

$B \rightarrow D_s X$ Inclusive Decay

Preliminary exercise, ver. 0

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- 1 million sample
- $B^- \rightarrow D^0 D_s^-$
 $D^0 \rightarrow K^- \pi^+$
 $D_s^- \rightarrow \phi \pi^-$
 $\phi \rightarrow K^+ K^-$
- comparison of two different approaches to reconstruction: indirect $D_s \rightarrow \phi \pi^-$ and direct $D_s \rightarrow K^+ K^- \pi^-$
- B_{tag} reconstruction with hadronic FEI

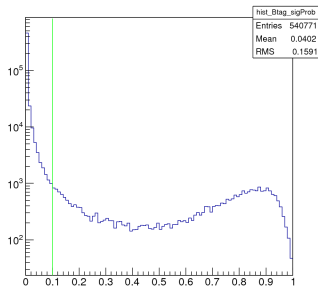
```
# Decay B-  
Decay B-  
1.0 D0my D_s-my  
Enddecay
```

```
# Decay D0  
Decay D0my  
1.0 K- pi+  
Enddecay
```

```
# Decay D_s-  
Decay D_s-my  
1.0 phimy pi-  
Enddecay
```

```
# Decay phi  
Decay phimy  
1.0 K+ K-  
Enddecay
```

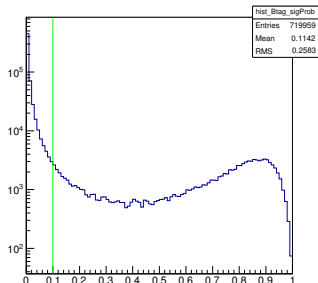
Tagging side: sigProb Selection



indirect method:

$$D_s \rightarrow \phi\pi^-$$

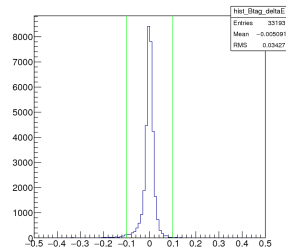
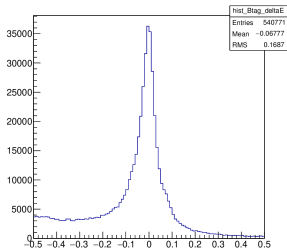
cut: sigProb > 0.1



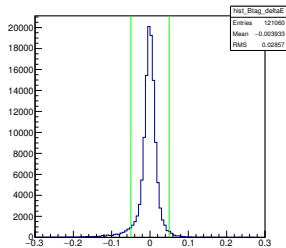
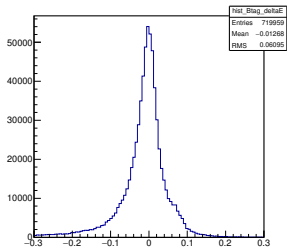
direct method:

$$D_s \rightarrow K^+K^-\pi^-$$

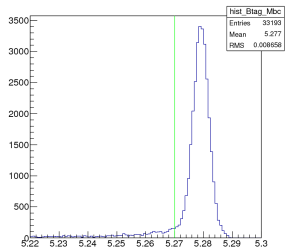
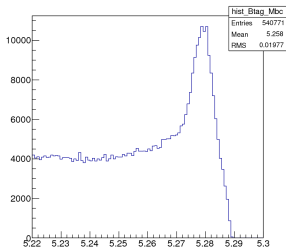
Tagging side: deltaE Selection



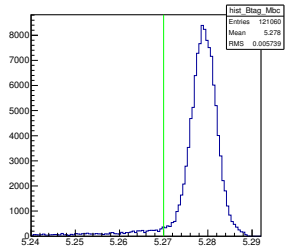
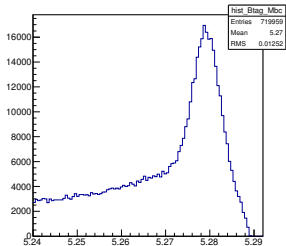
cut: sigProb > 0.1



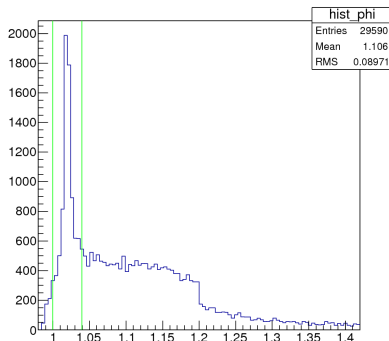
Tagging side: Mbc Selection



cuts: $\text{sigProb} > 0.1$, $\text{abs}(\Delta E) < 0.1$ (indirect method), $\text{abs}(\Delta E) < 0.05$ (direct method)



Signal side: ϕ Selection



cuts applied:

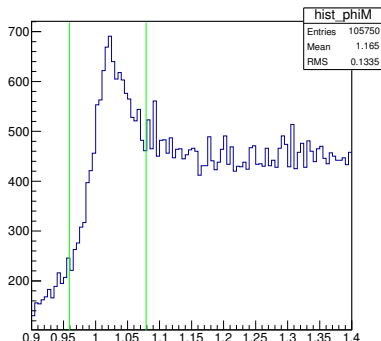
$$\text{sigProb} > 0.1$$

$$\text{abs}(\text{deltaE}) < 0.1$$

$$\text{Mbc} > 5.27$$

new cut:

$$\text{abs}(m\phi - 1.019) < 0.02$$



cuts applied:

$$\text{sigProb} > 0.1$$

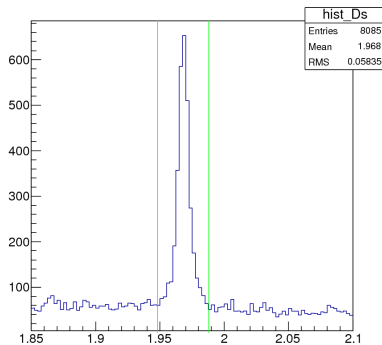
$$\text{abs}(\text{deltaE}) < 0.05$$

$$\text{Mbc} > 5.27$$

new cut:

$$\text{abs}(m\phi - 1.019) < 0.06$$

Signal side: D_s Selection



cuts applied:

$$\text{sigProb} > 0.1$$

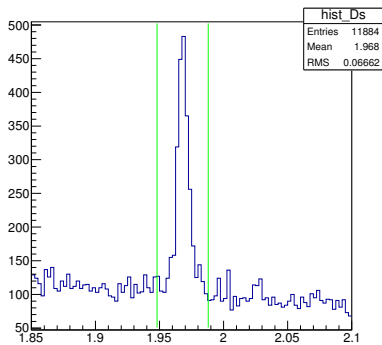
$$\text{abs}(\text{deltaE}) < 0.1$$

$$\text{Mbc} > 5.27$$

$$\text{abs}(\text{mphi} - 1.019) < 0.02$$

new cut:

$$\text{abs}(\text{mDs} - 1.968) < 0.02$$



applied cuts:

$$\text{sigProb} > 0.1$$

$$\text{abs}(\text{deltaE}) < 0.05$$

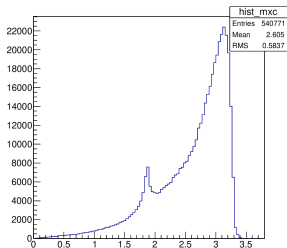
$$\text{Mbc} > 5.27$$

$$\text{abs}(\text{mphi} - 1.019) < 0.06$$

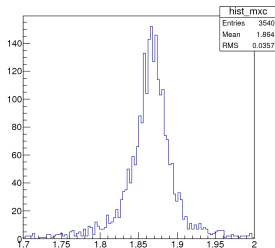
new cut:

$$\text{abs}(\text{mDs} - 1.968) < 0.02$$

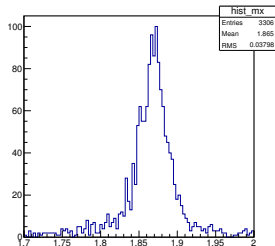
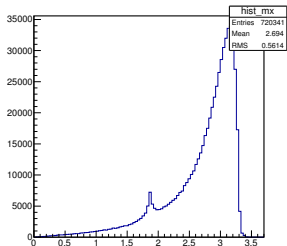
Signal Side: mx



before cuts

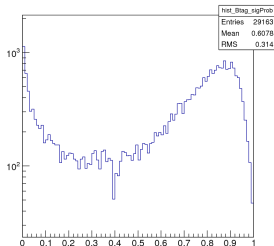
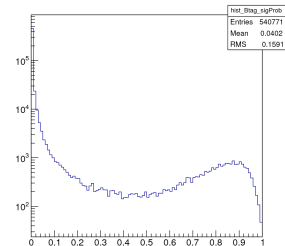


after cuts

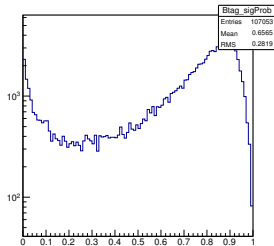
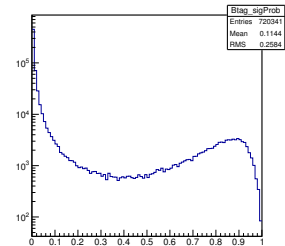


BACKUP SLIDES

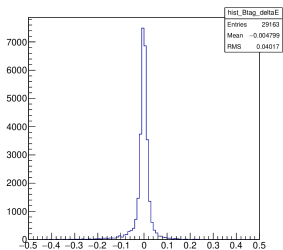
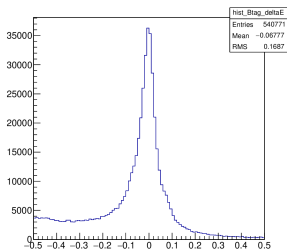
True Matching: sigProb



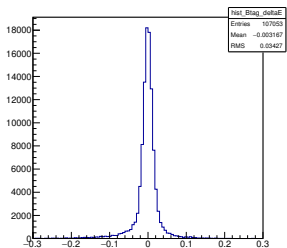
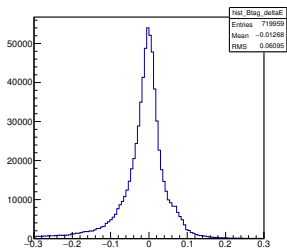
cut: B_isSignal == 1



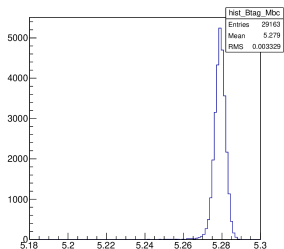
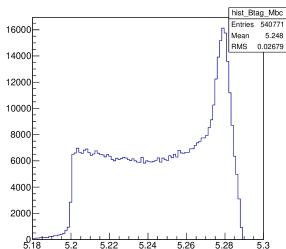
True Matching: ΔE



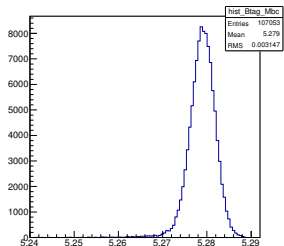
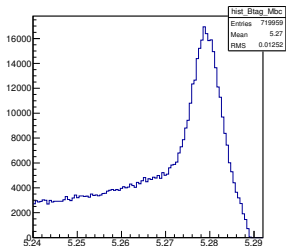
cut: B_isSignal == 1



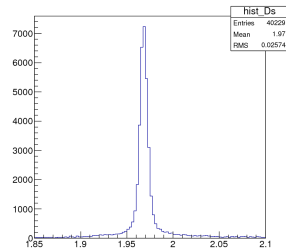
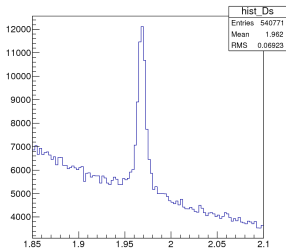
True Matching: Mbc



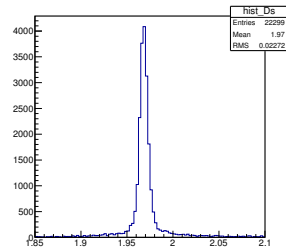
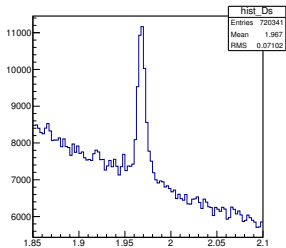
cut: B_isSignal == 1



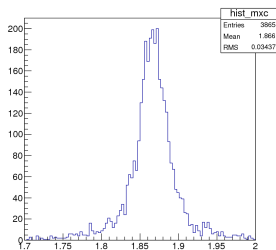
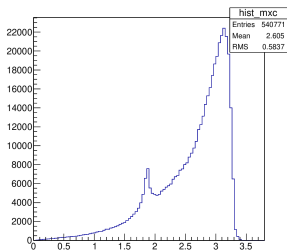
True Matching: D_s



cut: $D_s_isSignal == 1$



True Matching: mxc



cuts: B_isSignal == 1, D_s_isSignal == 1

