
Semi-tauonic Update

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Wednesday, June 6, 18

$B^0 \rightarrow D^+ \tau \nu$

█ Cocktail sample with 12, 700, 000 events

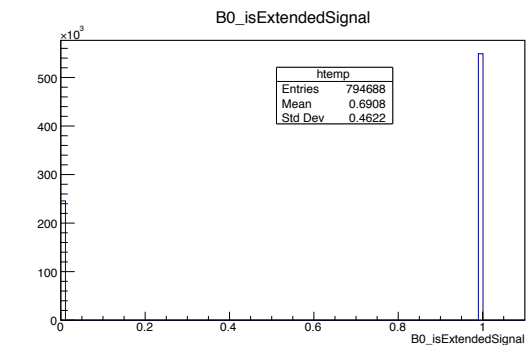
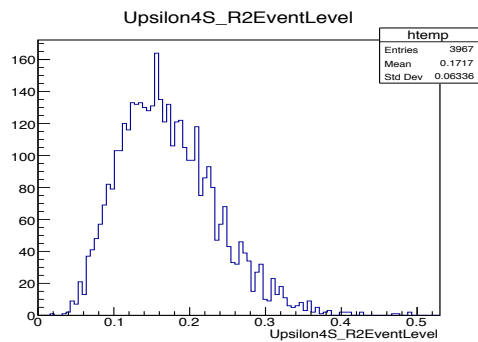
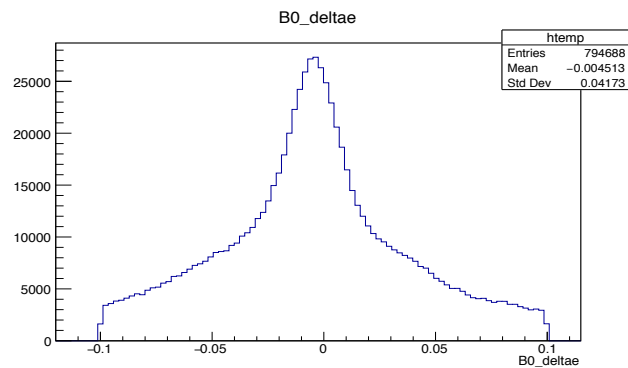
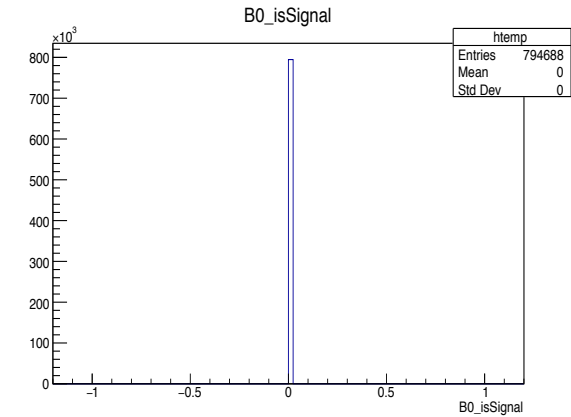
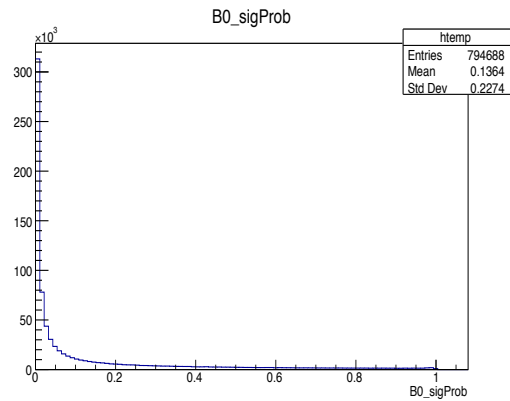
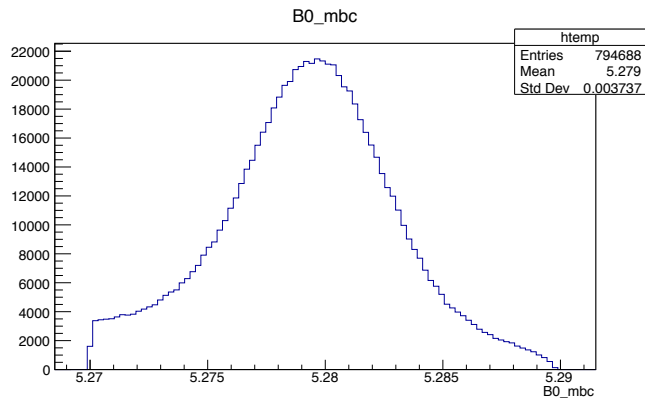
█ $B_{\text{tag}} \rightarrow D \pi, D \rightarrow K \pi$

█ $B_{\text{sig}} \rightarrow D^{(*)} \tau \nu$

█ $M_{bc} > 5.27 \text{ GeV}/c^2, \Delta E < 0.100 \text{ GeV}$

█ Signal Probability > 0.100

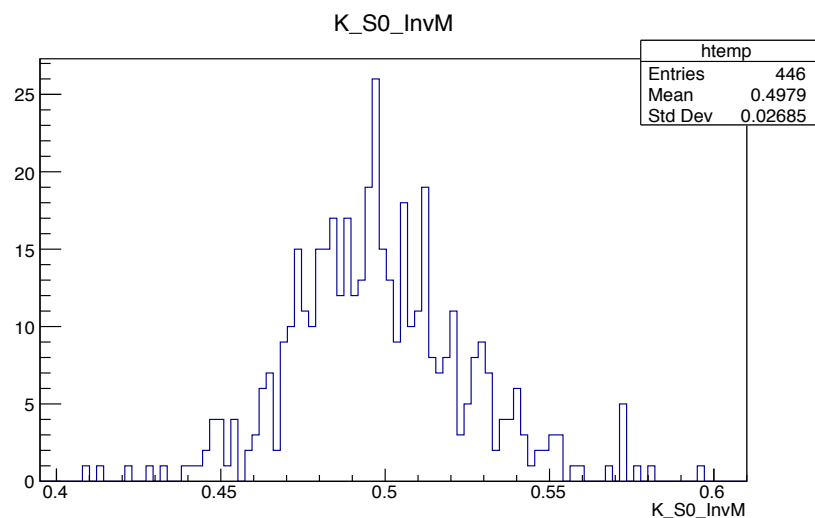
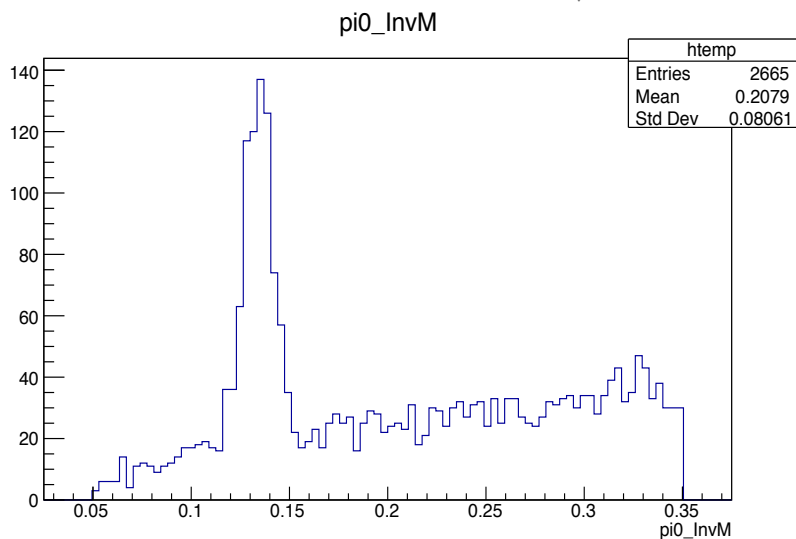
█ $R2 < 0.5$



B_{sig}

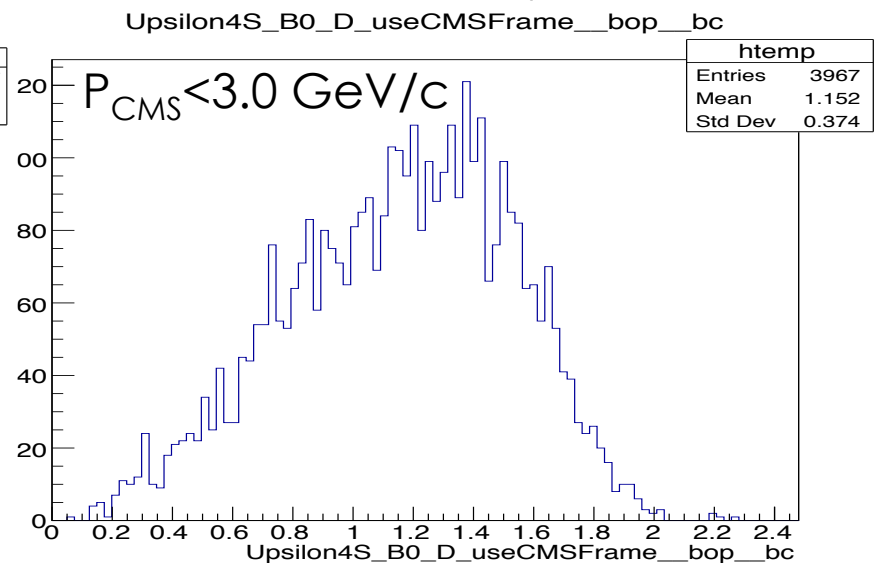
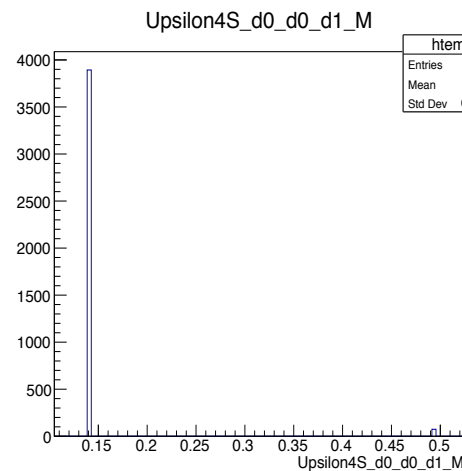
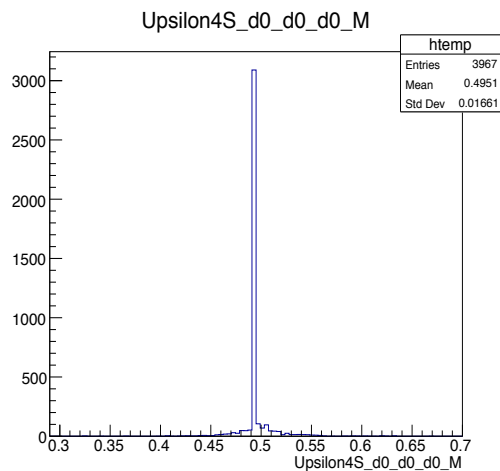
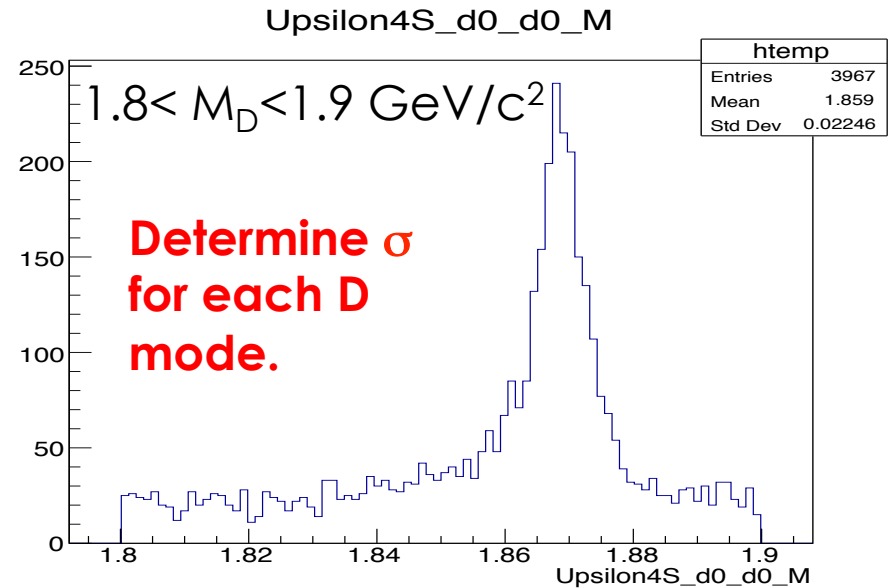
Tracks:

- ▣ π^+ : pionID>0.258 and dr < 0.5 and -2 < dz < 2 and pt > 0.1
- ▣ K^+ : kaonID>0.685 and dr < 0.5 and -2 < dz < 2 and pt > 0.1 and 0.3<useCMSFrame(p)<2.8
- ▣ μ^+ : muonID>0.438 and dr < 0.5 and -2 < dz < 2 and pt > 0.1 and 0.3<useCMSFrame(p)<1.8
- ▣ e^+ :elecID>0.597 and dr < 0.5 and -2 < dz < 2 and pt > 0.1 and 0.3<useCMSFrame(p)<1.8
- ▣ K_S^0 : $\pi^+\pi^-$ combinations with vertex fit and 0.45<M<0.55 GeV/c² (Standard List)
- ▣ π^0 : combine gamma:tight list $E_\gamma > 50$ MeV and 0.124<M<0.14 GeV/c²



D reconstruction

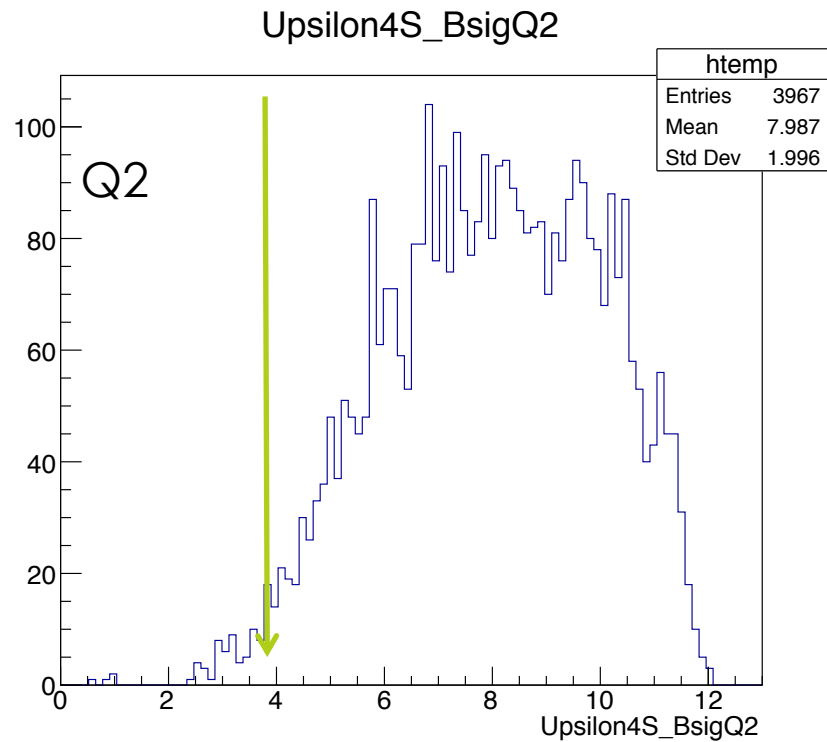
#	Decay	BF
1	$D_+ \rightarrow K^- \pi^+ \pi^+$	8.98 +/- 0.28%
2	$D_+ \rightarrow K^- \pi^+ \pi^+ \pi^0$	5.98 +/- 0.23 %
3	$D_+ \rightarrow K_s^0 \pi^+$	1.47 +/- 0.08 %
4	$D_+ \rightarrow K_s^0 \pi^+ \pi^- \pi^+$	2.97 +/- 0.11 %
5	$D_+ \rightarrow K_s^0 \pi^+ \pi^0$	7.05 +/- 0.27 %
6	$D_+ \rightarrow K_s^0 K^+$	1.05%



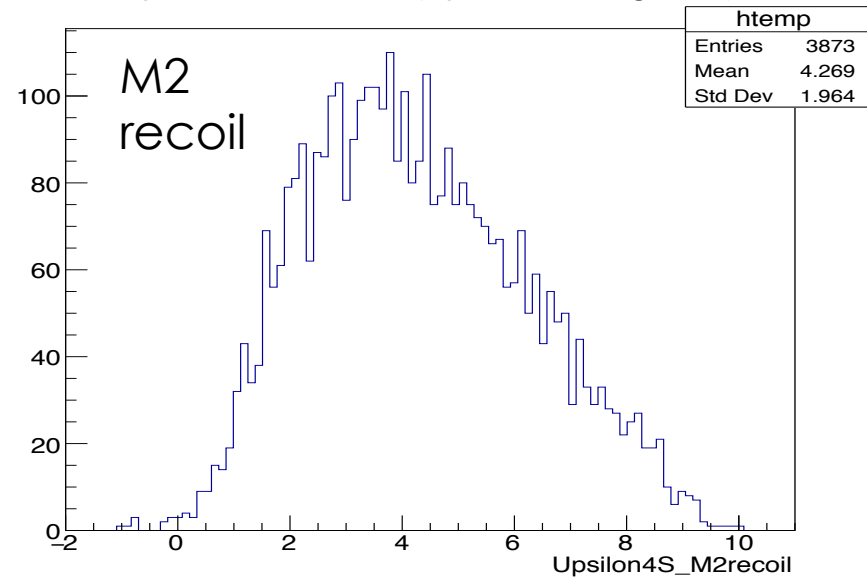
I do not understand this tight mass peak for D daughters

$$B_{\text{tag}} + D^*|$$

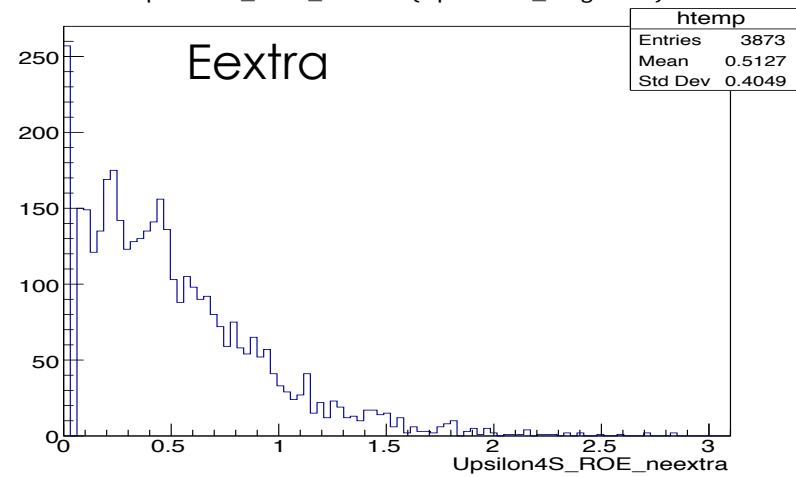
- ▣ ROE tracks == 0
- ▣ ROE charge == 0
- ▣ $Q^2 > 4.0 \text{ GeV}^2/c^4$



Upsilon4S_M2recoil {Upsilon4S_BsigQ2>4}

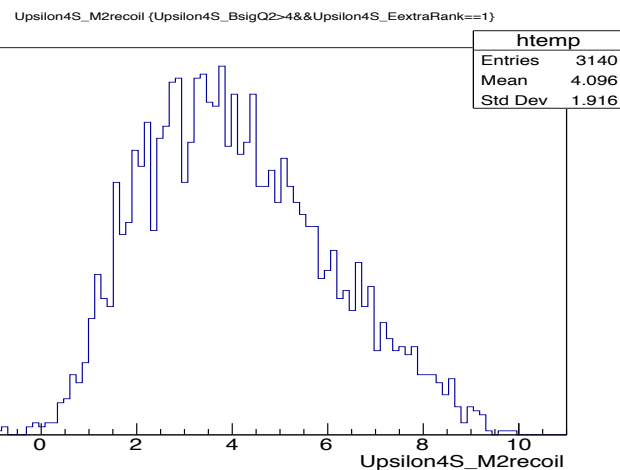
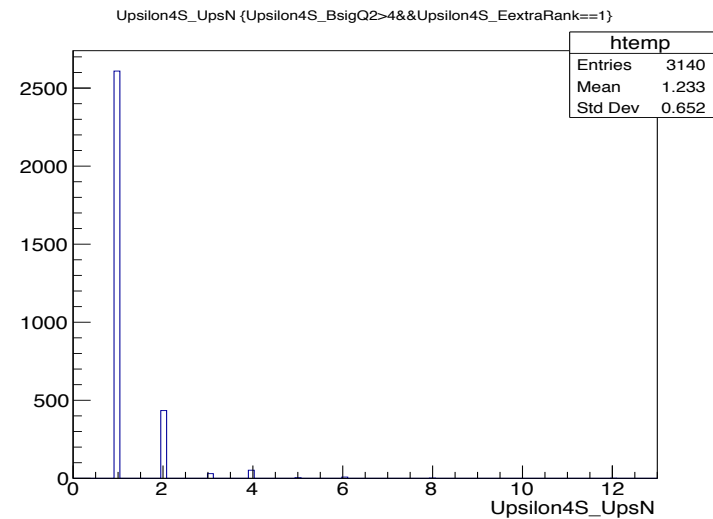
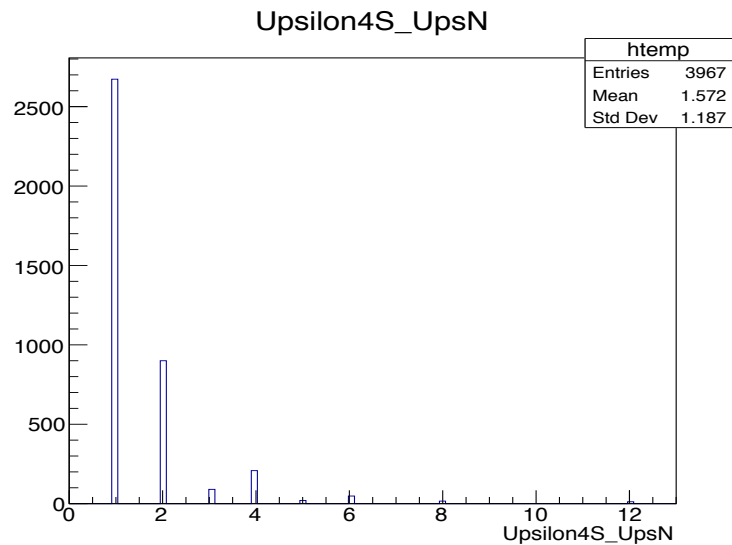


Upsilon4S_ROE_neextra {Upsilon4S_BsigQ2>4}



Best Y(4S) candidate selection

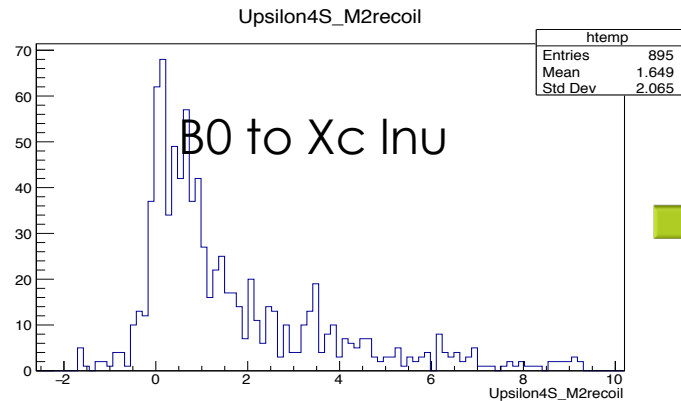
- Choose Y(4S) with the lowest E_{extra}



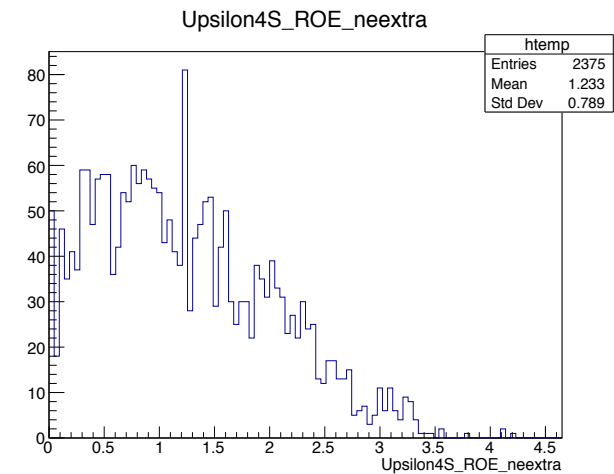
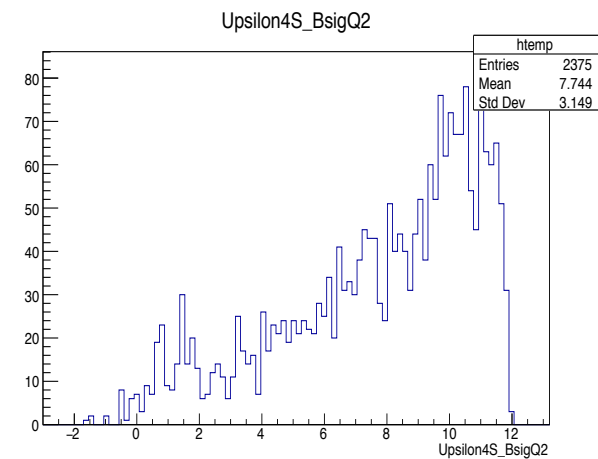
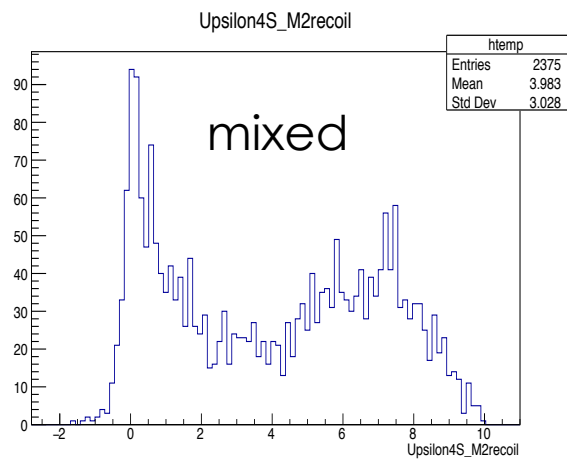
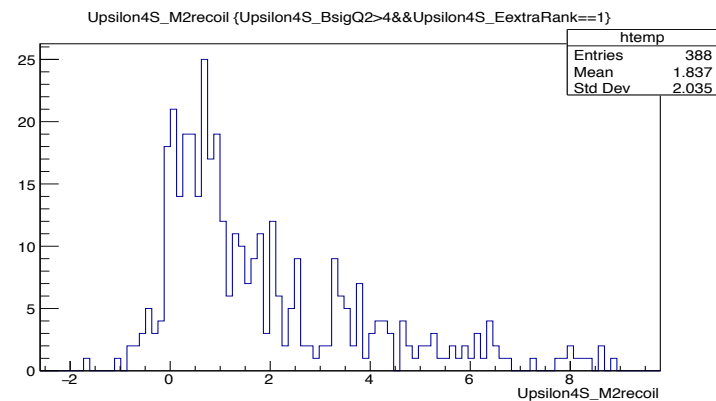
Number of events after full selection: 3059

Efficiency=0.024%

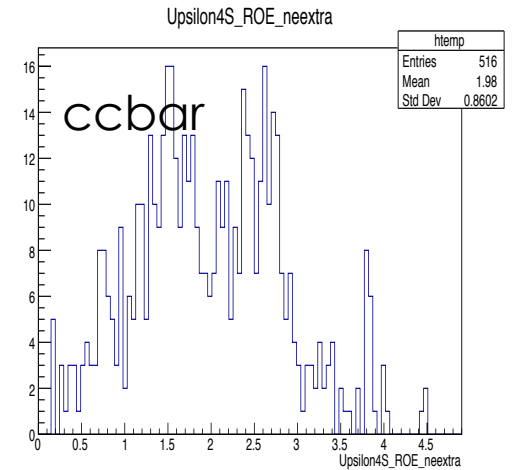
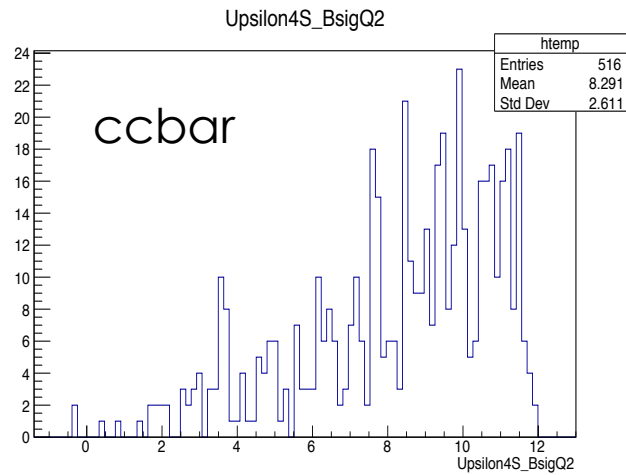
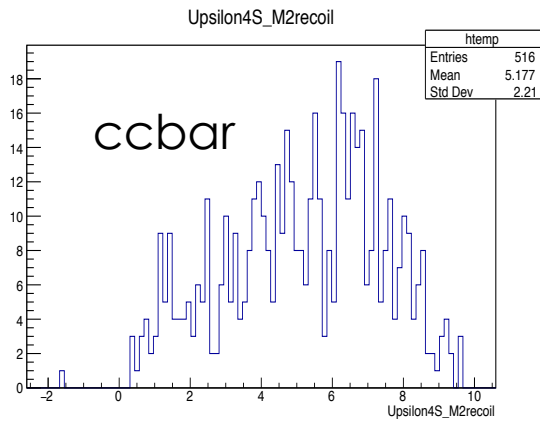
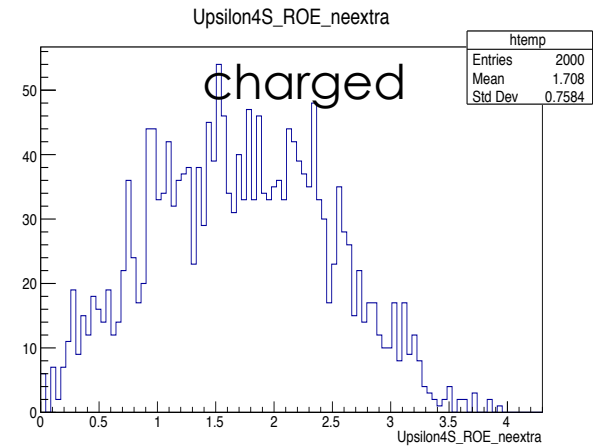
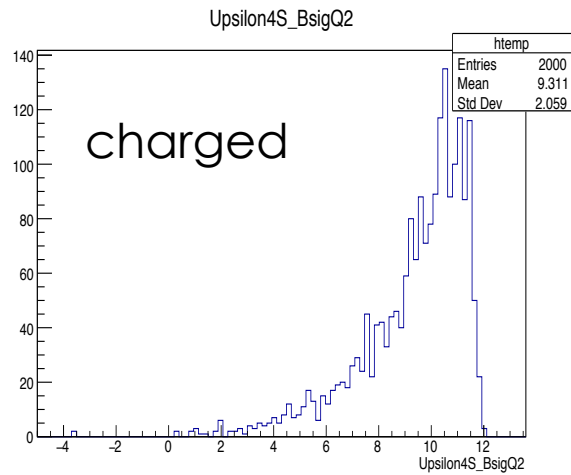
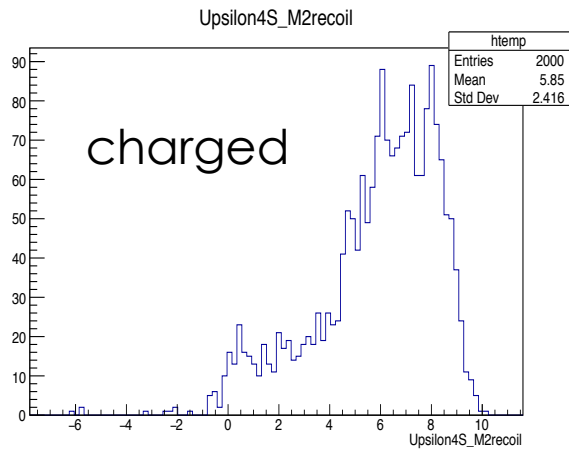
Backgrounds:



Q2
cut



Backgrounds



Task list

- Plotting tool to show different bkg+signal in one plot.
- Repeat same studies with charged modes.
 - Code already written and run
- Determine discriminating variables for background suppression.
- Start working with MC10 and release-02-00-00 when ready.
- FYI: charged modes scripts have a bug, I will push the corrected version today!