

$B \rightarrow D_s X$ Inclusive Decay

Preliminary exercise, ver. 2

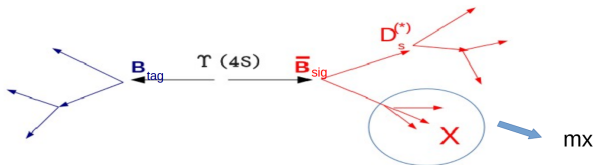
Oliwia Krasowska

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Method of analysis

1. Full reconstruction of B_{tag} meson in hadronic mode

2. Reconstruction of the $D_s^{(*)}$ meson from the remaining tracks



3.
→ BF calculation for different charge configurations

→ Study of the missing mass (mx)

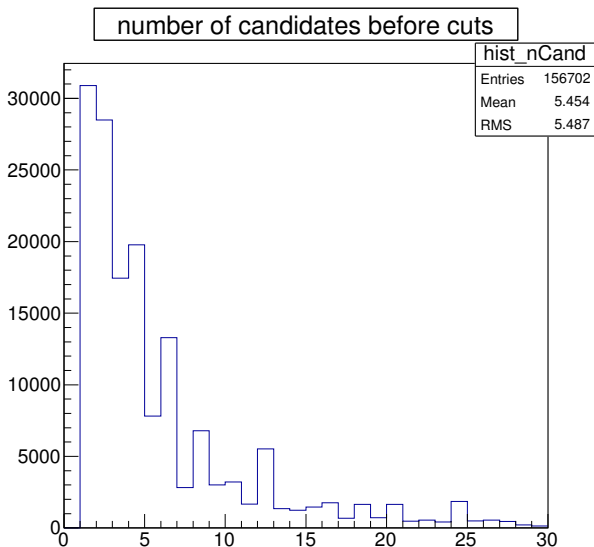
$$mx = \sqrt{p_{\text{miss}}^2} = \sqrt{(p(\Upsilon(4S)) - p(B_{\text{tag}}) - p(D_s^{(*)}))^2}$$

- 4 million sample
- $B^- \rightarrow D^0 D_s^-$
 $D^0 \rightarrow K^- \pi^+$
 $D_s^- \rightarrow \text{everything}$
- B_{tag} reconstruction with hadronic FEI

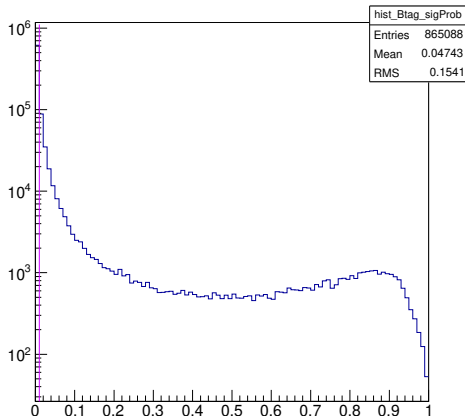
```
# Decay B-
Decay B-
1.0    D0my    D_s-
Enddecay

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

Number of candidates per event before cuts



Tagging side: sigProb Selection

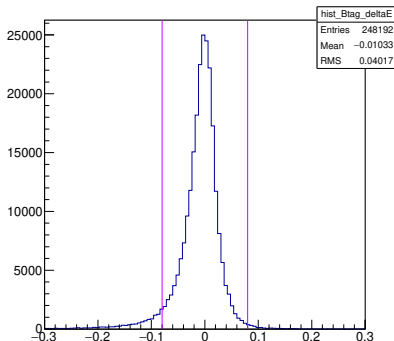
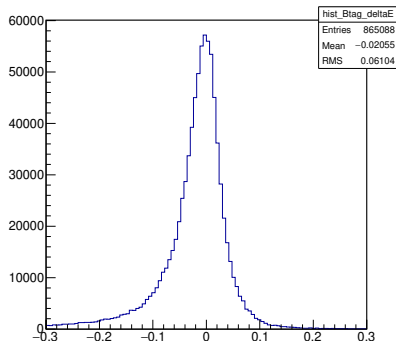


cut: sigProb > 0.01

direct reconstruction:

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

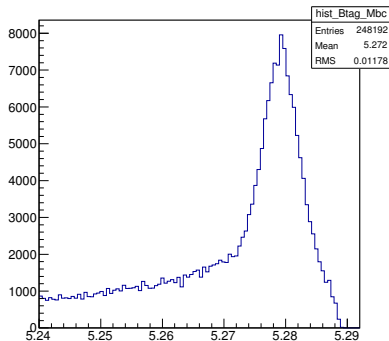
Tagging side: deltaE Selection



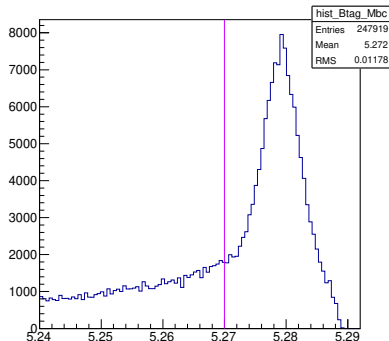
new cut: $\text{sigProb} > 0.01$

defined cut: $|\Delta E| < 0.08$

Tagging side: Mbc Selection



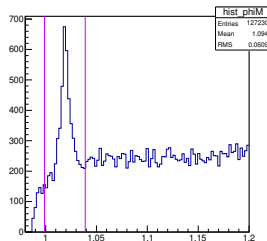
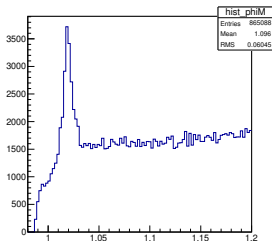
cut applied: $\text{sigProb} > 0.01$



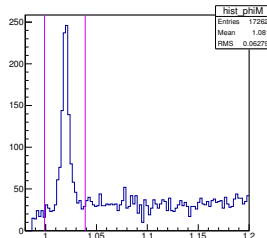
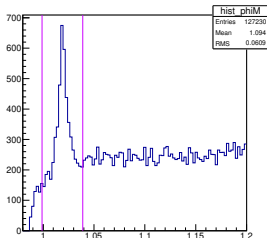
new cut: $|\Delta E| < 0.08$
defined cut: $Mbc > 5.27$

Signal side: ϕ Selection

new cut: $M_{bc} > 5.27$, defined cut: $|M(K^+K^-) - 1.019| < 0.02$



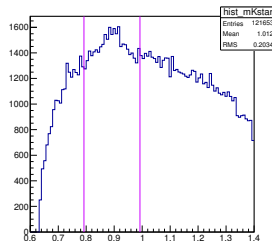
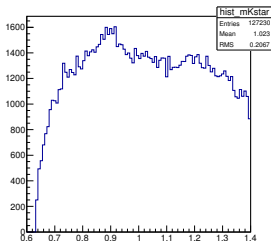
cuts applied: $\text{sigProb} > 0.01$, $|\Delta E| < 0.08$



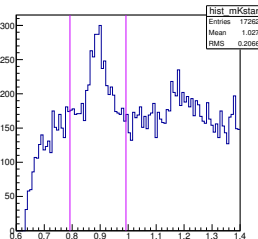
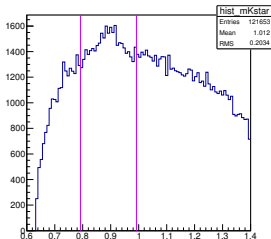
new cut: $|M(K^+K^-\pi^-) - 1.968| < 0.015$, defined cut: $|M(K^+K^-) - 1.019| < 0.02$

Signal side: K^* Selection

new cut: $M_{bc} > 5.27$, defined cut: $|M(K^+\pi^-) - 0.892| < 0.1$



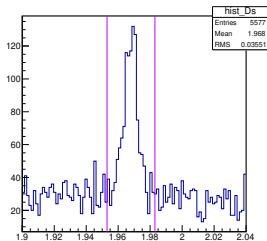
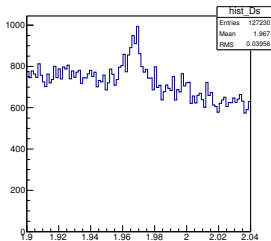
cuts applied: $\text{sigProb} > 0.01$, $|\Delta E| < 0.08$



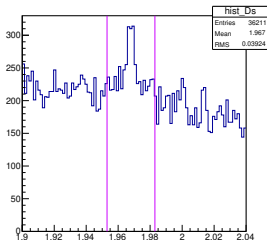
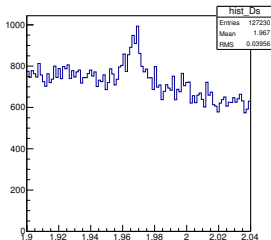
new cut: $|M(K^+K^-\pi^-) - 1.968| < 0.015$, defined cut: $|M(K^+\pi^-) - 0.892| < 0.1$

Signal side: D_s Selection

+ new channel $\phi\pi$ cut: $|M(K^+K^-) - 1.019| < 0.02$; defined cut: $|M(K^+K^-\pi^-) - 1.968| < 0.015$



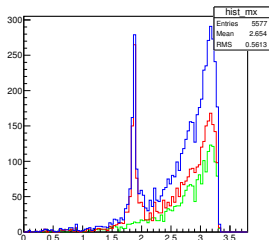
applied cuts: $\text{sigProb} > 0.01$, $|\Delta E| < 0.08$, $M_{bc} > 5.27$



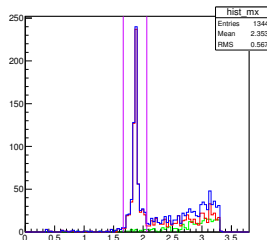
+ new channel K^*K cut: $|M(K^+\pi^-) - 0.892| < 0.1$; defined cut: $|M(K^+K^-\pi^-) - 1.968| < 0.015$

Signal Side: mx

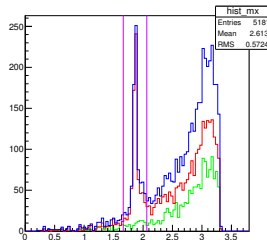
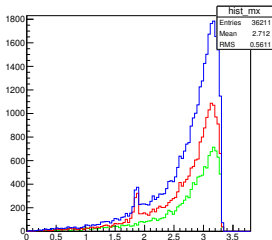
with channel $\phi\pi$ cut: $|M(K^+K^-) - 1.019| < 0.02$; in the peak: 587, $\epsilon = 0.015\%$



before cuts

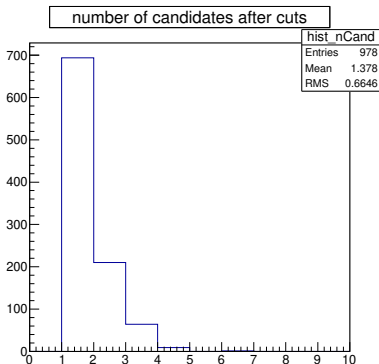


after cuts

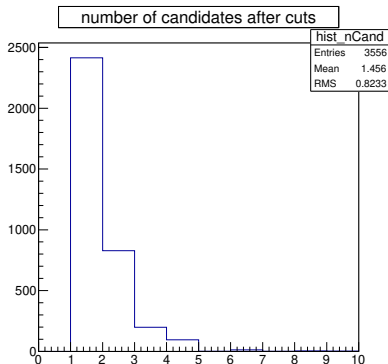


with channel K^*K cut: $|M(K^+\pi^-) - 0.892| < 0.1$; in the peak: 821, $\epsilon = 0.02\%$

Number of candidates per event after cuts (MC sample $D_s \rightarrow \text{generic}$)



decay mode $D_s \rightarrow \phi\pi$



decay mode $D_s \rightarrow K^*K$