# Lab meeting

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# Comparison my charm tagger and ccbarFEI

- Check on recoil mass distribution for signal side D^{*+}
  - Best candidate selection variables
    - ccbarFEI variables : pValueCombSigProb, daugProdOfSigProb
    - Opening Angle between momentum vectors of $D^{(*)}_{tag}$ and signal side $D^{*\pm}$ in the cm frame in my charm tagger

- Reconstruction on not skimmed signal MC($D^0 \rightarrow \nu\bar{\nu}$)

- Check on recoil mass distribution for signal side D^0
  - Best candidate selection variables
    - BCS with pValueCombSigProb on signal side D^{*+} and then BCS with daugProdOfSigProb on signal side D^0
    - BCS with daugProdOfSigProb on signal side D^{*+} and then BCS with pValueCombSigProb on signal side D^0
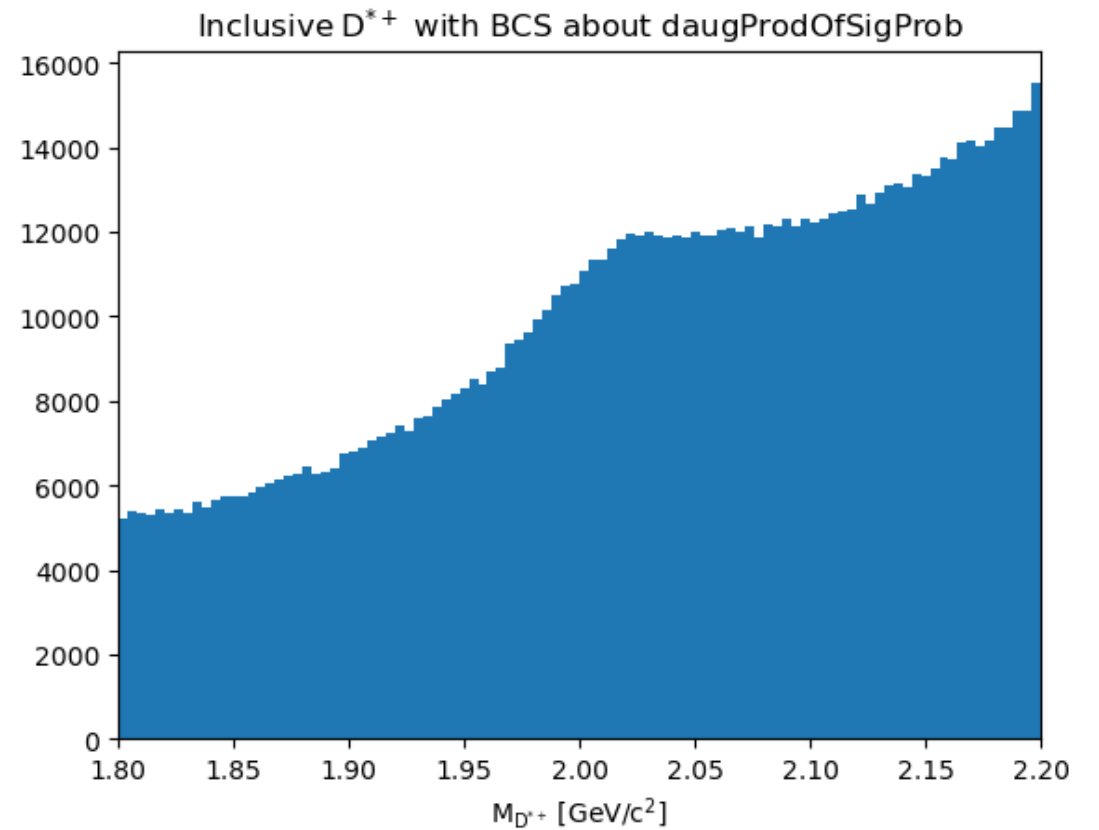
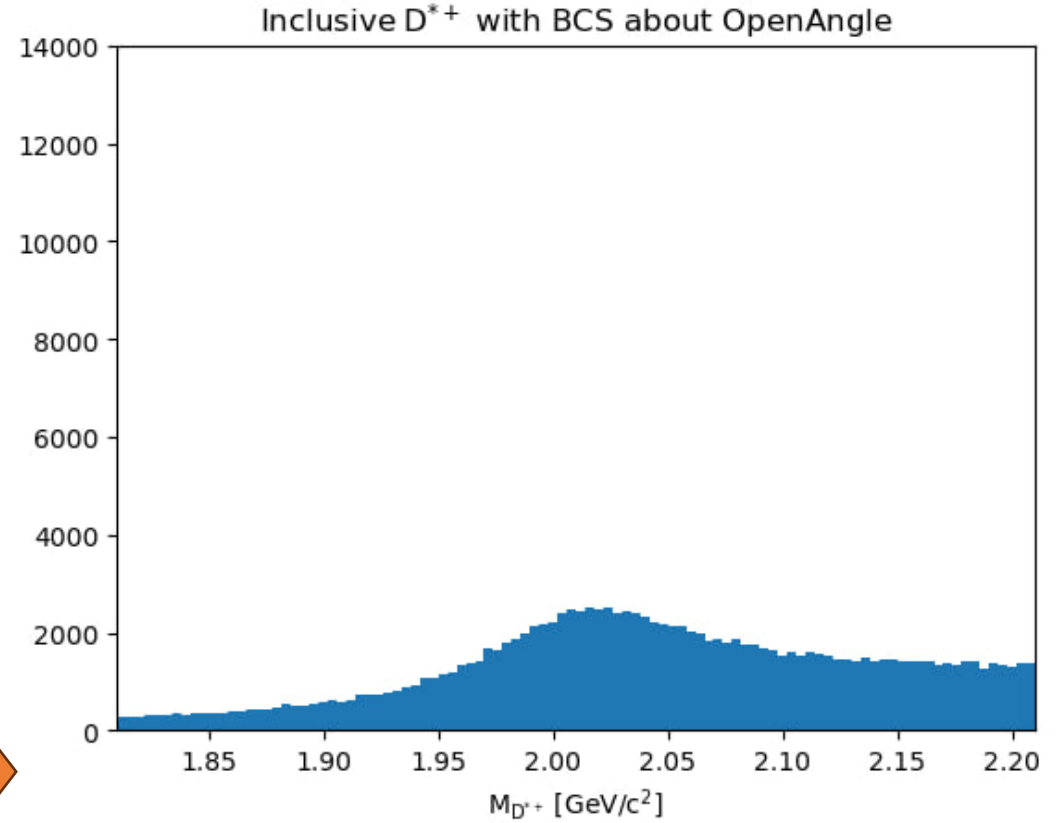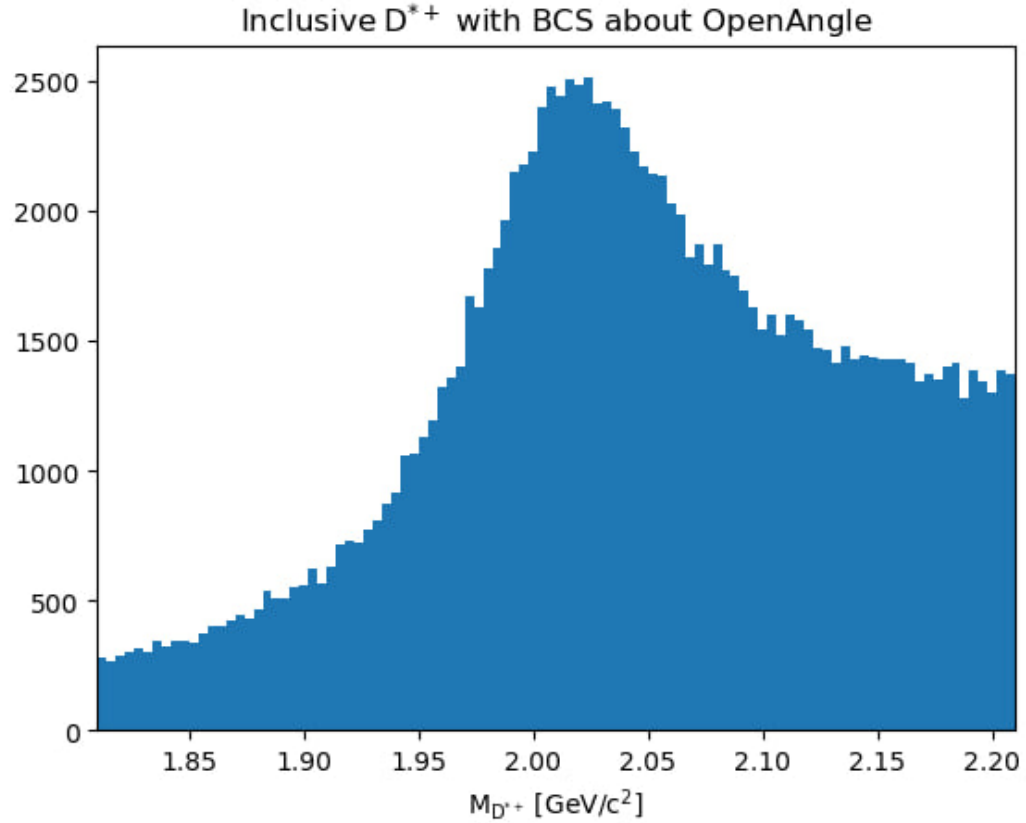# Signal side D^{*+} from ccbarFEI without BCS
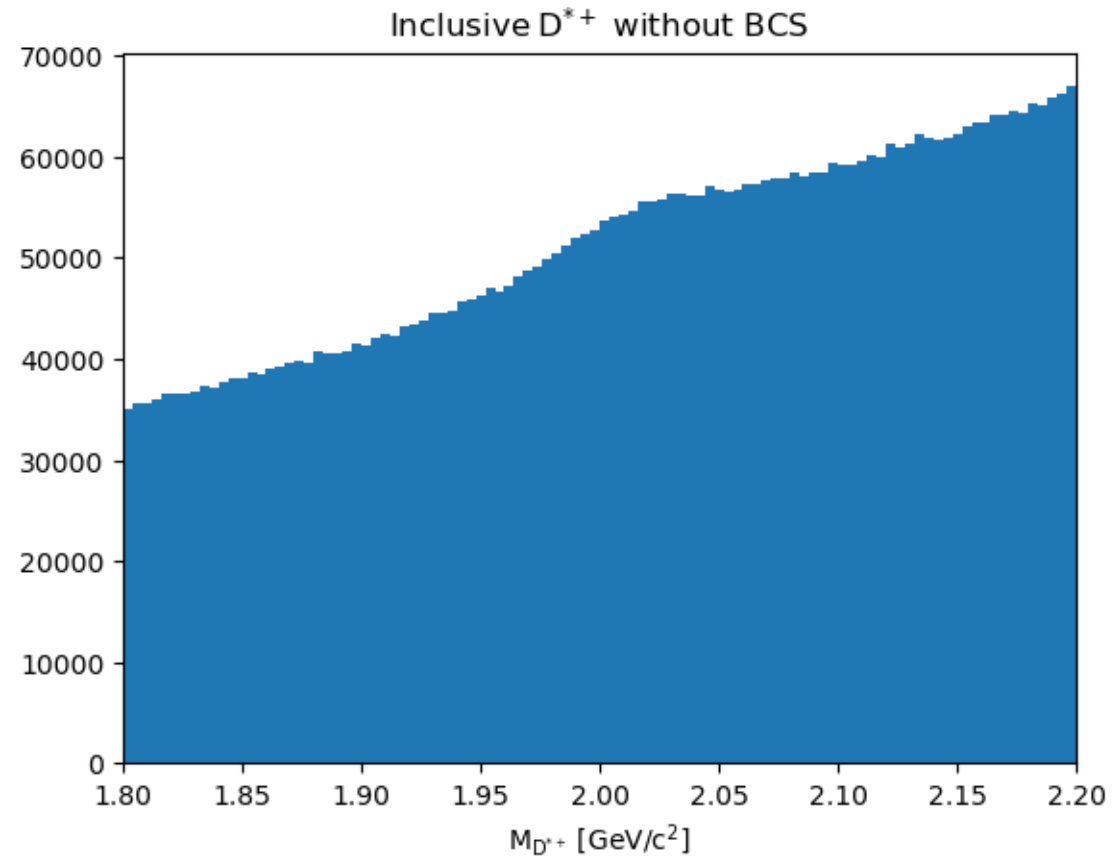
Signal side D^{*+} with BCS

BCS with pValueCombSigProb
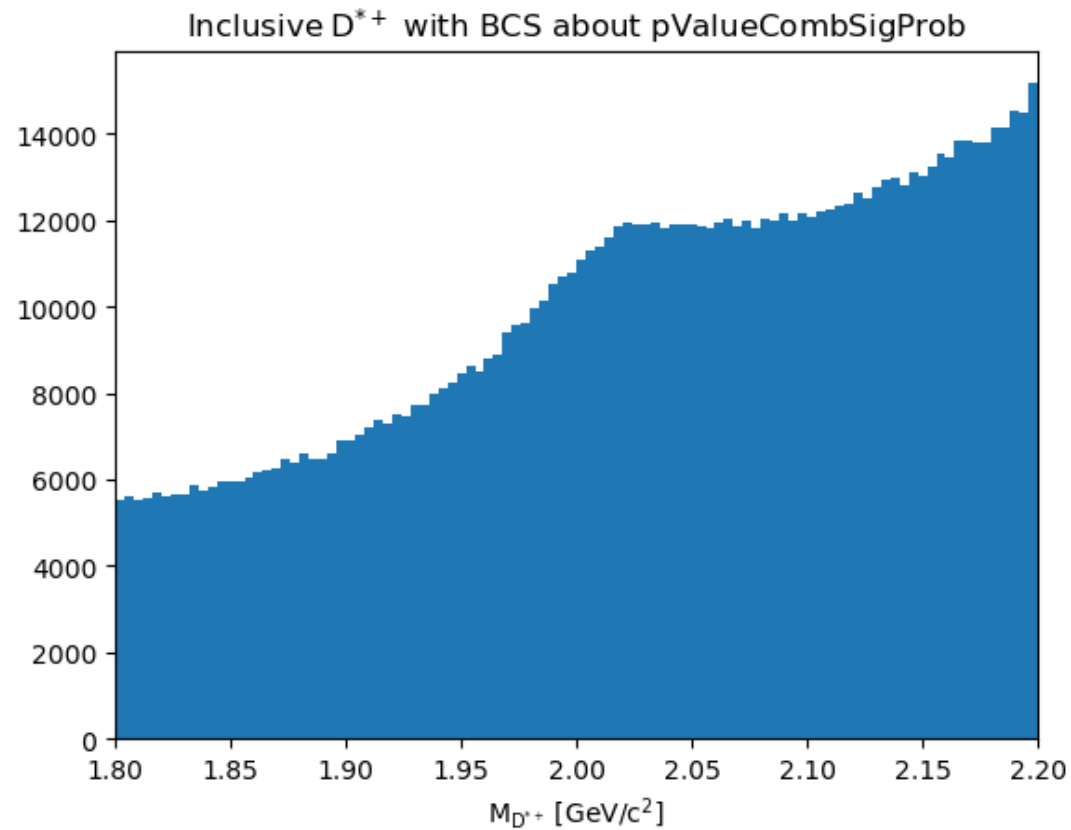
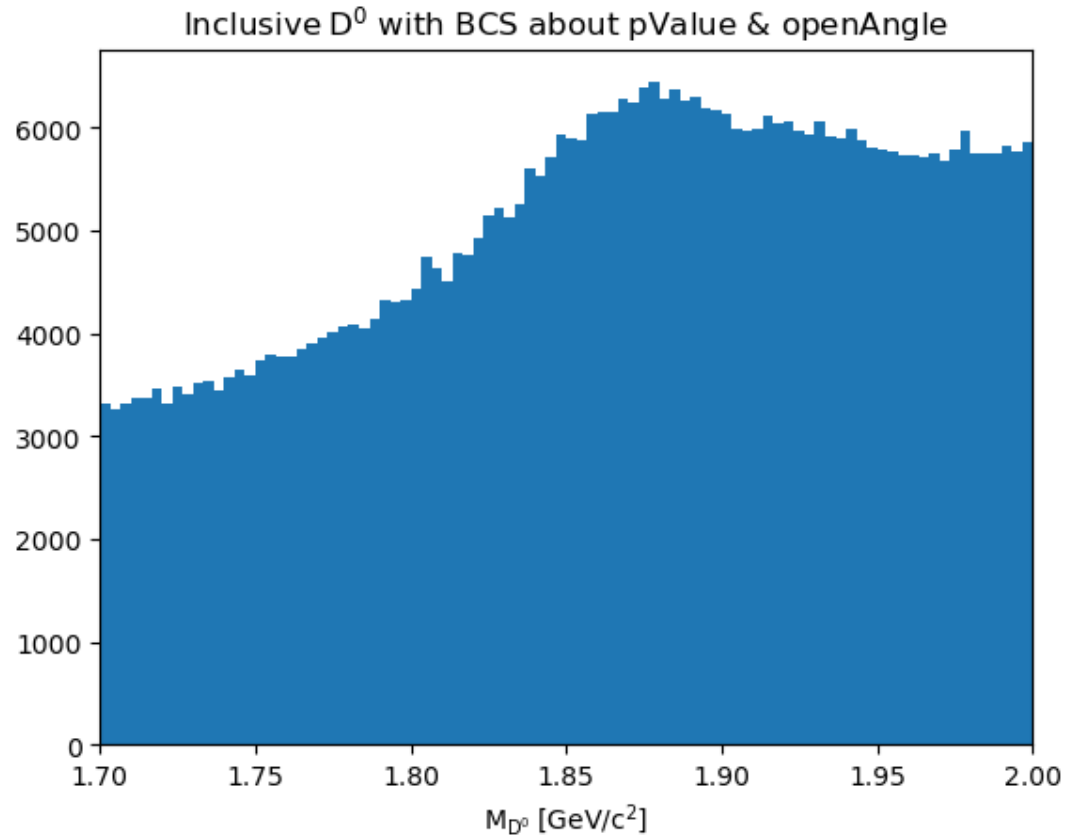**BCS with daugProdOfSigProb**

Signal side D^{*+} with BCS (from my charm tagger)
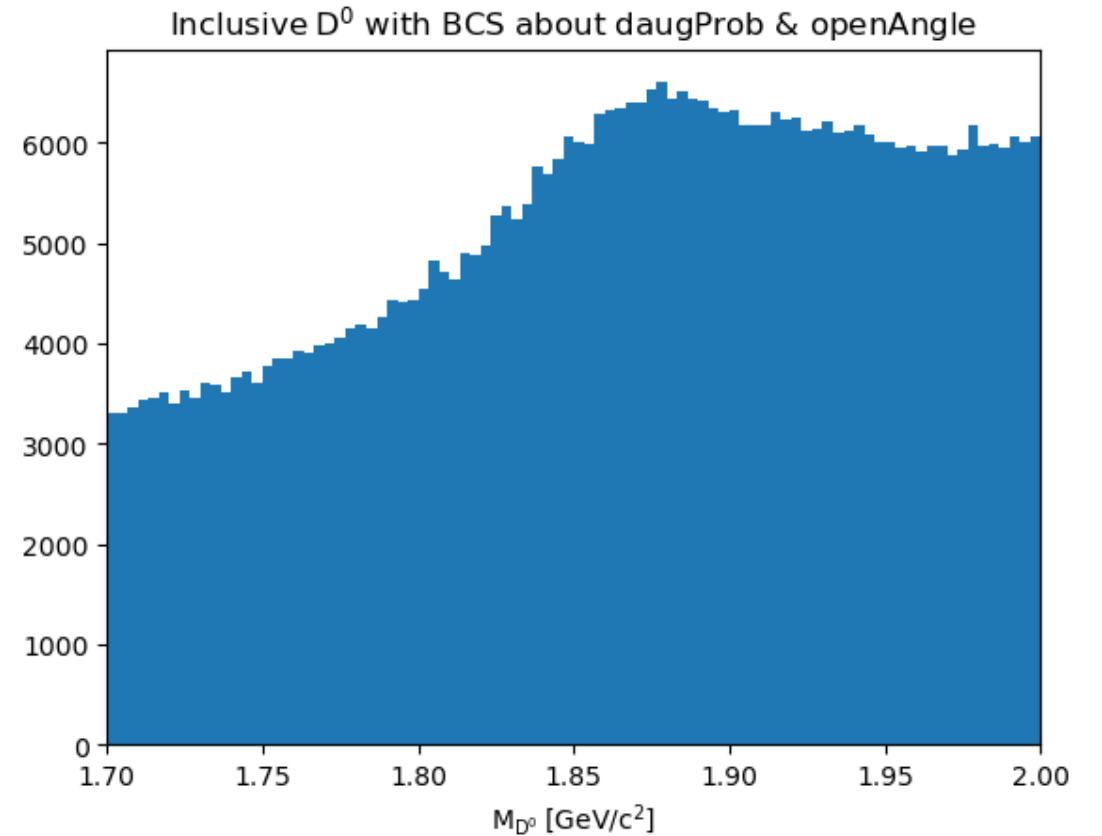

Just adjust y-axis scale for comparison

Signal side D^0 with BCS about FEI prob and openAngle

BCS with pValueCombSigProb(D^*) & openAngle(D^0)

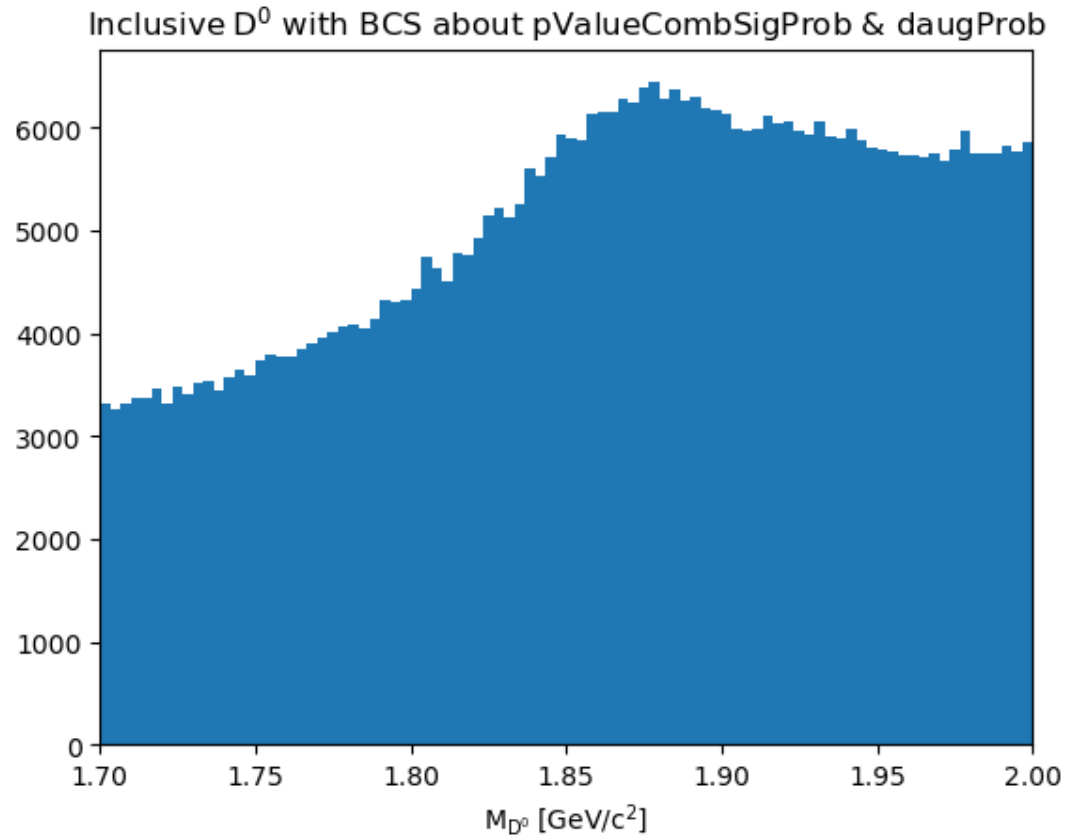**BCS with daugProdOfSigProb(D^*) & openAngle(D^0)**

Inclusive D^0 with BCS about pValue & openAngle

Inclusive D^0 with BCS about daugProb & openAngle
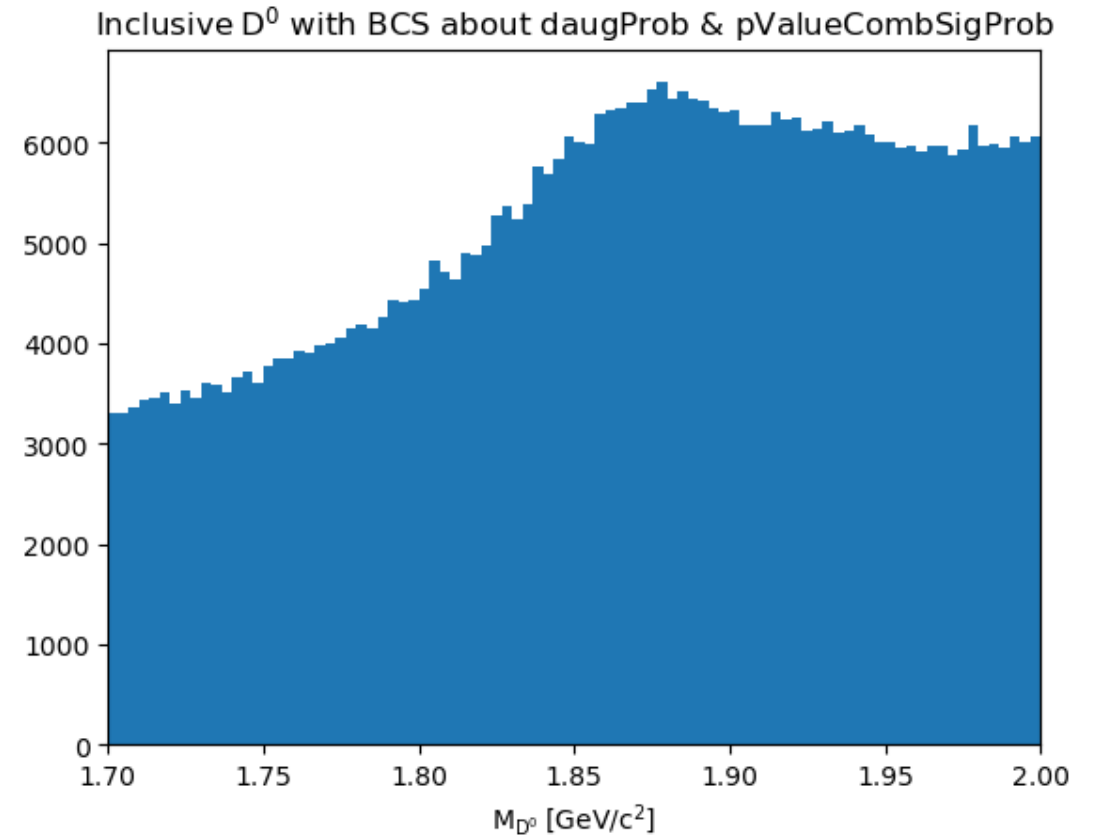
Signal side D^0 with BCS about FEI variables

BCS with pValueCombSigProb(D^*) & daugProdOfSigProb(D^0)

BCS with daugProdOfSigProb(D^*) & pValueCombSigProb(D^0)

Inclusive D^0 with BCS about pValueCombSigProb & daugProb

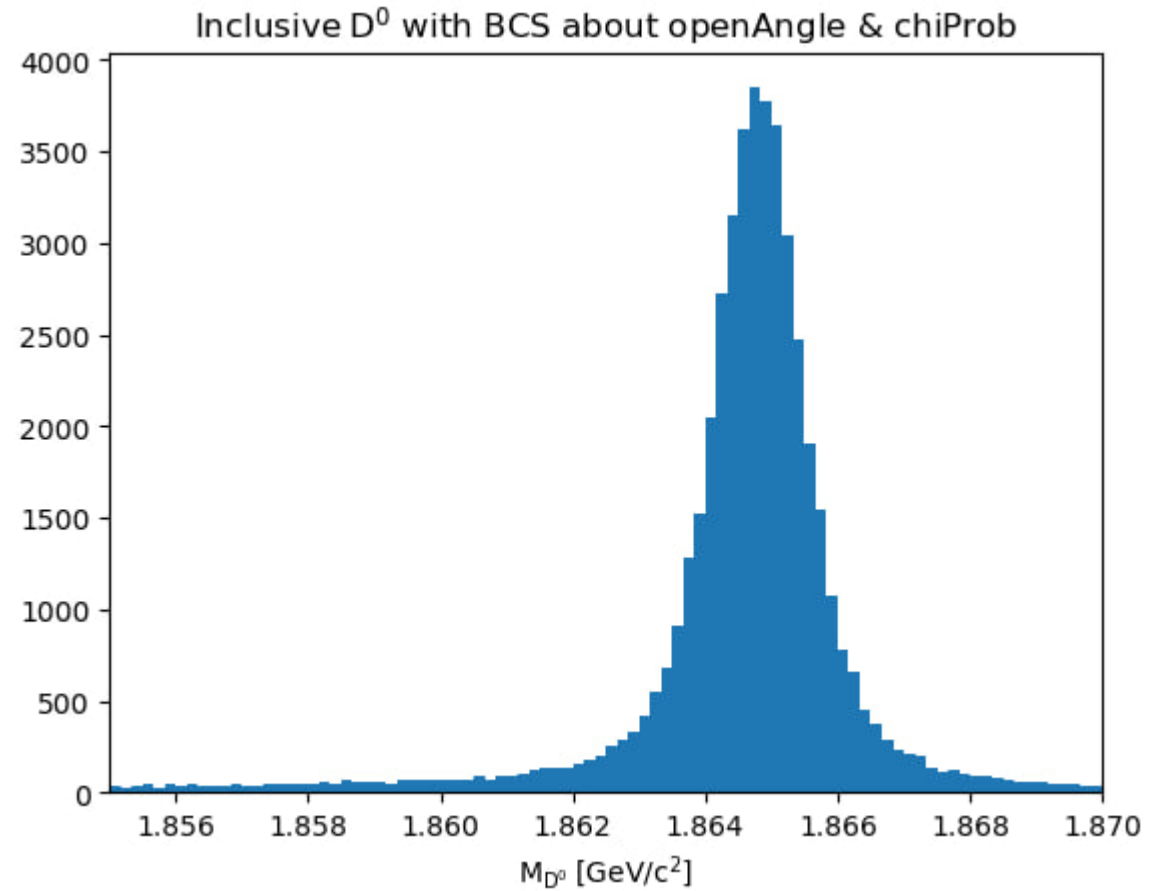Inclusive D^0 with BCS about daugProb & pValueCombSigProb

D^0 from my charm tagger

From my charm tagger,

the number of reconstructed inclusive D0 events is about 42000.
(not fitted, just estimated number)

From ccbarFEI,

the number of reconstructed inclusive D0 events is about 46000.

Inclusive D^0 with BCS about openAngle & chiProb

how to estimate #(inclusive D0) ?

- The total number of entries can be counted easily in the mass window
(number of entries in some region also can be counted)

- Assumed that Background distribution is like linear function

- Total number : 457247 / 90 Bin

- # in (1.70,1.75) ~ 51634

- # in (1.95,2.00) ~ 85500

- Mean value in (1.70, 2.00) ~ 68500

- #(inclusive D) ~ 46000
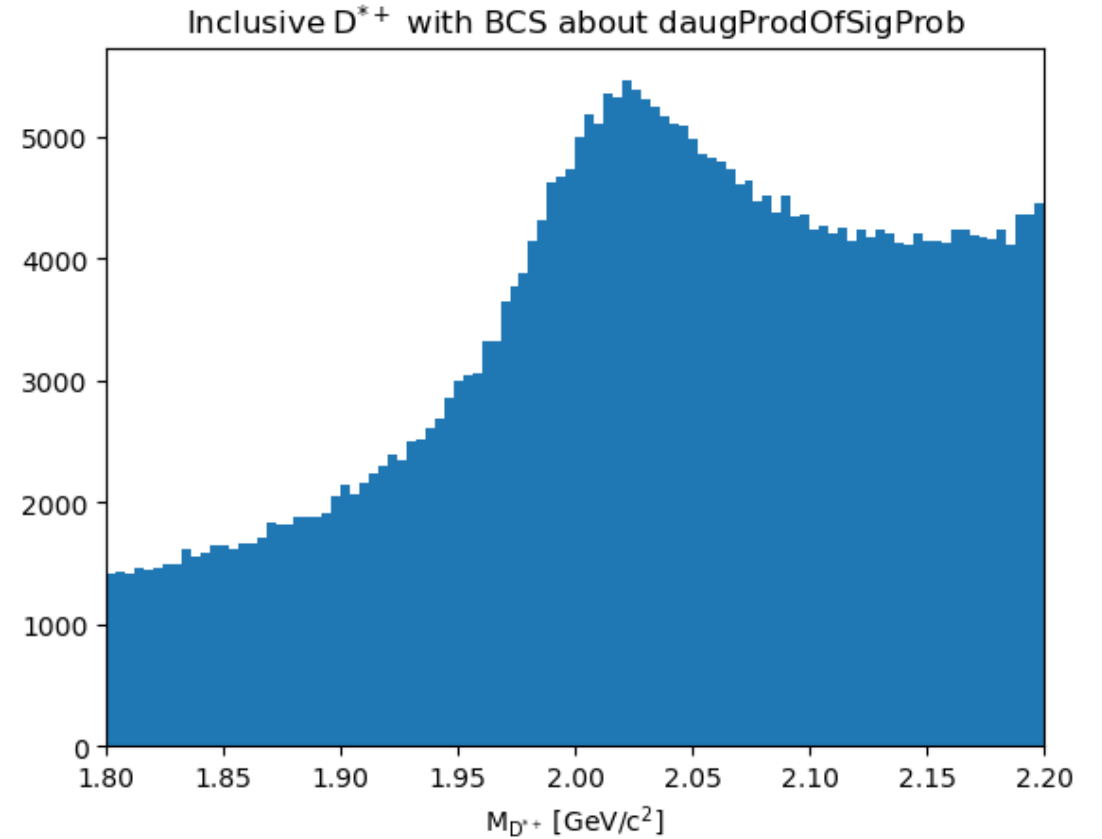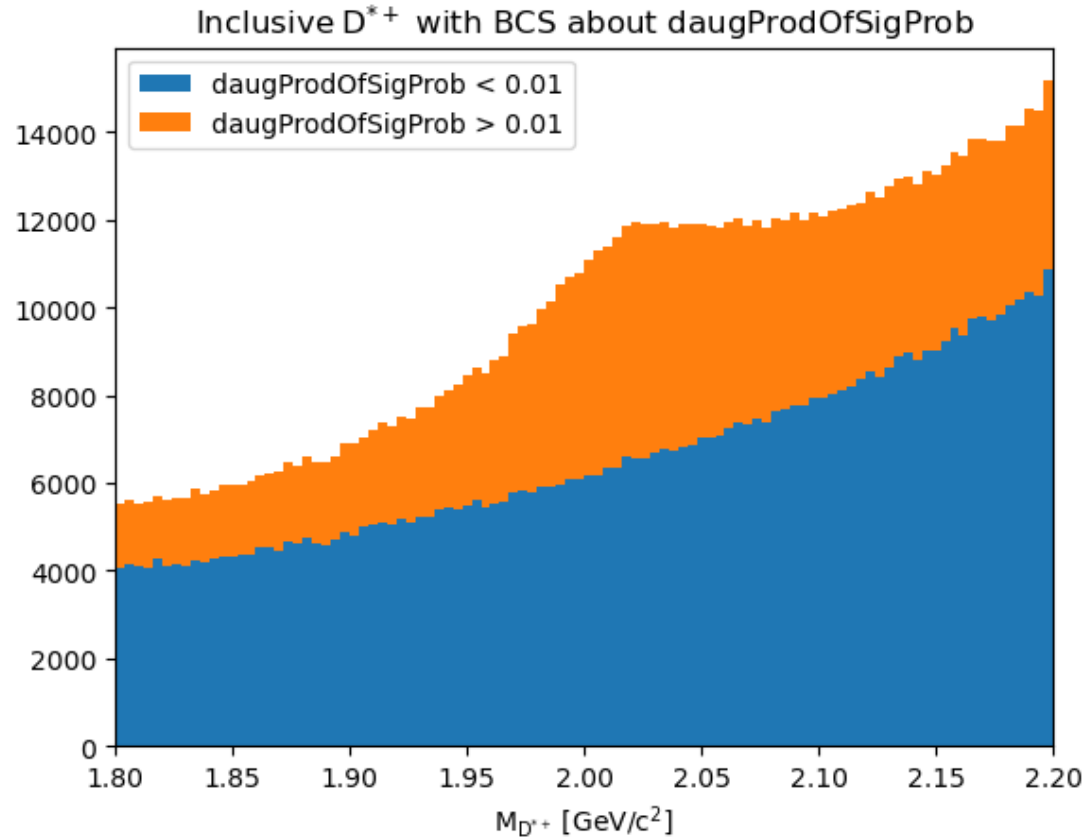
Inclusive D^0 with BCS about pValueCombSigProb & daugProb
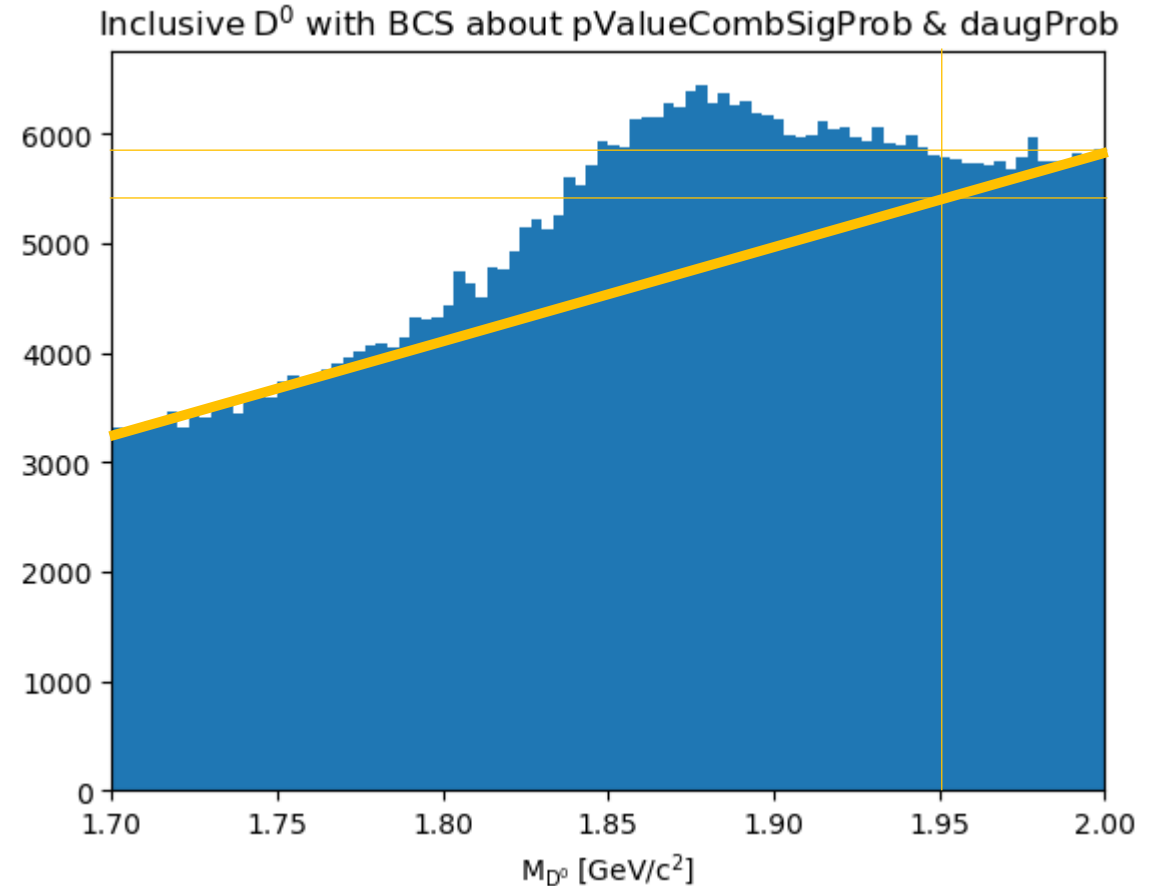
Background suppression with FEI variables?

only pValueCombSigProb > 0.1
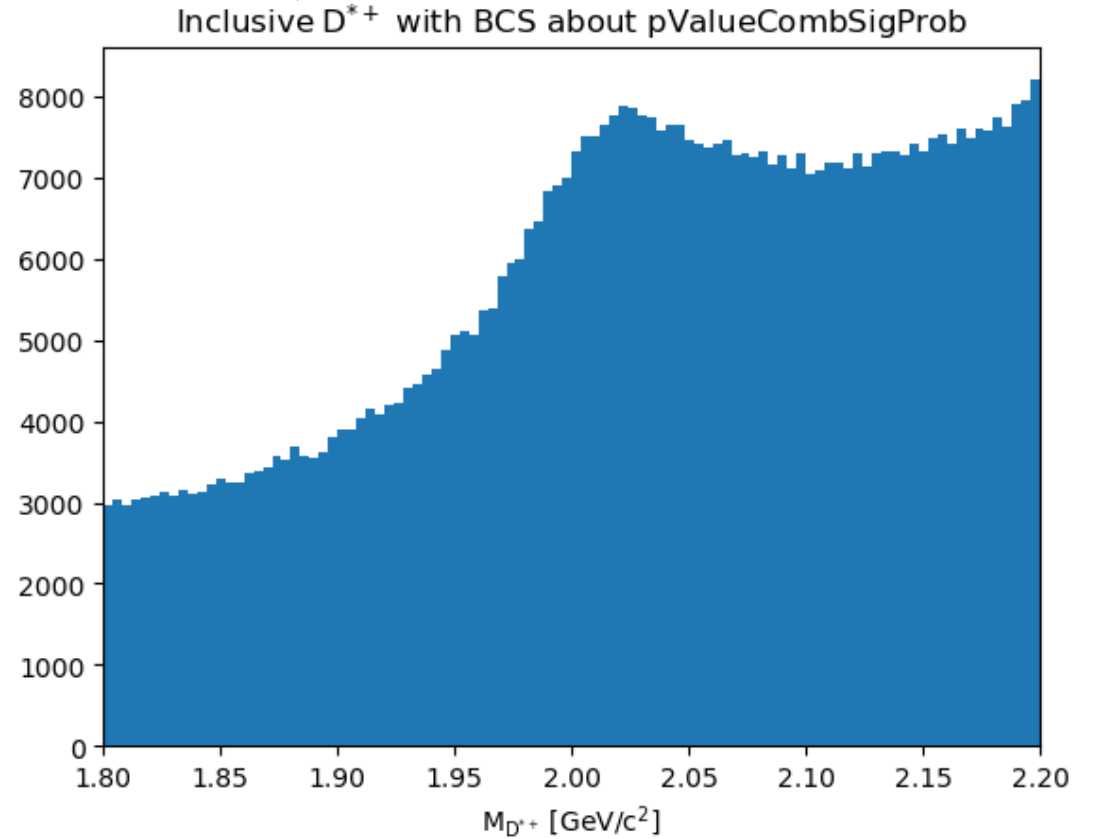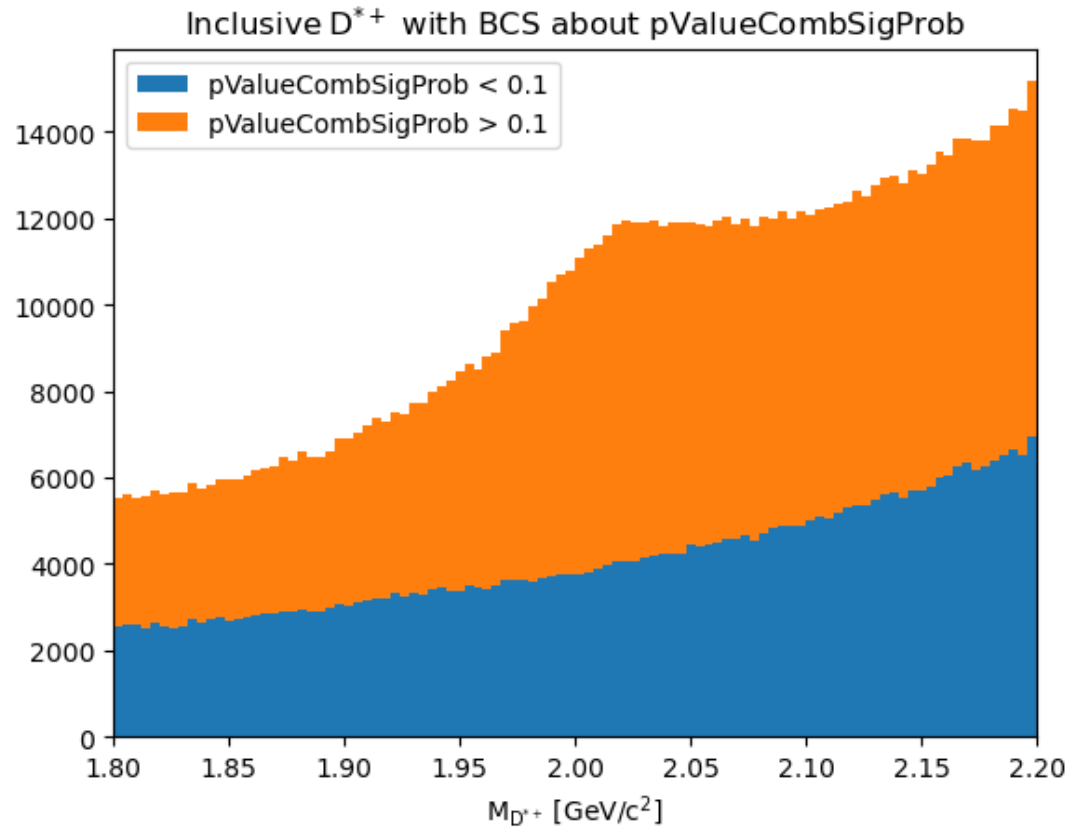
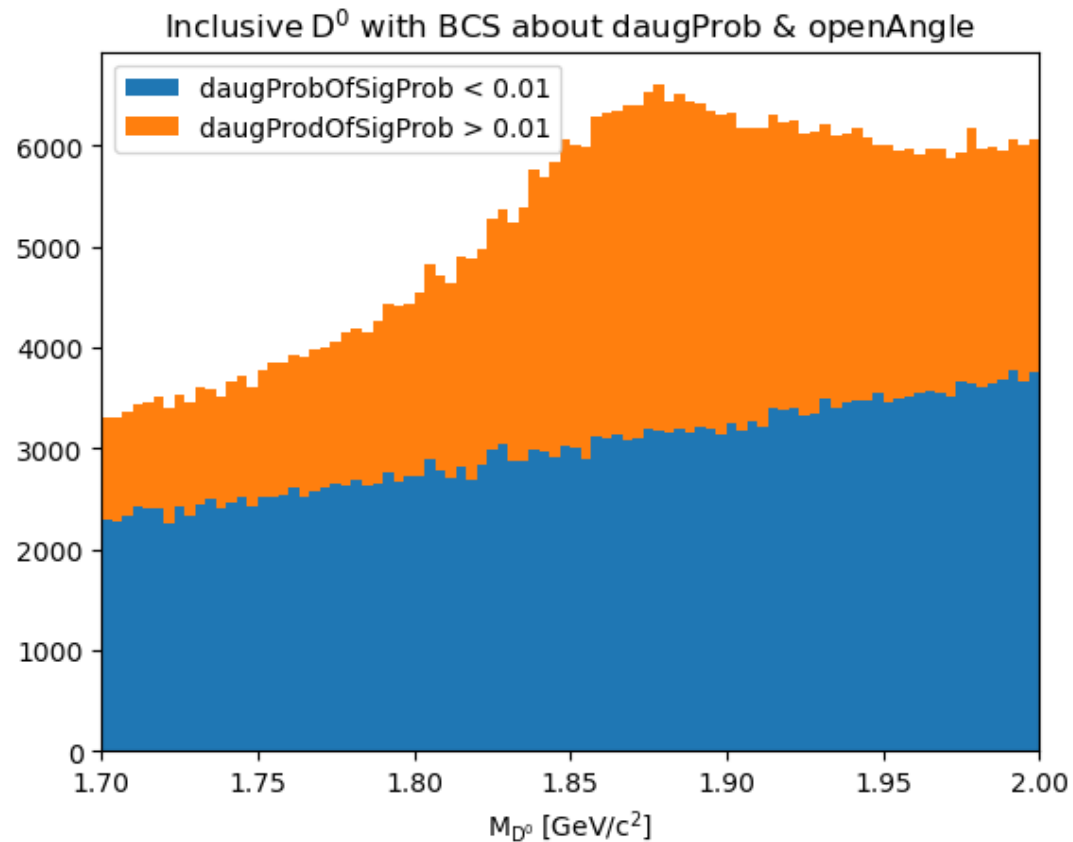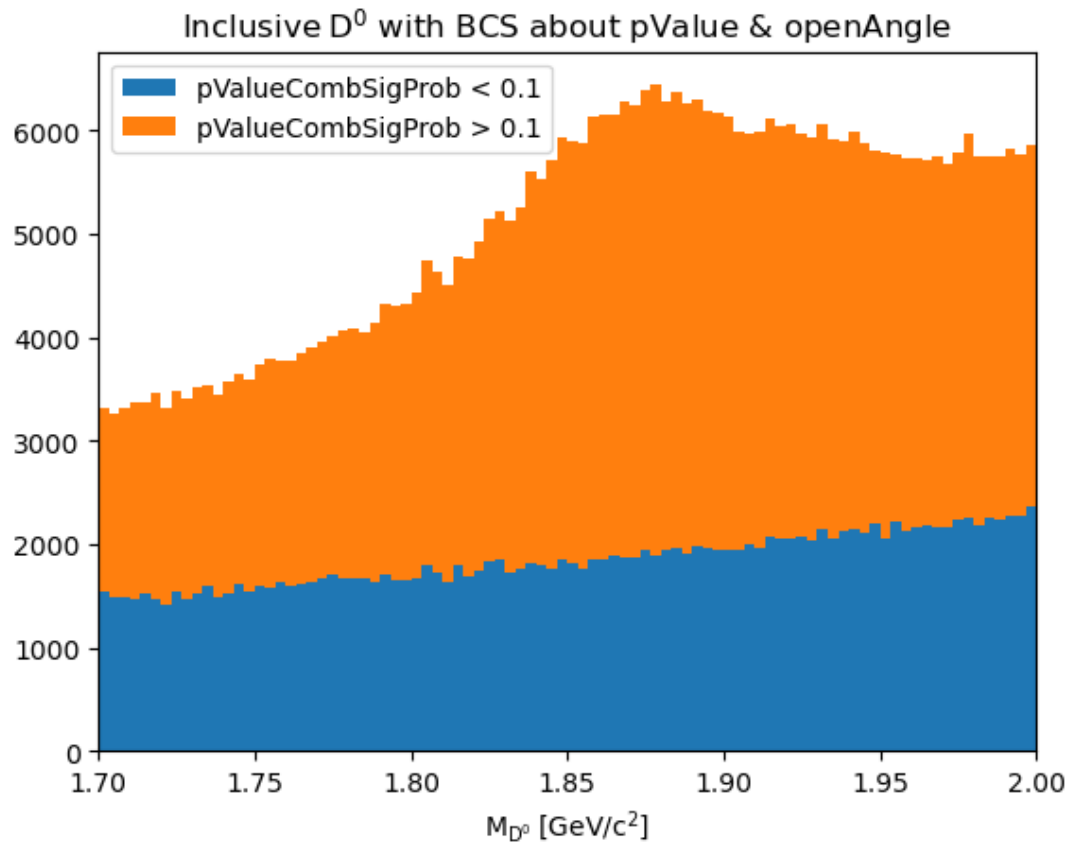# Background suppression with FEI variables?

only daugProdOfSigProb > 0.01
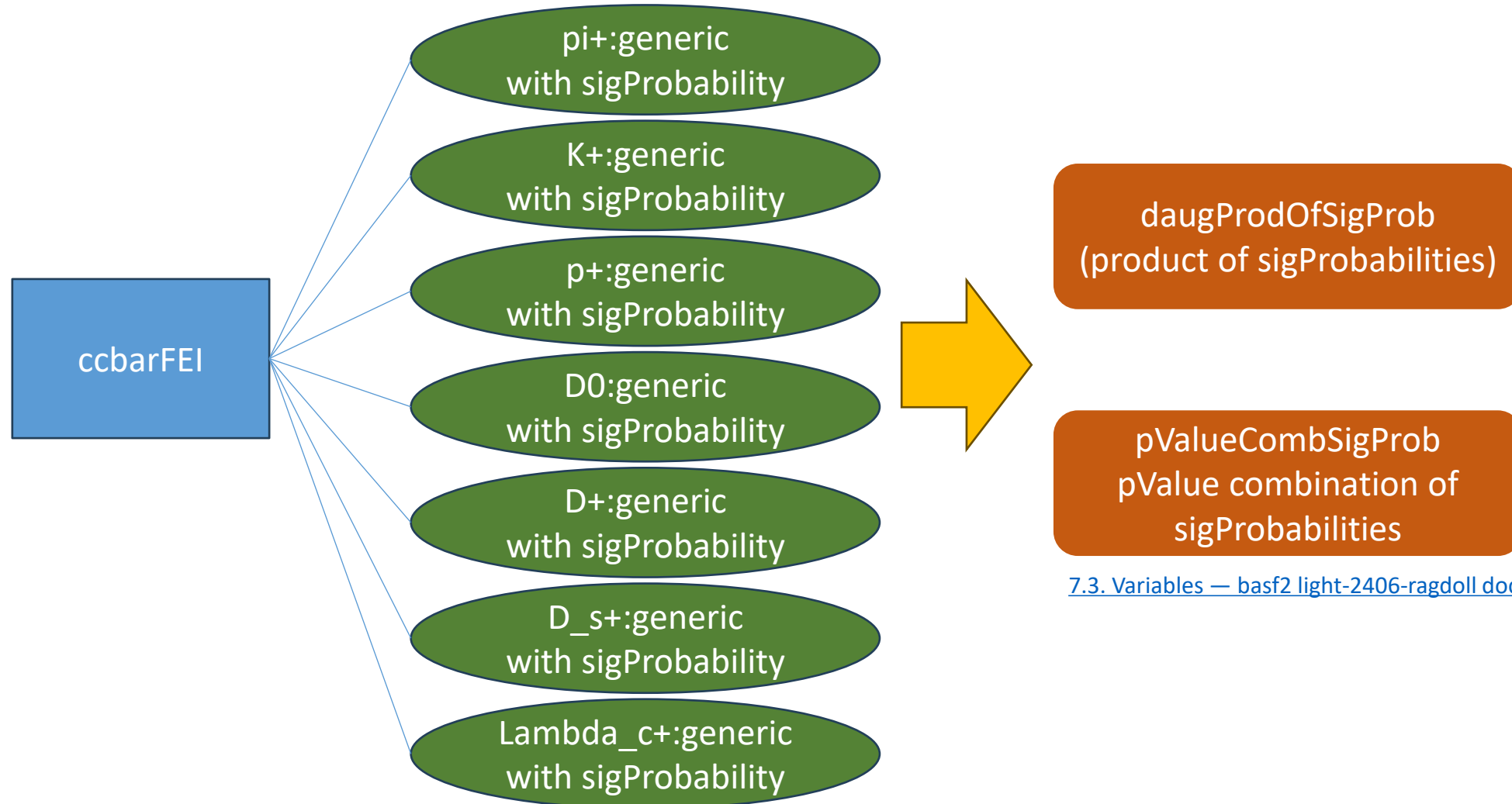
Background suppression with FEI variables on D0?

D^{*+}, D^+	D^{*0}, D^0	Λ_c^+	D_S^{*+}, D_S^+
Nothing (K^+K^-)	$\pi^+(K^+K^-)$	π^+p^-	K_S^0
$\pi^0(K^+K^-)$	$\pi^+\pi^0(K^+K^-)$	$\pi^+\pi^0p^-$	$\pi^0 K_S^0$
$\pi^+\pi^-(K^+K^-)$	$\pi^+\pi^-\pi^+(K^+K^-)$	$\pi^+\pi^-\pi^+p^-$	π^+K^-
$\pi^+\pi^-\pi^0(K^+K^-)$			$\pi^+\pi^0 K^-$
			$\pi^+\pi^- K_S^0$
			$\pi^+\pi^-\pi^0 K_S^0$
			$\pi^+\pi^-\pi^+ K^-$

My charm tagger fragmentation channels (24)

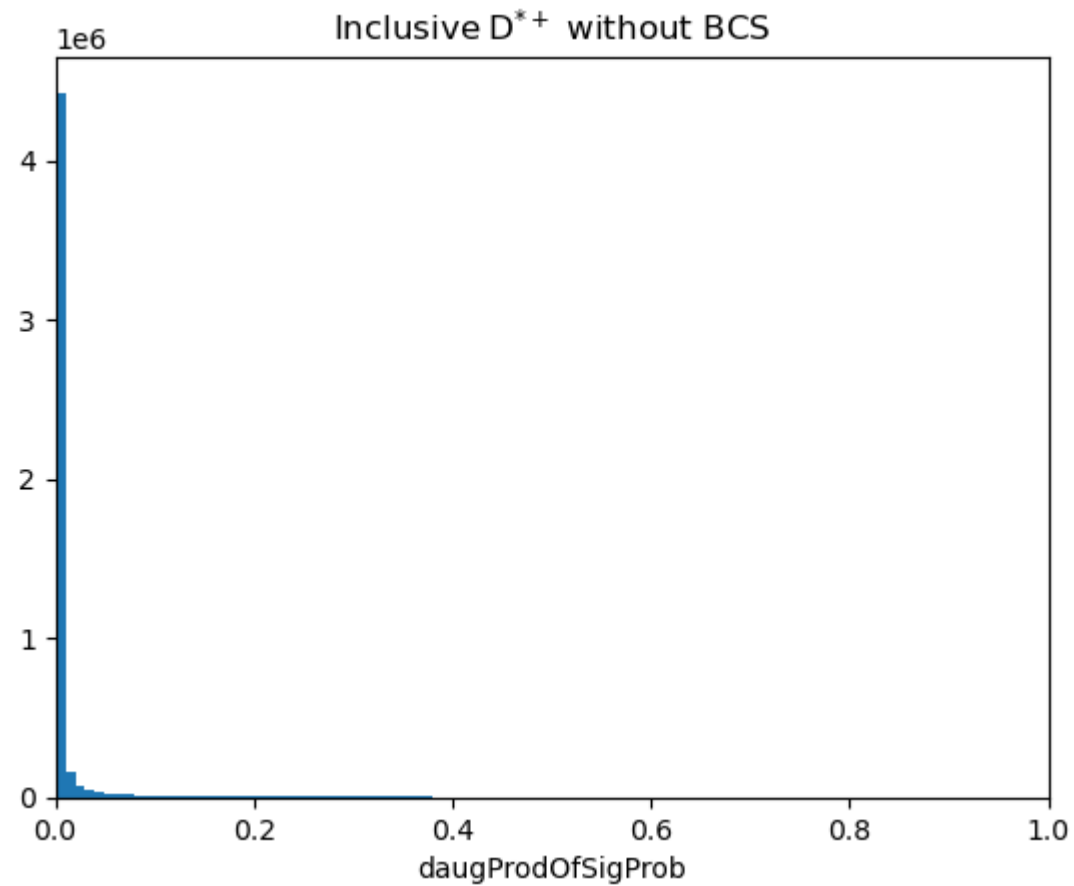| D_{tag}	X_{frag}
$D^{(*)+}$	Nothing
$D^{(*)+}$	π^0
$D^{(*)+}$	$K^+ K^-$
$D^{(*)+}$	$K^+ K^- \pi^0$
$D^{(*)+}$	$K^+ K^- \pi^+ \pi^-$
$D^{(*)+}$	$K^+ K^- \pi^+ \pi^- \pi^0$
$D^{(*)0}$	π^+
$D^{(*)0}$	$\pi^+ \pi^0$
$D^{(*)0}$	$\pi^+ K^+ K^-$
$D^{(*)0}$	$\pi^+ \pi^- \pi^+$
$D^{(*)0}$	$\pi^+ K^- K^+ \pi^0$
$D^{(*)0}$	$\pi^+ K^- K^+ \pi^- \pi^+$
Λ_c^+	$\bar{p}^- \pi^+$
Λ_c^+	$\bar{p}^- \pi^+ \pi^0$
Λ_c^+	$\bar{p}^- \pi^+ \pi^- \pi^+$
$D_S^{(*)+}$	K_S^0
$D_S^{(*)+}$	$K_S^0 \pi^0$
$D_S^{(*)+}$	$K^- K^+ (=> \pi^+\pi^- K_S^0)$
$D_S^{(*)+}$	$K_S^0 \pi^+\pi^- \pi^0$
$D_S^{(*)+}$	$K^- \pi^+$
$D_S^{(*)+}$	$K^- \pi^+ \pi^0$
$D_S^{(*)+}$	$K^- \pi^+ \pi^- \pi^+$

ccbarFEI tag modes (22 => 24)

Backup : ccbarFEI work?

ccbarFEI

pi+:generic
with sigProbability

K+:generic
with sigProbability

p+:generic
with sigProbability

D0:generic
with sigProbability

D+:generic
with sigProbability

D_s+:generic
with sigProbability

Lambda_c+:generic
with sigProbability

daugProdOfSigProb
(product of sigProbabilities)

pValueCombSigProb
pValue combination of
sigProbabilities

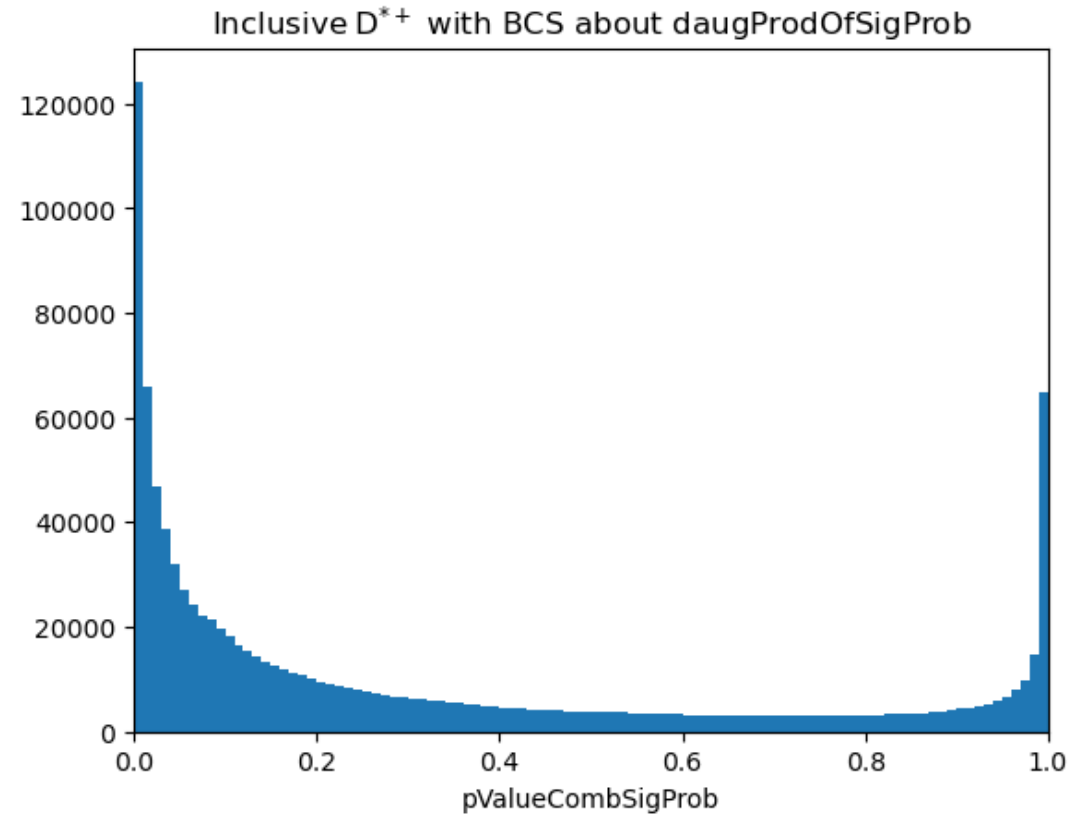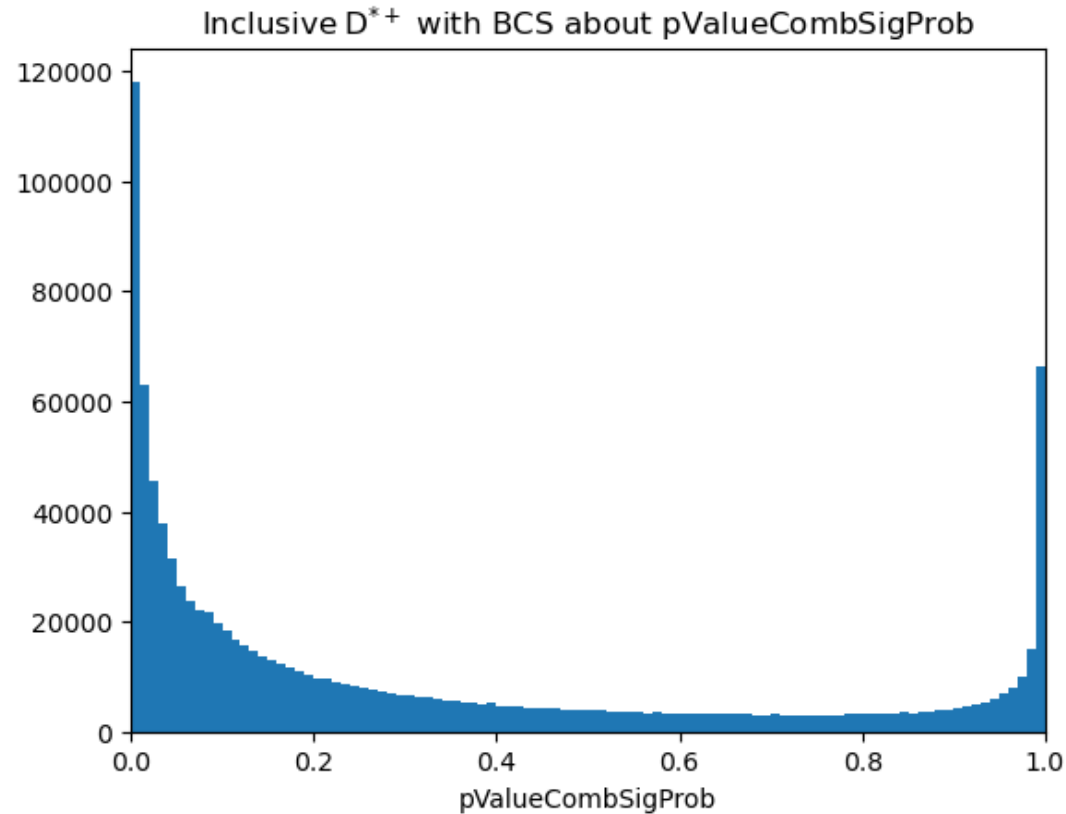7.3. Variables — basf2 light-2406-ragdoll documentation

Backup : ccbarFEI variables
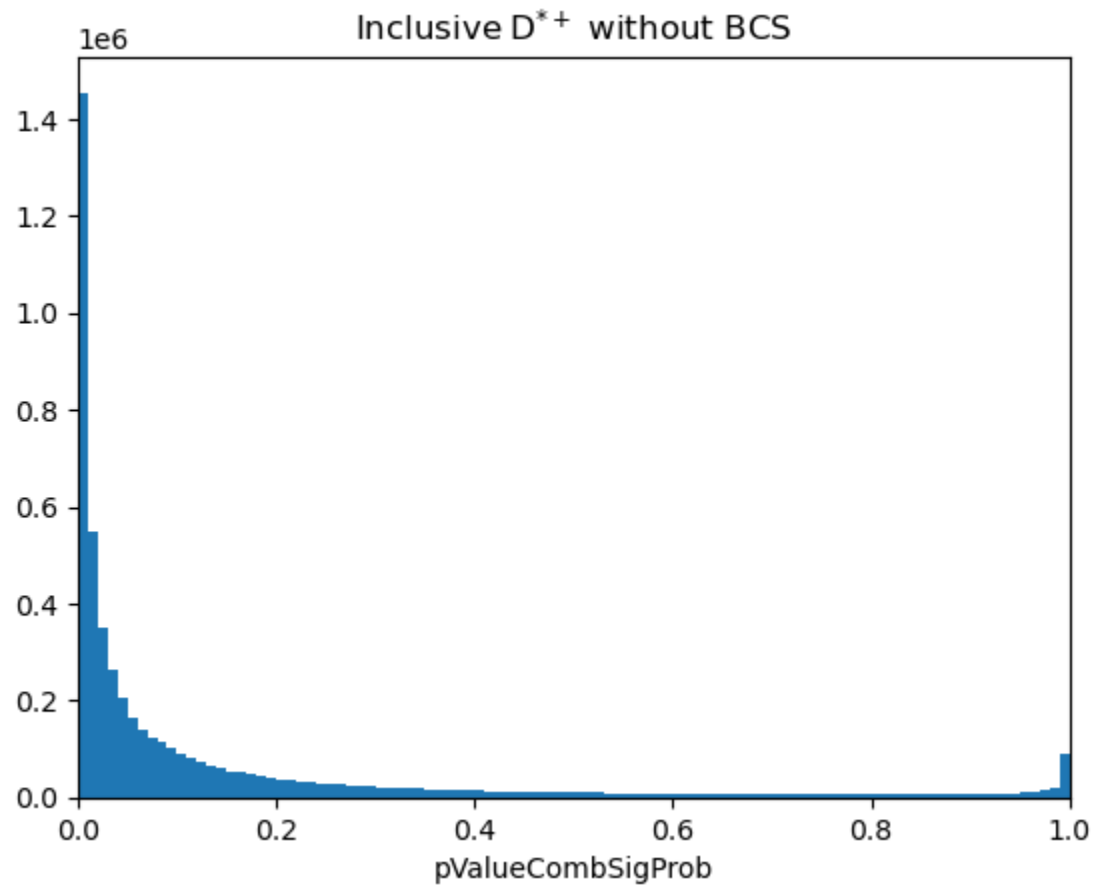
Backup : BCS effects between ccbarFEI variables

Inclusive D*+ with BCS about pValueCombSigProb

Inclusive D*+ with BCS about daugProdOfSigProb

Backup : BCS effects between ccbarFEI variables