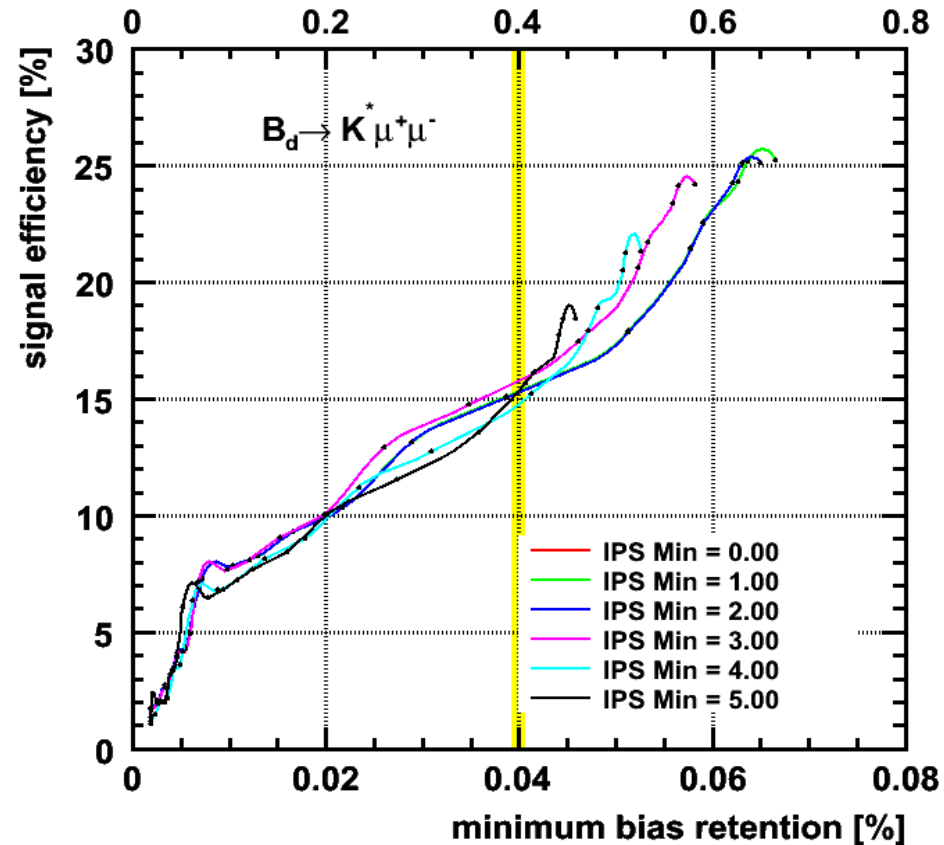
# Data sample

- **MinBias** 307800 (L0 accepted)
- **Bs -> Jpsi Phi** 79572 (L0 accepted)
  - Offline selected 6838 (8.6%)
- **Bd -> Jpsi Ks(LL)** 109839 (L0 accepted)
  - Offline selected 2021 (1.9%)
- **Bd -> Kstar MuMu** 85355 (L0 accepted)
  - Offline selected 1837 (2.1%)

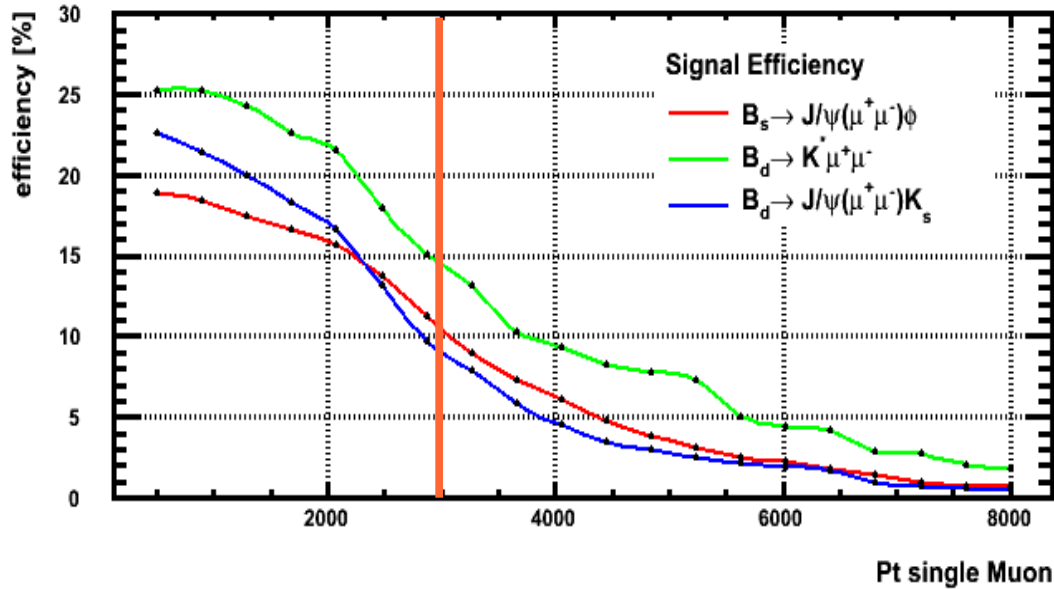
# Single Muon Trigger



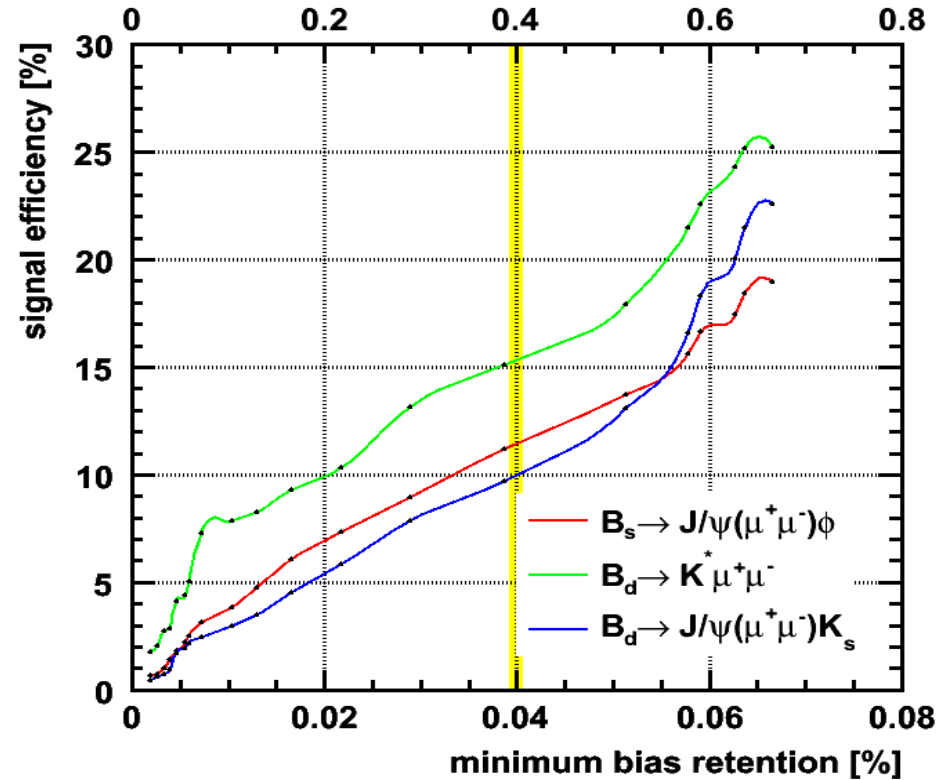
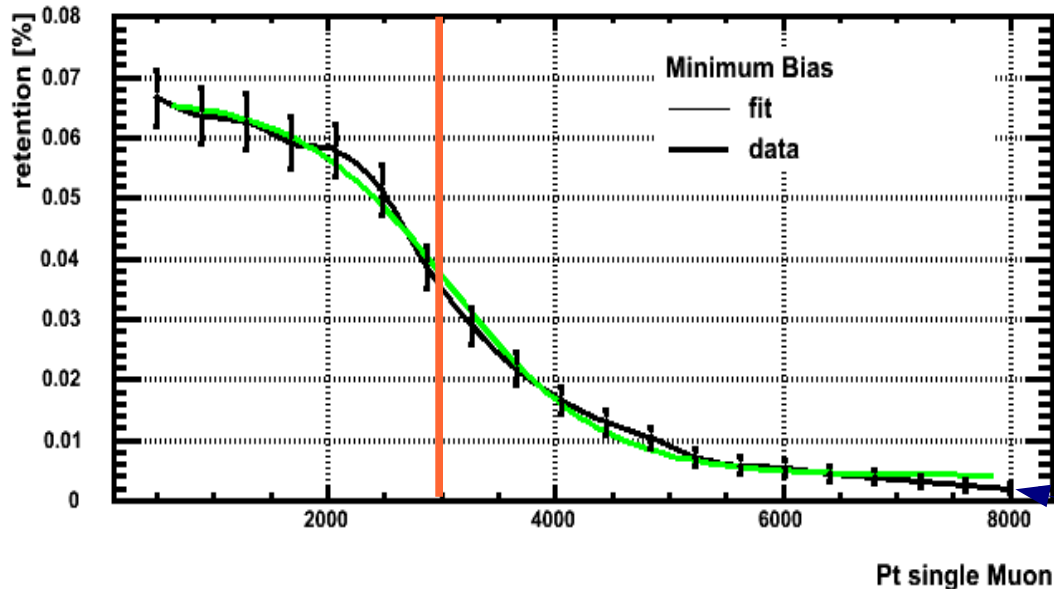
- Pt > 3000
- IPS > 3
- IP VETO = 0.1
- Passed Single Muon pretrigger



# Single Muon Trigger



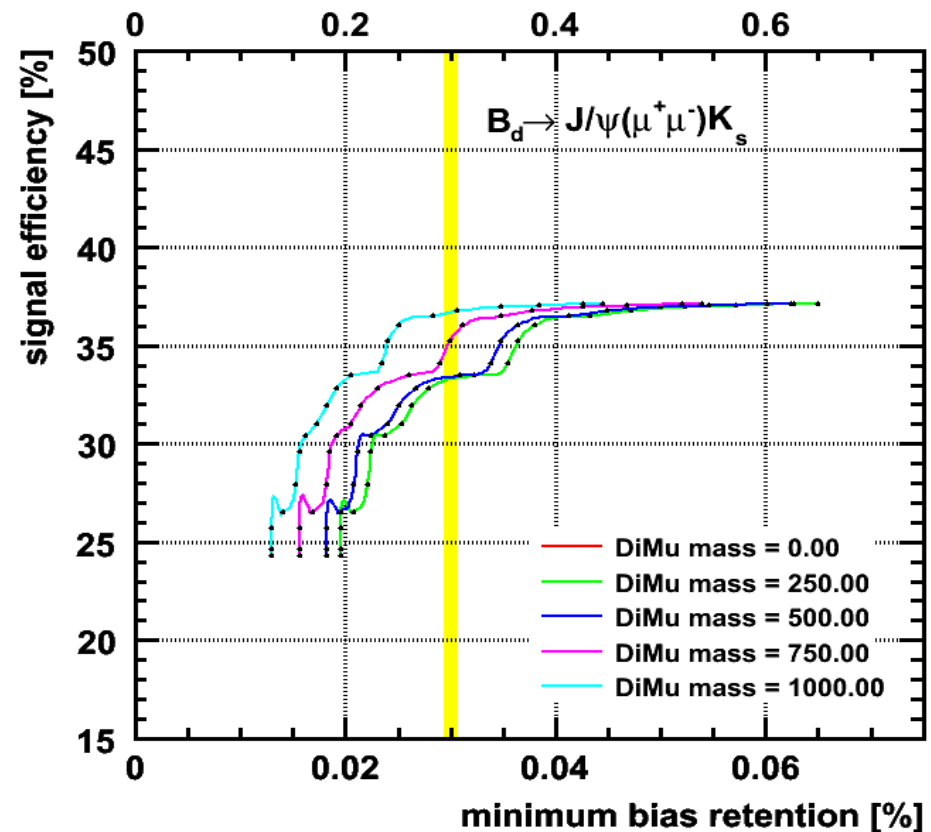
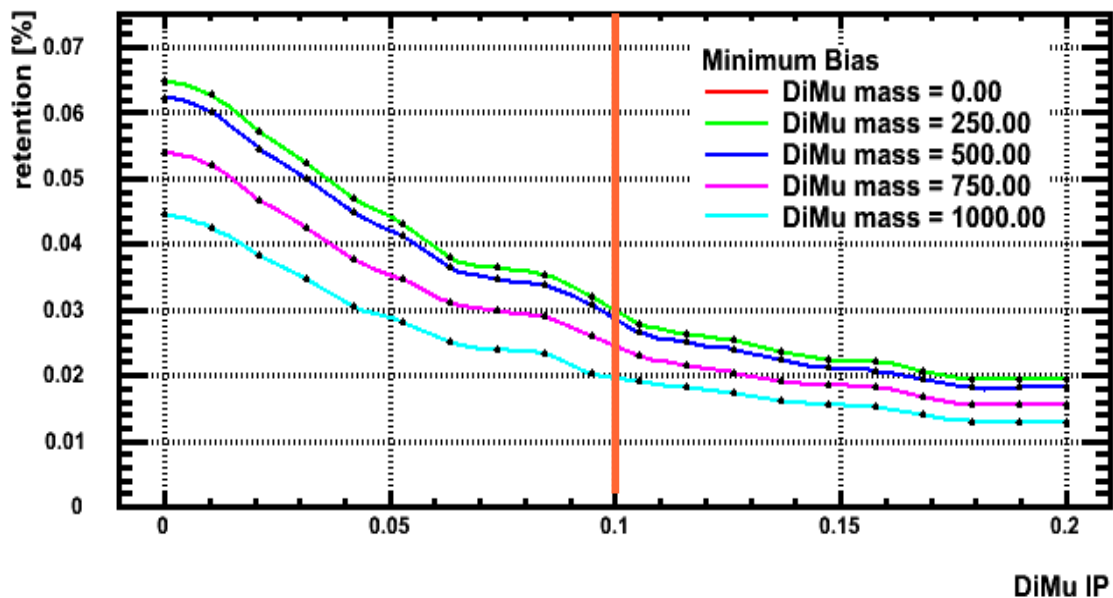
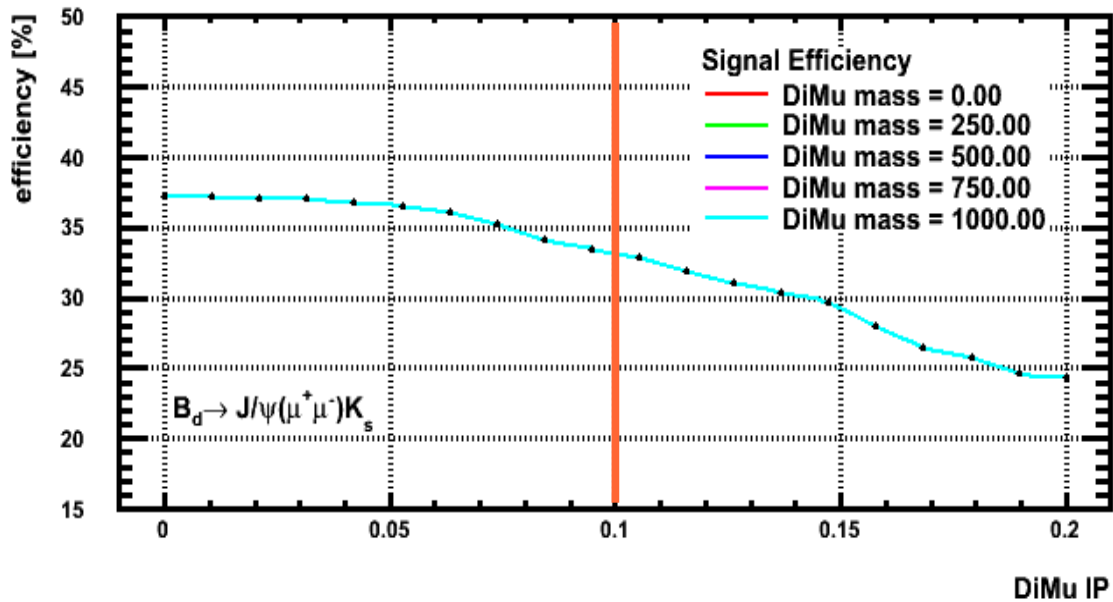
- Pt > 3000
- IPS > 3
- IP VETO = 0.1
- Passed Single Muon pretrigger



Fit with TanH

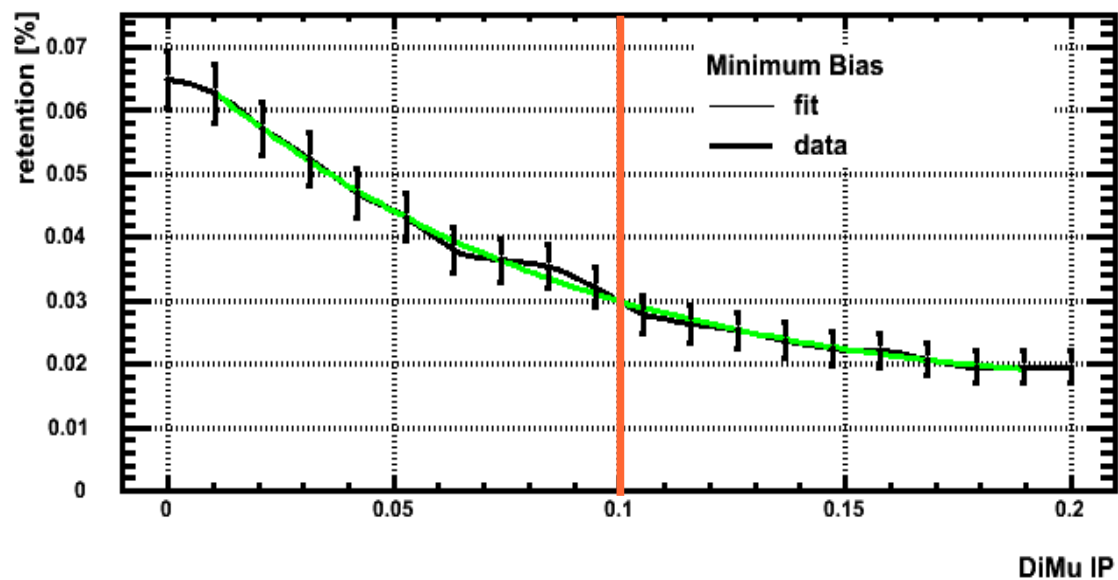
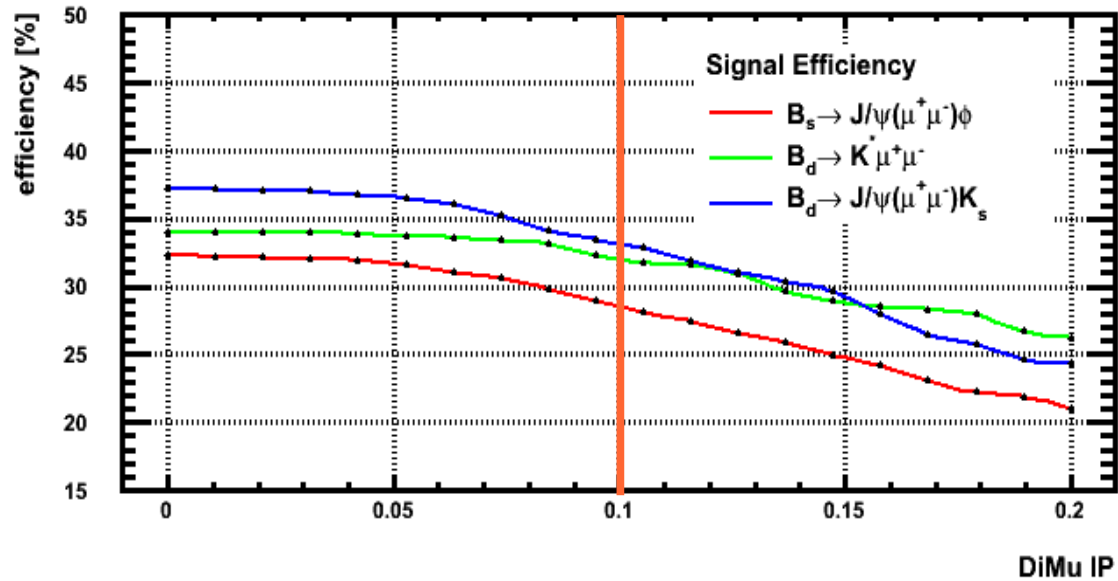
# DiMuon Trigger

- DiMuIP > 0.1
- DiMuMass > 500
- Passed Di Muon pretrigger

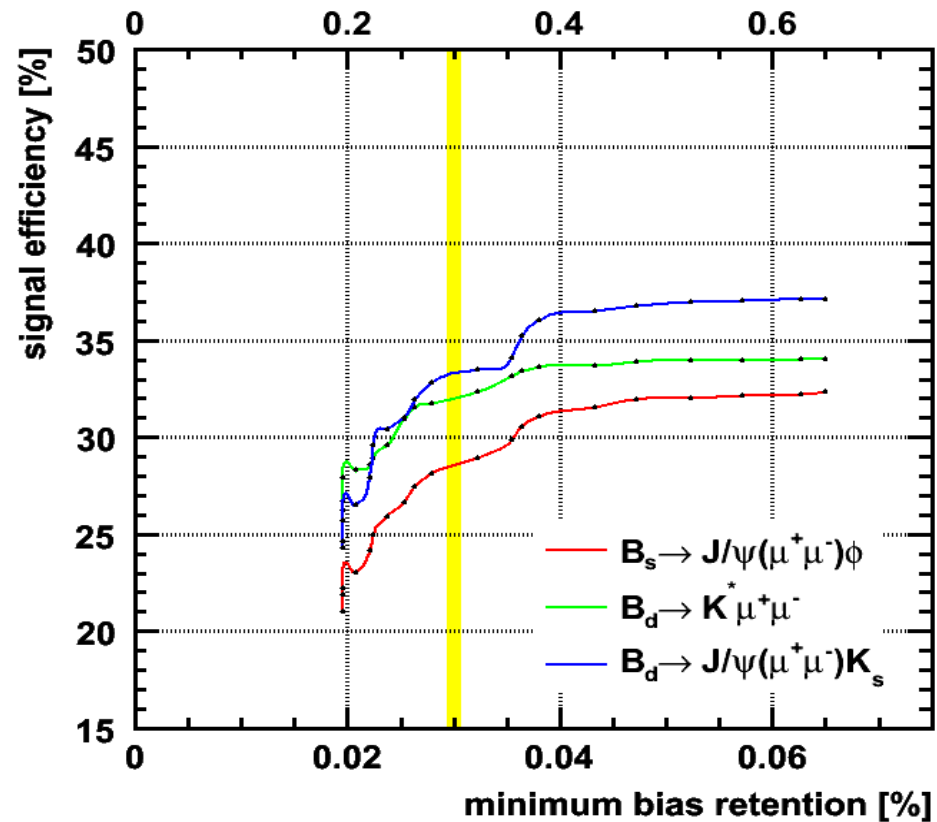


Signal efficiencies do not depend on mass cut??

# DiMuon Trigger



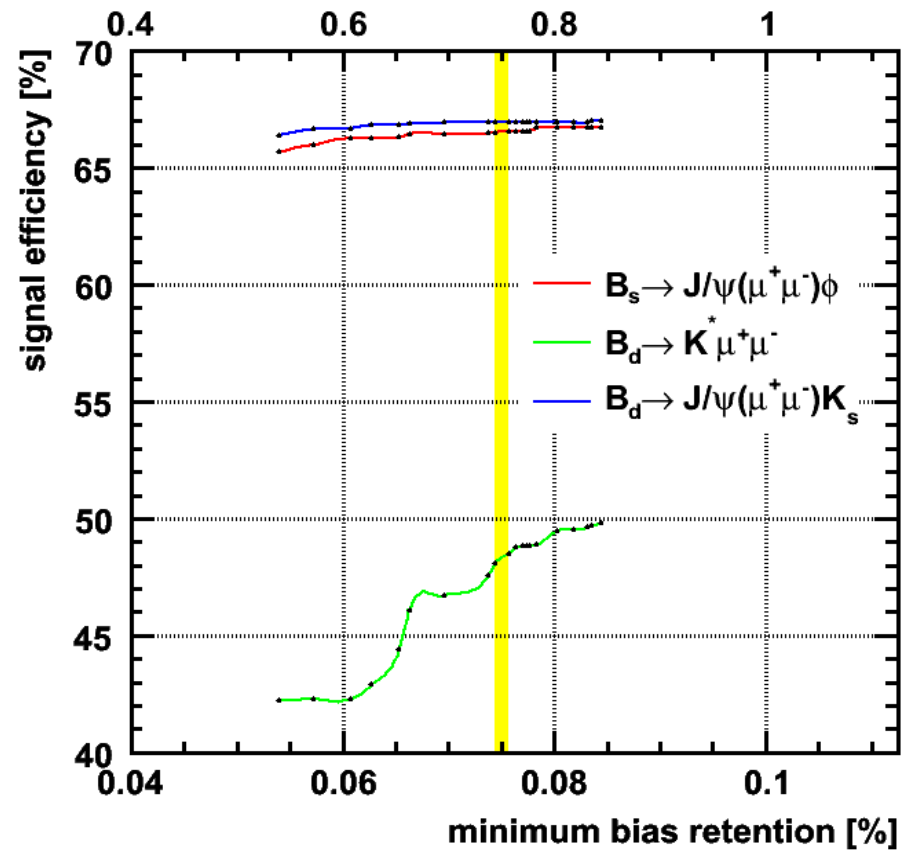
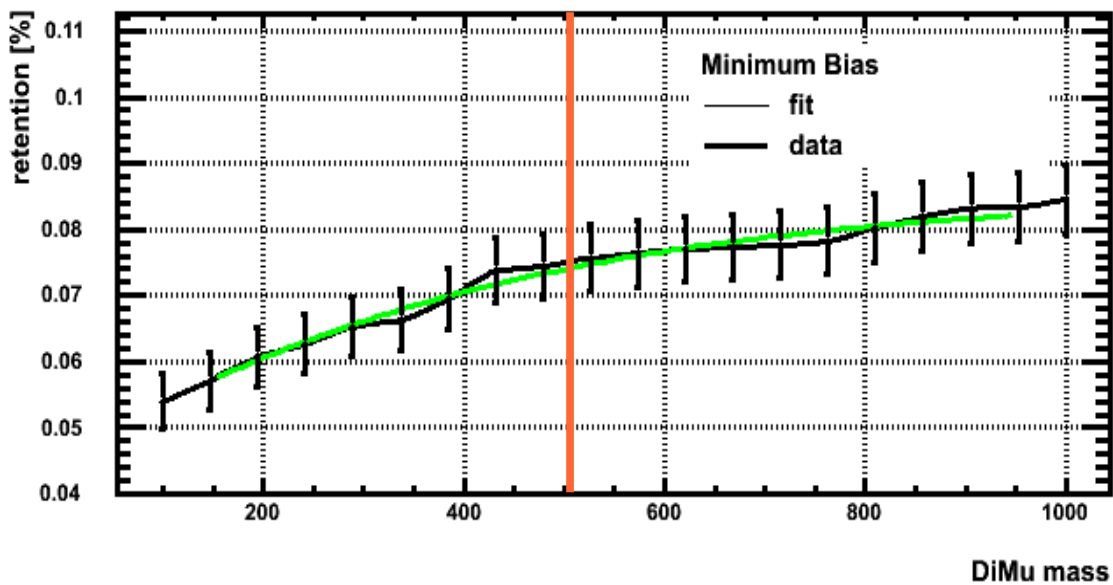
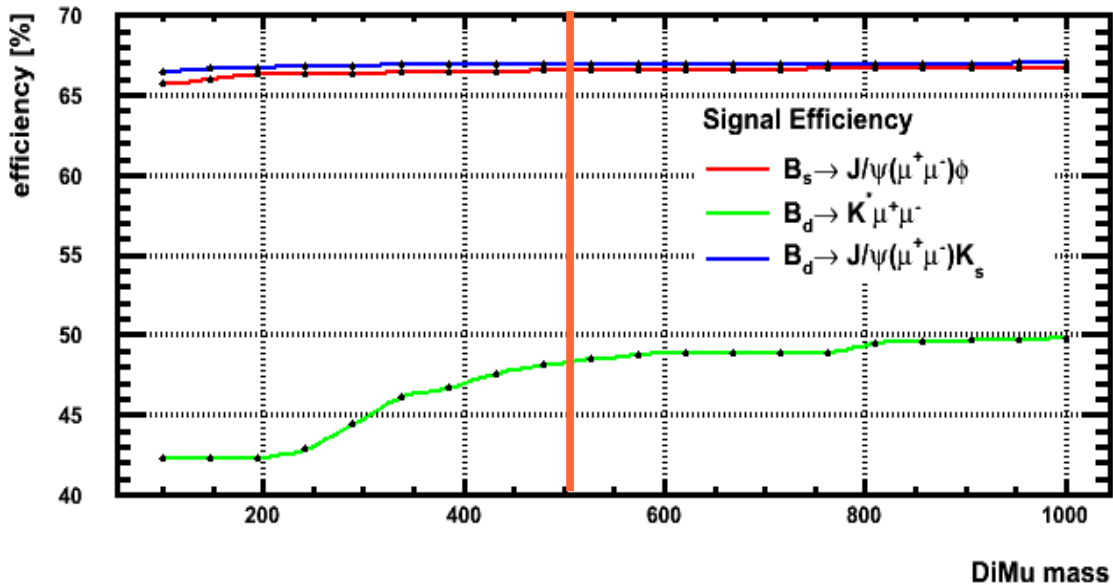
- **DiMuIP > 0.1**
- DiMuMass > 500
- Passed Di Muon pretrigger



Min bias fit not very good...

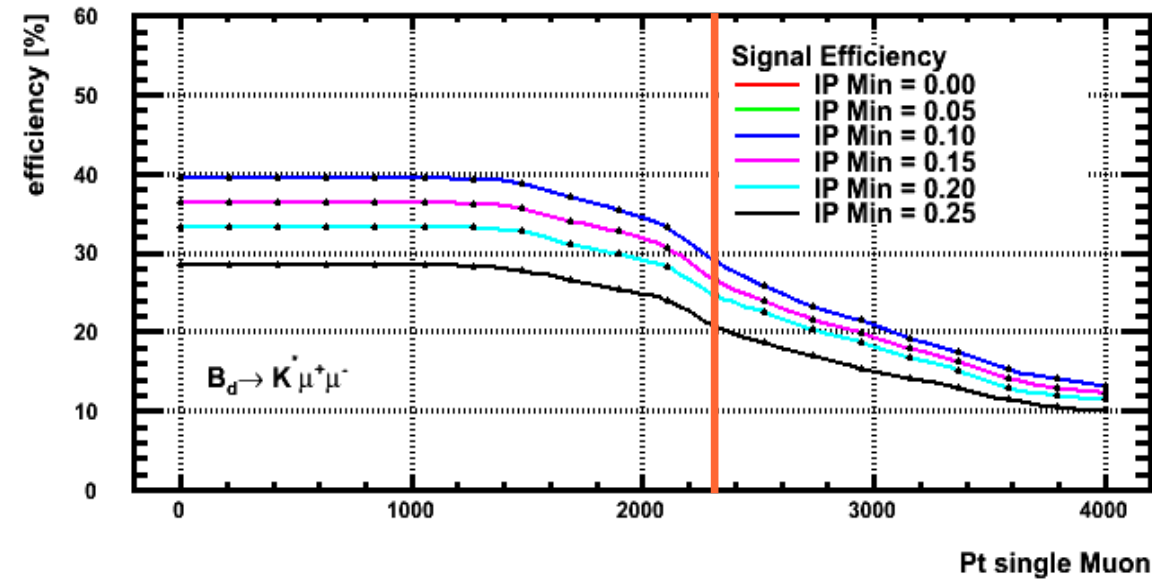
# Jpsi Trigger

- DiMuMass > Jpsi mass - 500
- Passed Jpsi pretrigger

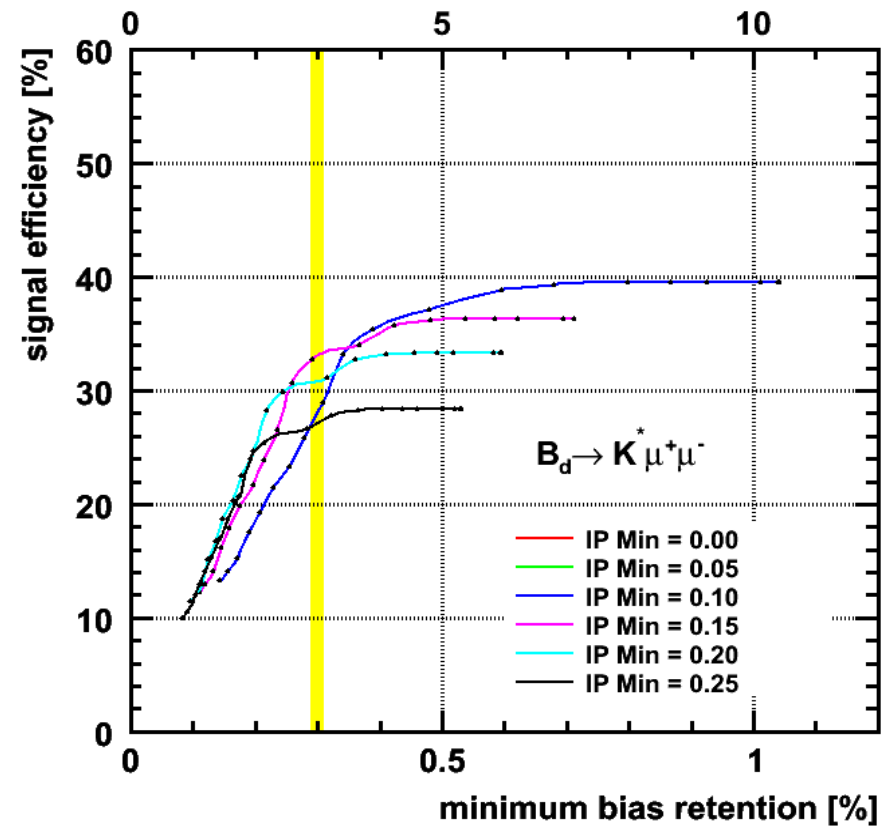
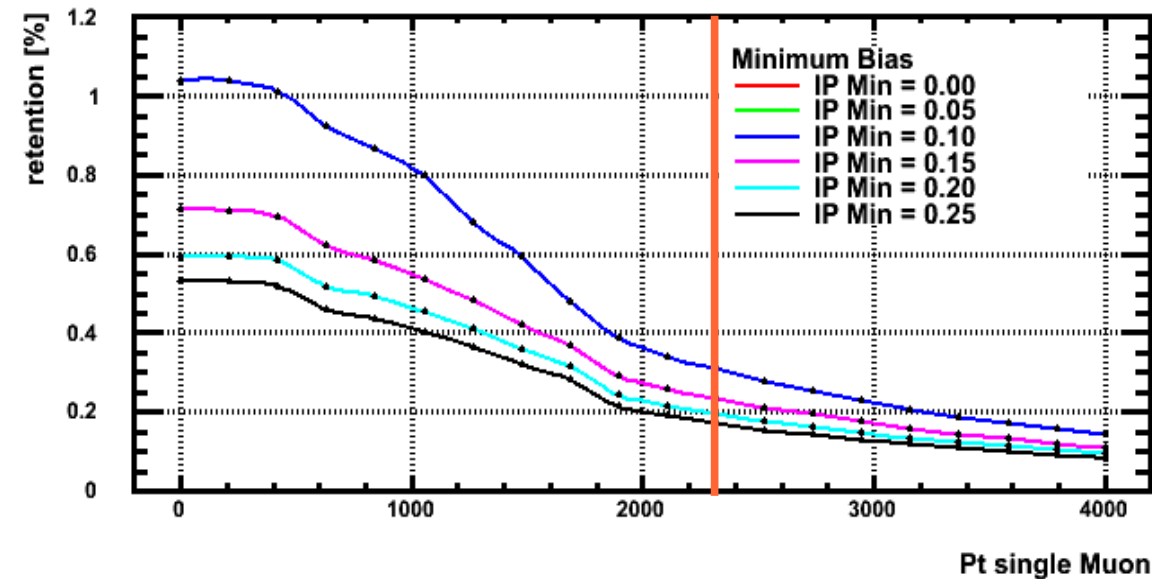




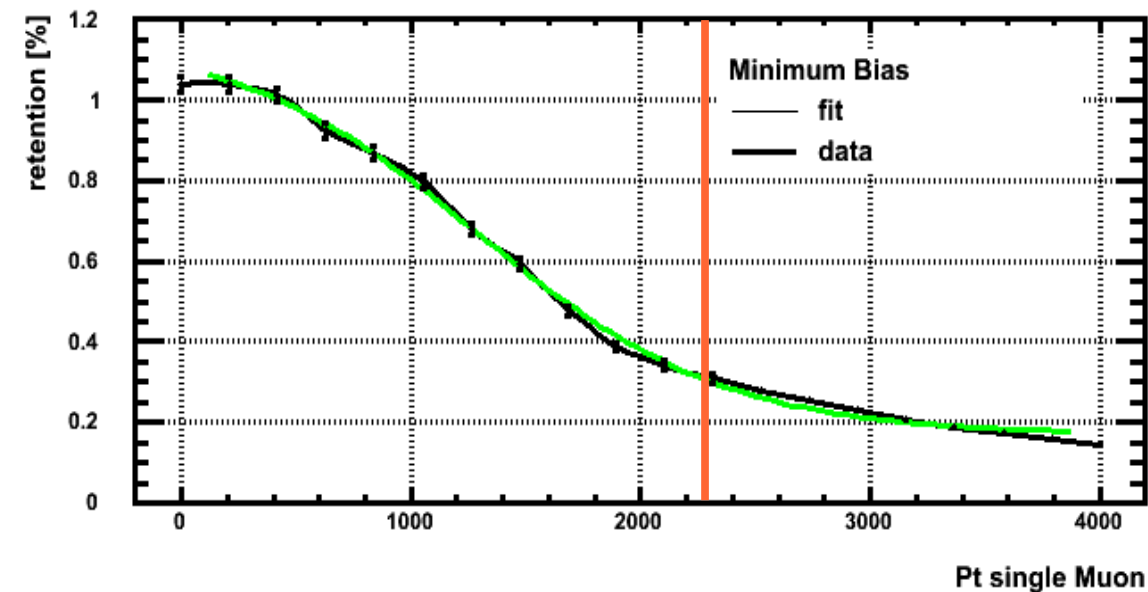
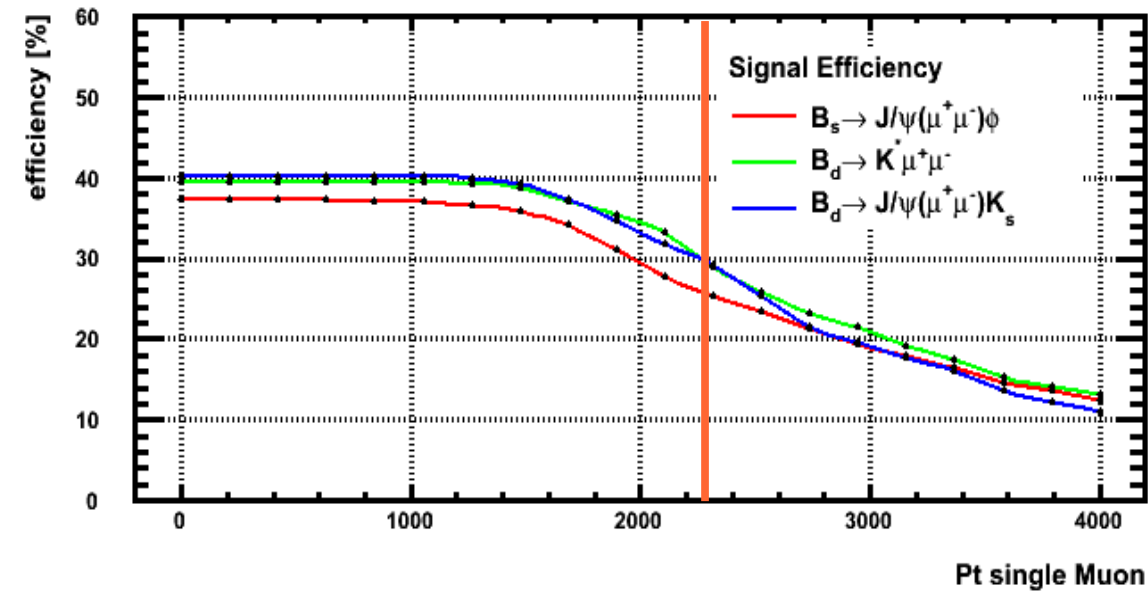
# Single Muon Pre Trigger



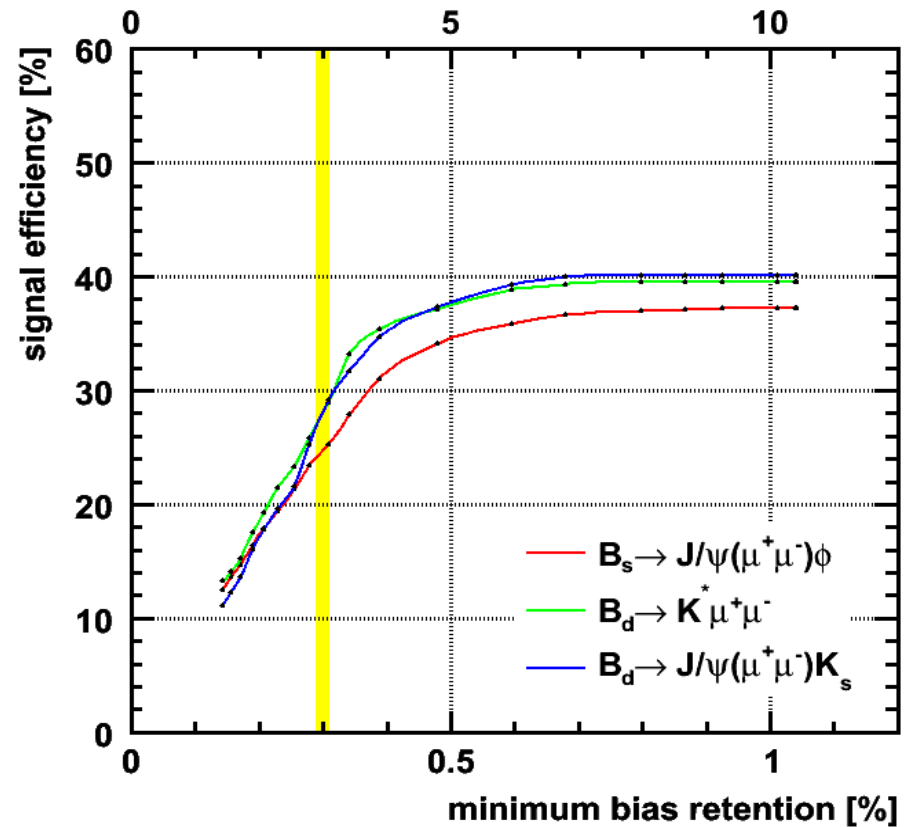
- Pt > 2300
- IP > 0.15
- IP VETO = 0.1



# Single Muon Pre Trigger

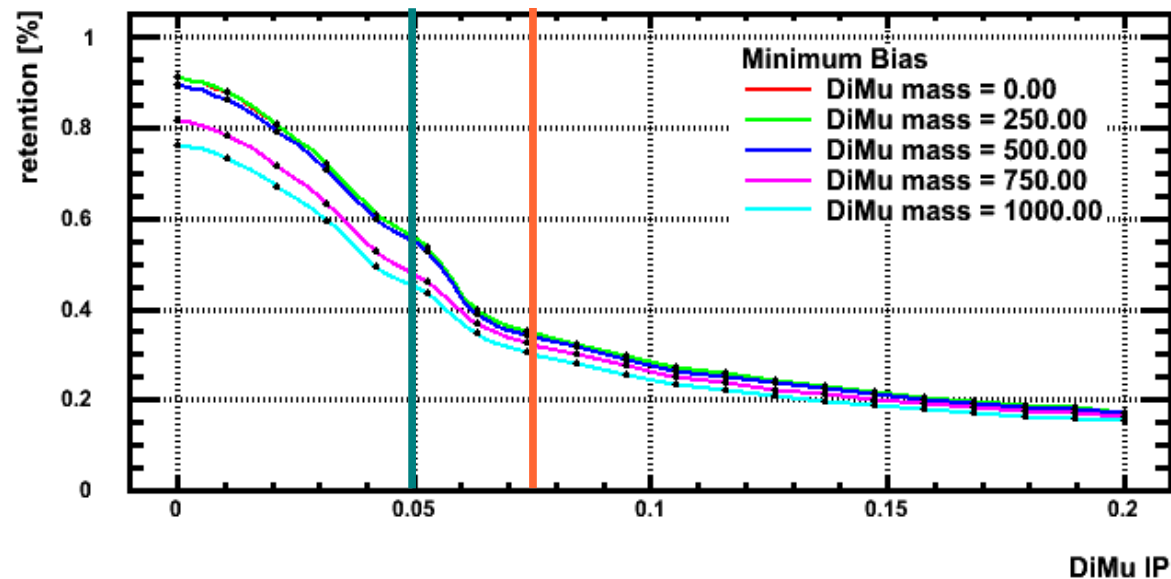
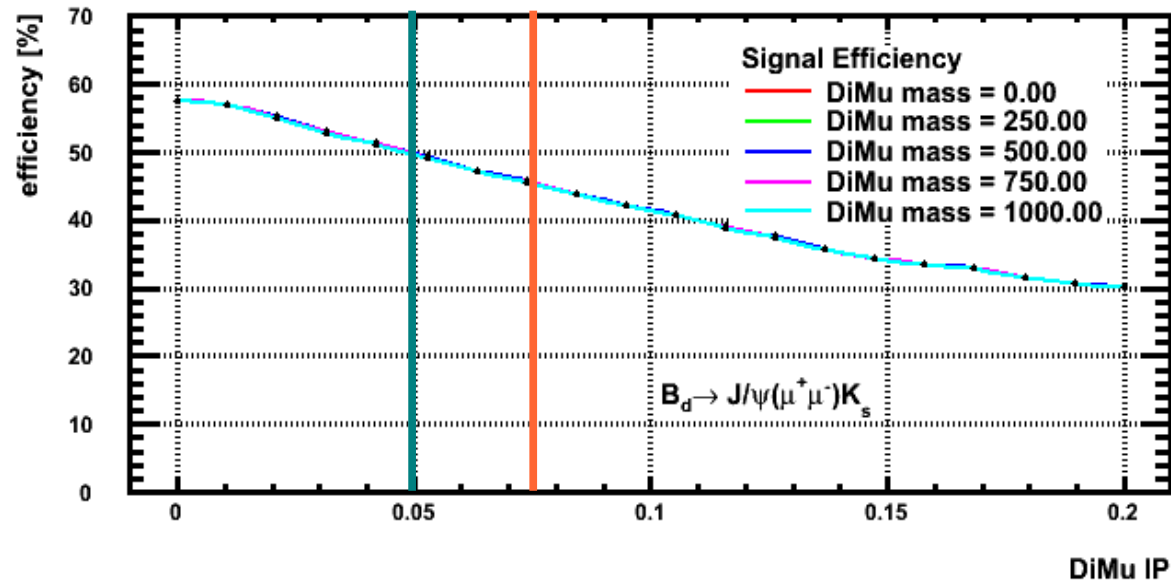


- **Pt > 2300**
- IP > 0.15
- IP VETO = 0.1

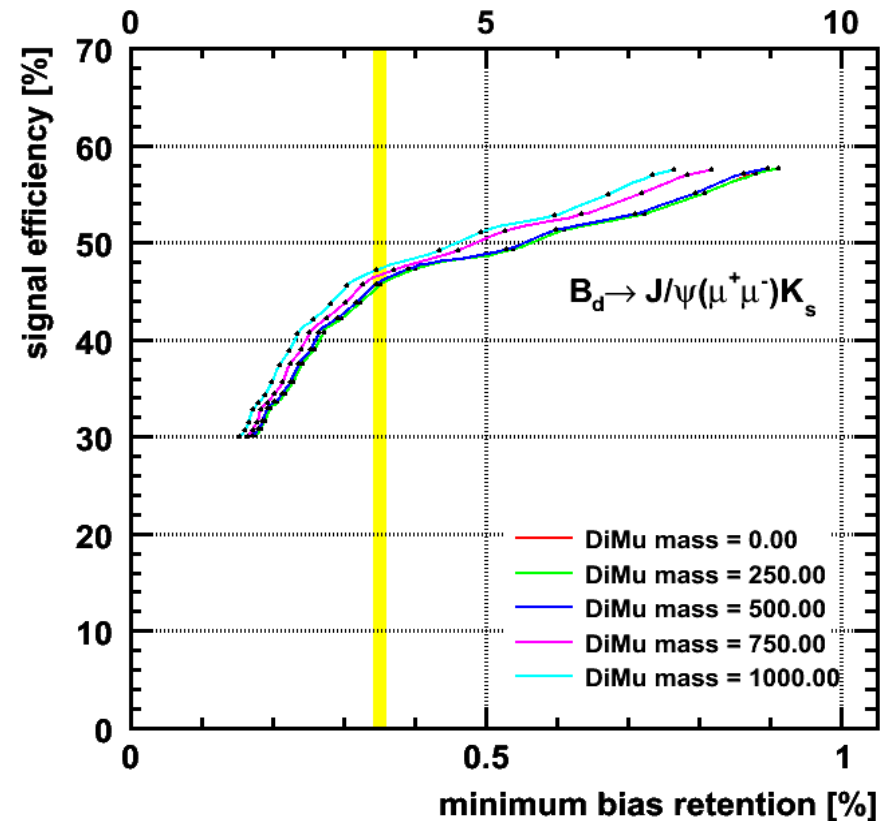


L1 Bandwidth: ~3.2 kHz  
OK

# DiMuon PreTrigger

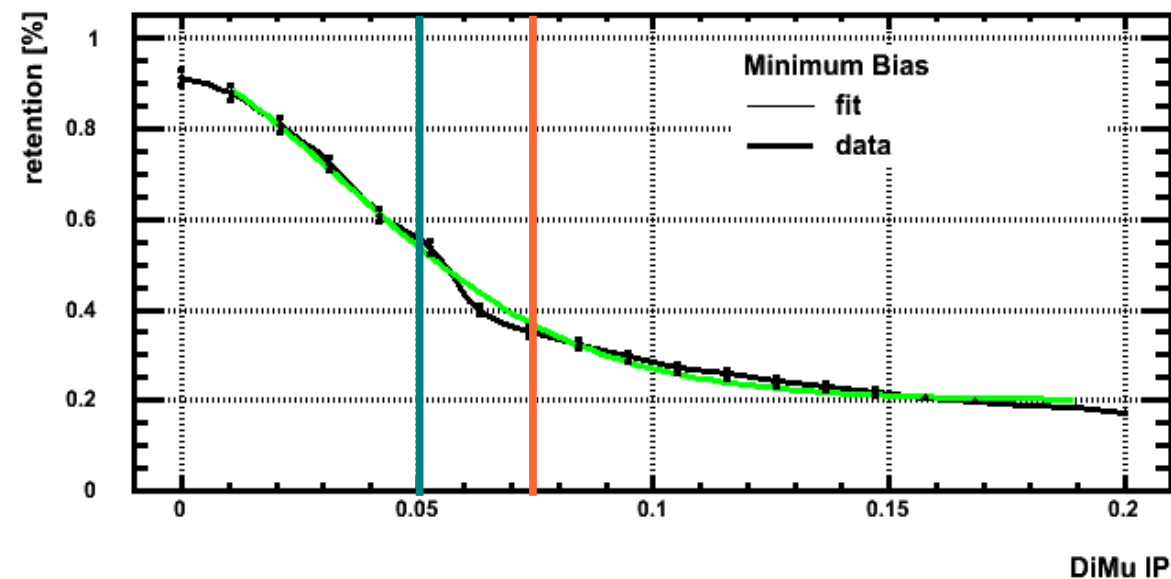
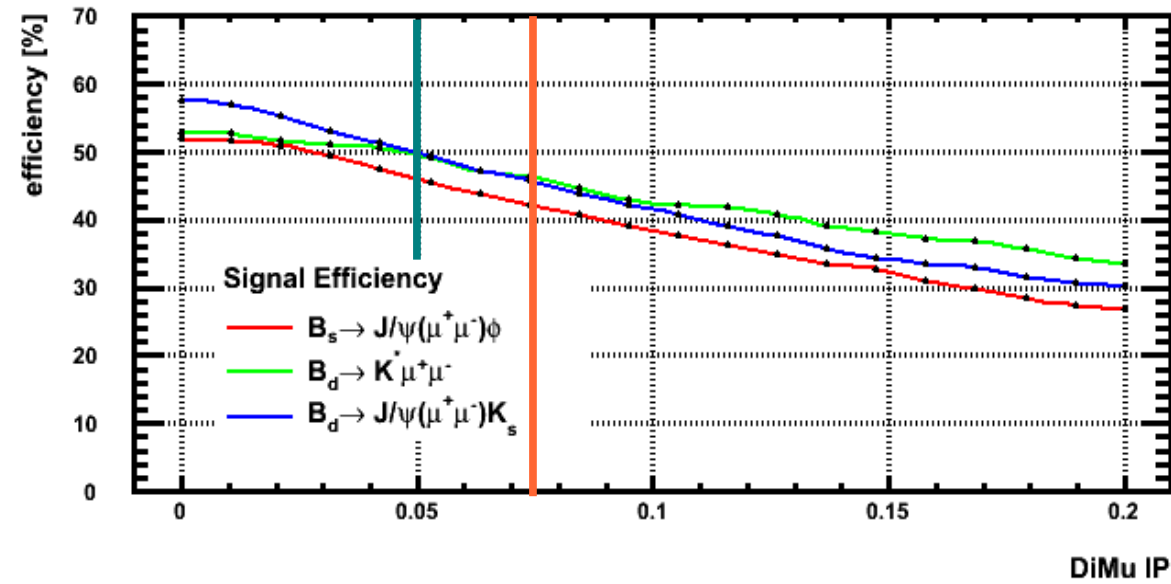


- DiMuIP > 0.075
- DiMuMass > 500

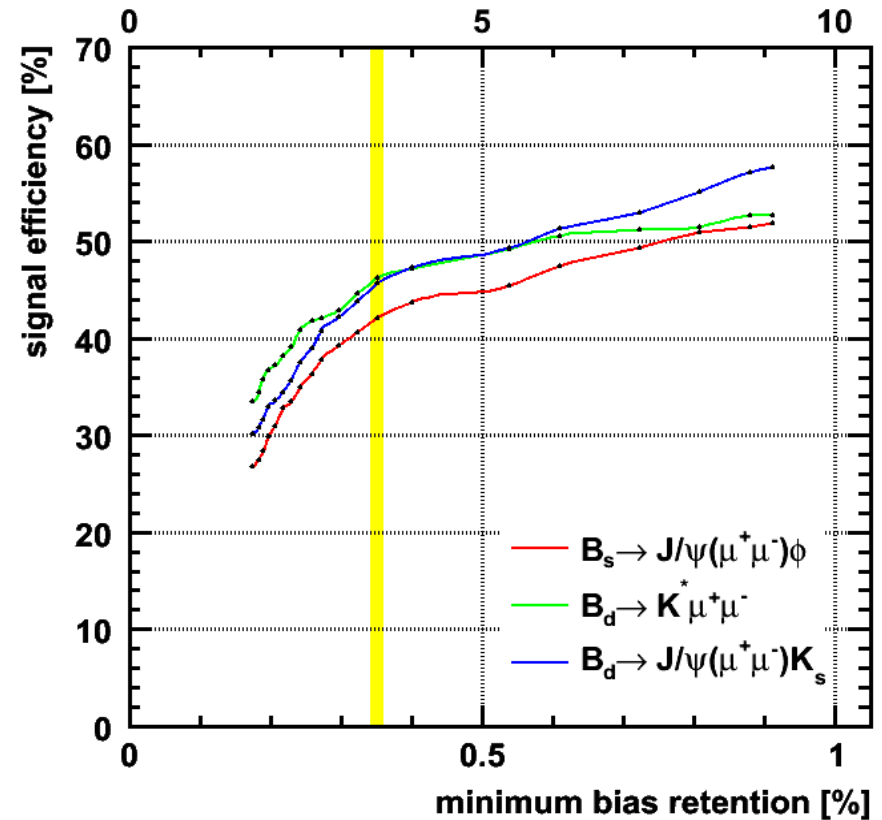


Signal efficiencies do not depend on mass cut??

# DiMuon PreTrigger



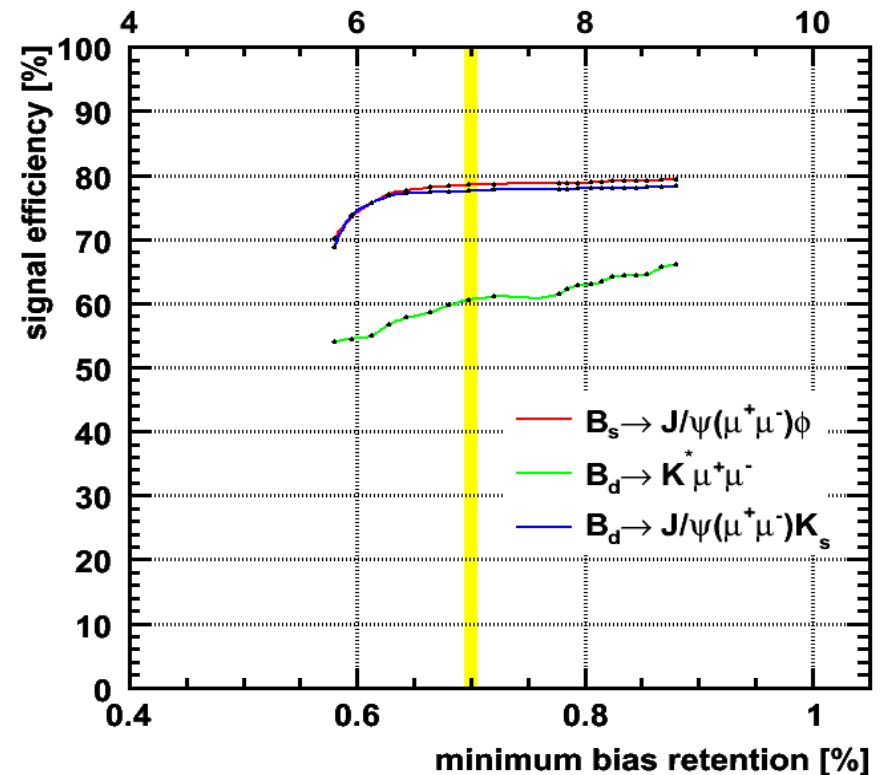
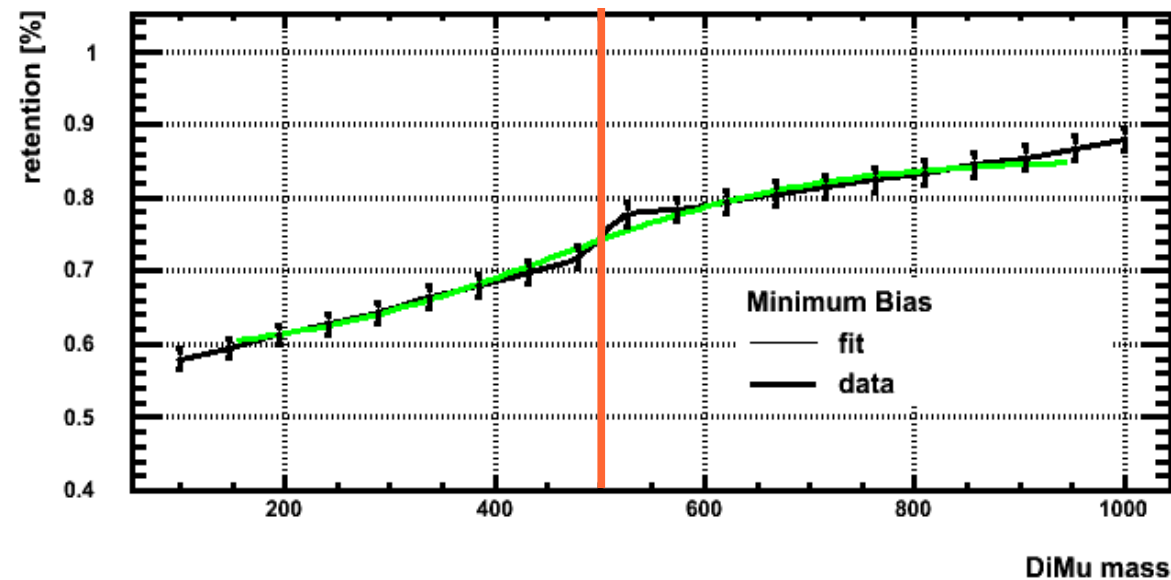
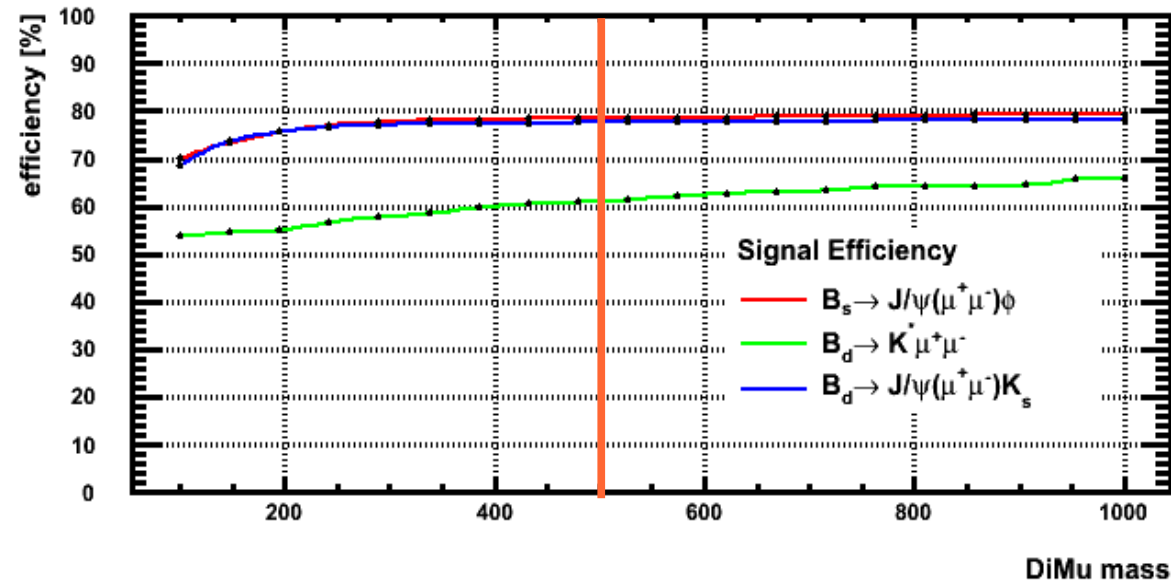
- DiMuIP > 0.075
- DiMuMass > 500



L1 Bandwidth: ~1.4 kHz  
 IP > 0.05 ???

# Jpsi PreTrigger

- DiMuMass > Jpsi mass - 500

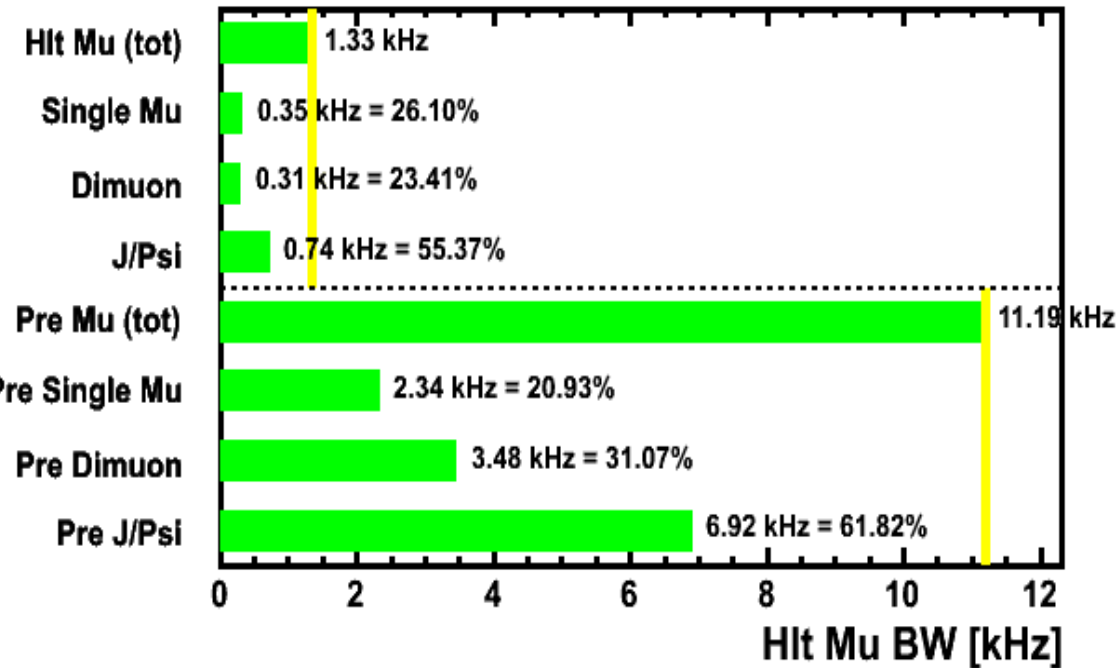


L1 (Old) Bandwidth: ~0.6 kHz

# BW Division

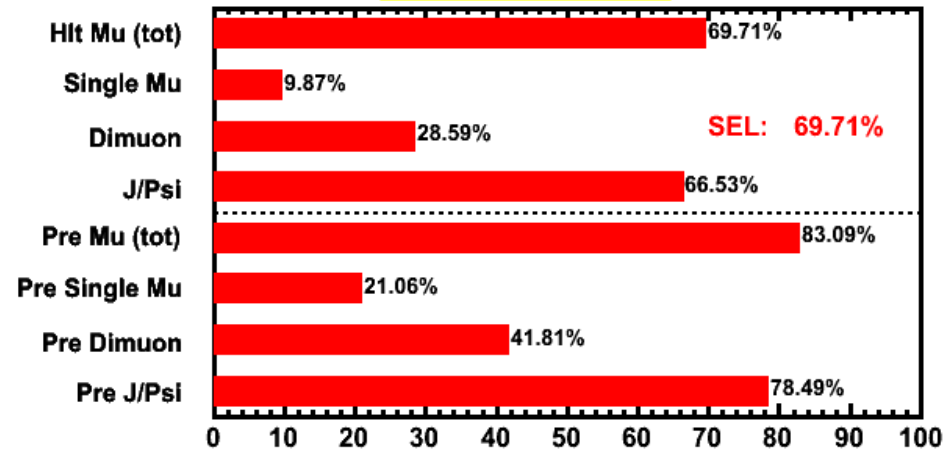
BW division [%]

0 50 100

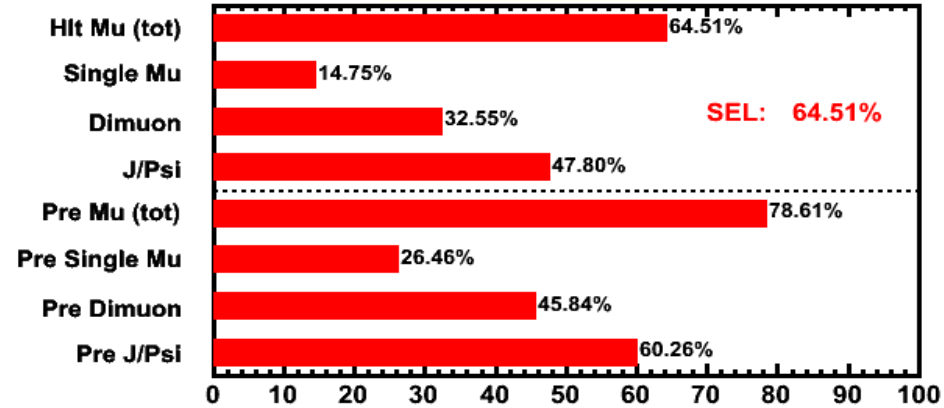


SINGLE MUON requested ret. = .04  
 DIMUON requested ret. = .03  
 JPSI requested ret. = .075  
 PRE SINGLE MU requested ret. = .3  
 PRE DIMUON requested ret. = .35  
 PRE JPSI requested ret. = .7

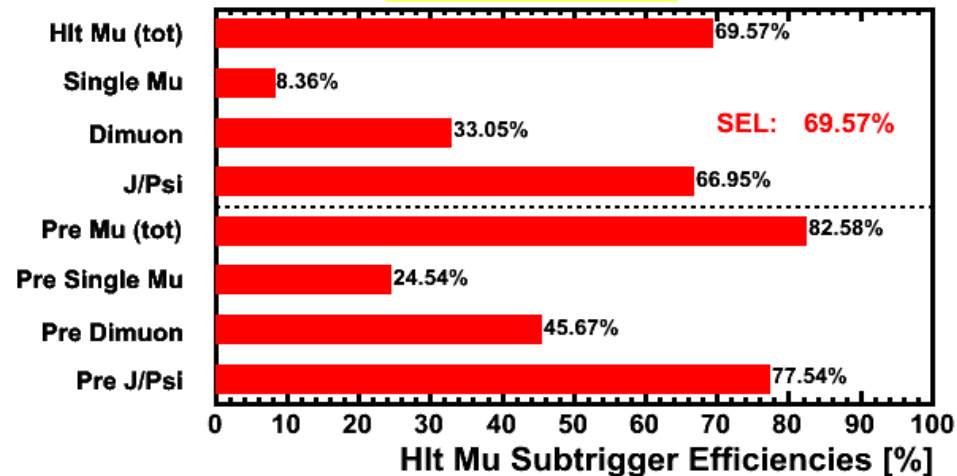
$B_s \rightarrow J/\psi(\mu^+\mu^-)\phi$



$B_d \rightarrow K^+\mu^+\mu^-$



$B_d \rightarrow J/\psi(\mu^+\mu^-)K_s$



# Still to do...

- Add L0 muon line analysis
- Adaptation to new base class?
- Find minimum bias retention best fit curve
- Check BW and efficiencies