



中国科学技术大学

University of Science and Technology of China

Measurement of $\Xi^- \rightarrow \Sigma^- \gamma$

Rui Sun

University of Science and Technology of China

2022/11/18



测量过程 $J/\psi \rightarrow \Xi^- \bar{\Xi}^+$, $\Xi^- \rightarrow \Sigma^- \gamma$ 的分支比

使用双标记方法(Double Tag Method) 可以减少系统误差

Tag端: $\bar{\Xi}^+ \rightarrow \bar{\Lambda} \pi^+$, $\bar{\Lambda} \rightarrow \bar{p} \pi^+$

$$N_{ST} = N_{\Xi^- \bar{\Xi}^+} \times B(\bar{\Xi}^+ \rightarrow \bar{\Lambda} \pi^+) \times B(\bar{\Lambda} \rightarrow \bar{p} \pi^+) \times \epsilon_{ST}$$

从中再挑选 $\Xi^- \rightarrow \Sigma^- \gamma$, $\Sigma^- \rightarrow n \pi^-$ 的事例

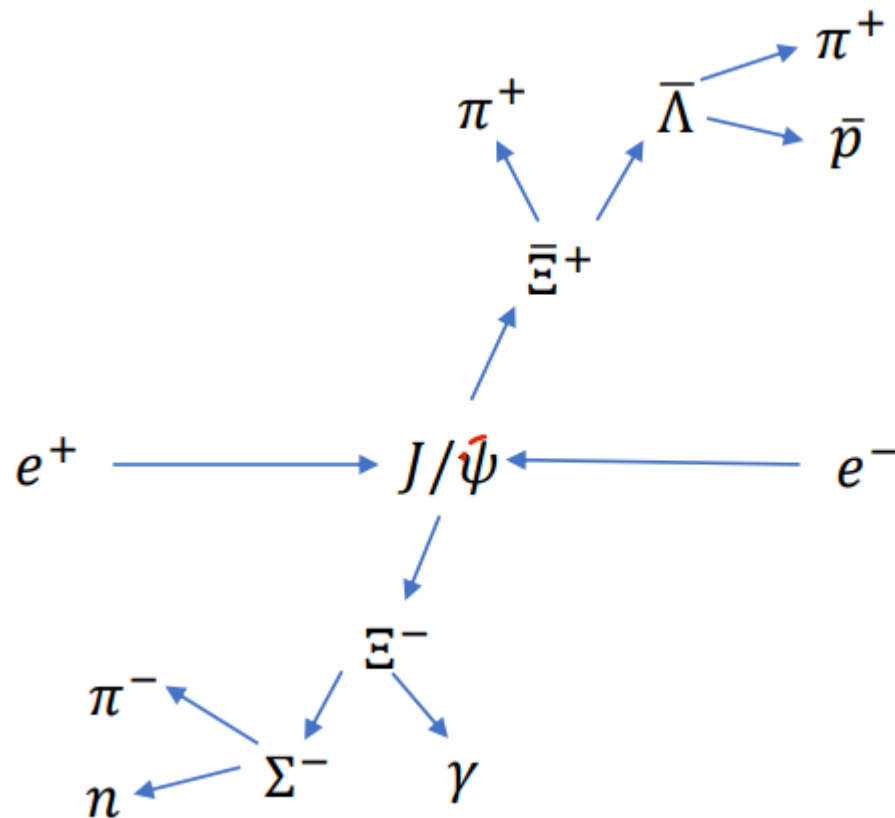
$$N_{DT} = \frac{N_{ST}}{\epsilon_{ST}} \times B(\Xi^- \rightarrow \Sigma^- \gamma) \times B(\Sigma^- \rightarrow n \pi^-) \times \epsilon_{DT}$$

整理得到

$$B(\Xi^- \rightarrow \Sigma^- \gamma) = \frac{N_{DT}}{N_{ST}} \times \frac{\epsilon_{ST}}{\epsilon_{DT}} \times \frac{1}{B(\Sigma^- \rightarrow n \pi^-)}$$

分母的分支比其他人测过了, 可以直接拿来用, 通过对事例数的记录和探测效率的测量, 就可以得到待测分支比

Decay Mode





Boss version: 7.0.8

Signal MC: 0.3M

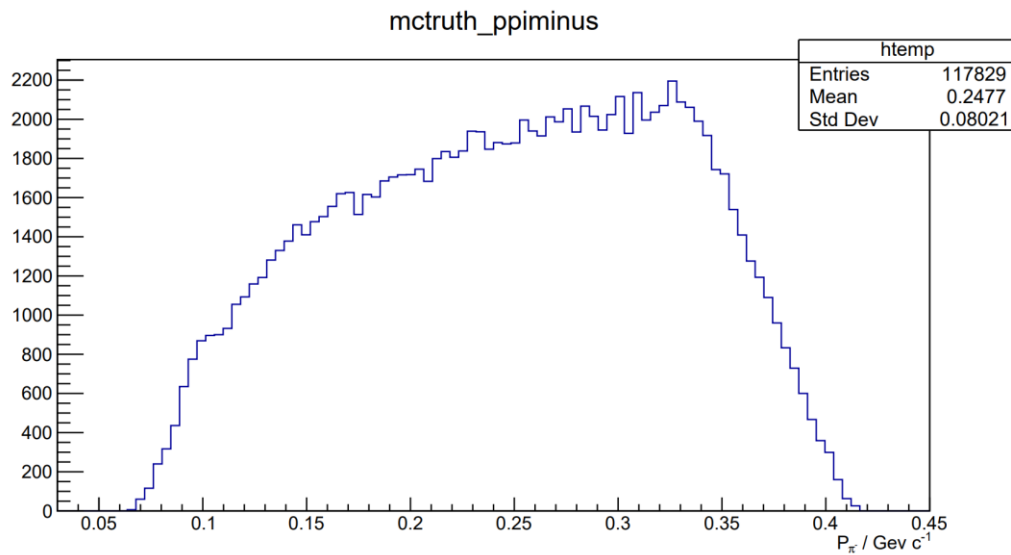
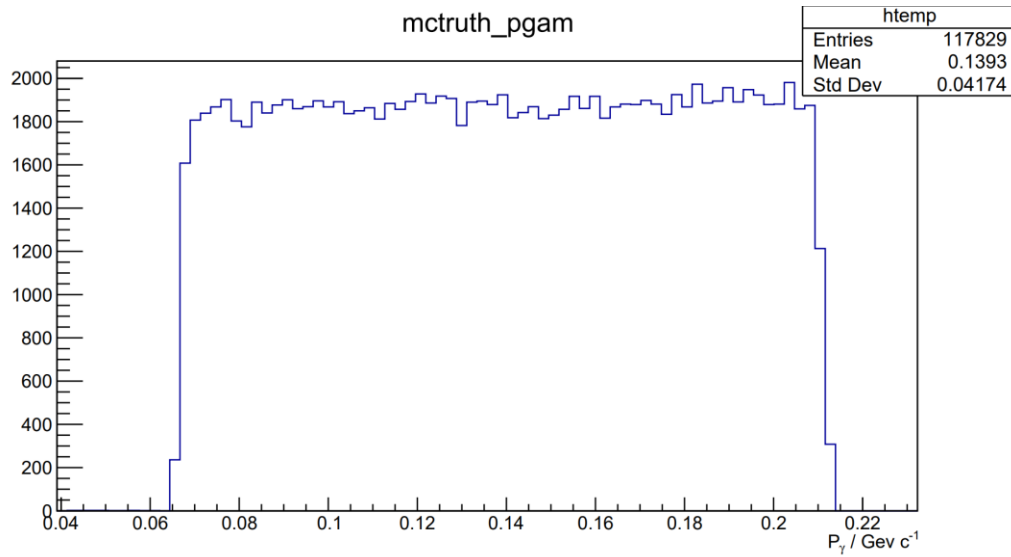
Inclusive MC: 0912年 1.3B

暂未运行Data



Follow谢师兄的单标结果

Double Tag signal MC truth information





π^- PID

- Charge < 0
- Prob_pi > Prob_k and Prob_pi > Prob_p
- At least 1 good π^-

Get Photons

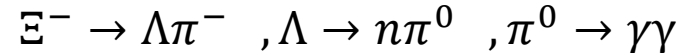
- 25 MeV $\rightarrow |\cos\theta| < 0.8$ 50 MeV $\rightarrow 0.86 < |\cos\theta| < 0.92$
- $0 \leq \text{TDC} \leq 14$
- Angle between γ and charged tracks larger than 10°
- Angle between γ and \bar{p} larger than 20°
- $n_{good} \geq 1$



Kinematic Fit

- Fit $\bar{\Xi}^+, \pi^-, \gamma, n$, constrain 4-momentum
- n: missing track, constrain the mass m_n
- Loop over all γ, π^-
- Select minimum χ^2 combination

相似的过程



在nGam>2时, 额外做一个运动学拟合

Additional Kinematic Fit

- Fit $\bar{\Xi}^+, \pi^-, \gamma, \gamma, n$, constrain 4-momentum
- n: missing track, constrain the mass m_n
- Loop over all γ, π^-
- Select minimum χ^2 combination

Background Analysis



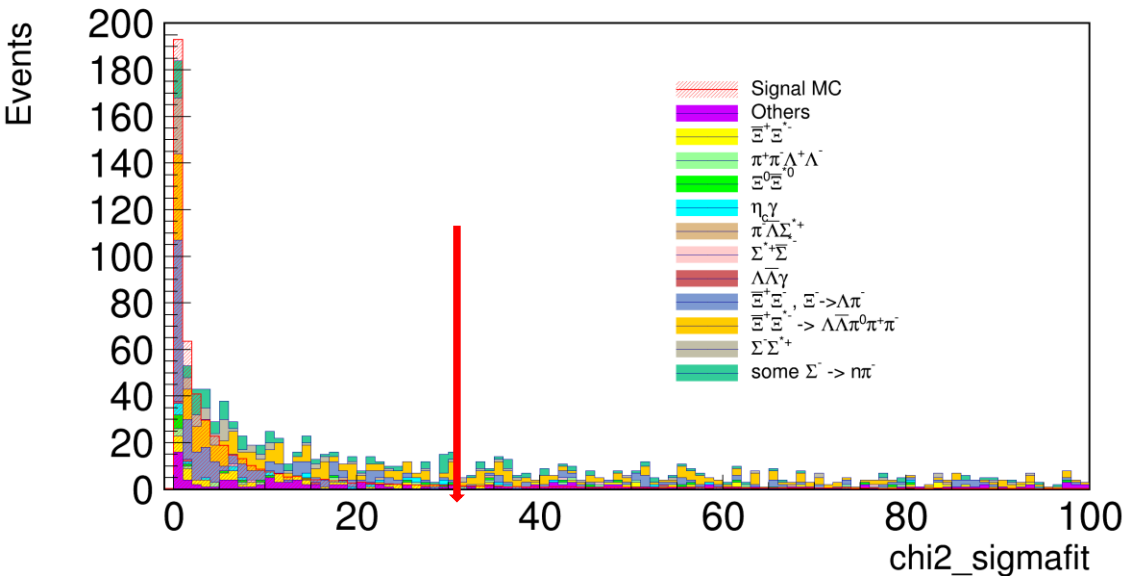
1	$J/\psi \rightarrow \Xi^+\Xi^-, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Lambda \rightarrow \pi^-p$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	1	79325	79325
2	$J/\psi \rightarrow \Xi^+\Xi^-, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Lambda \rightarrow \pi^0n$	$\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	4	53531	132856
3	$J/\psi \rightarrow \pi^+\pi^-\Lambda\bar{\Lambda}, \Lambda \rightarrow \pi^-p, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	6	19468	152324
4	$J/\psi \rightarrow \Xi^+\Xi^{*-}, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^{*-} \rightarrow \pi^-\Xi^0, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Xi^0 \rightarrow \pi^0\Lambda, \Lambda \rightarrow \pi^-p$	$\pi^0\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	2	14895	167219
5	$J/\psi \rightarrow \pi^+\pi^-\Lambda\bar{\Lambda}, \Lambda \rightarrow \pi^0n, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	11	11918	179137
6	$J/\psi \rightarrow \Xi^+\Xi^{*-}, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^{*-} \rightarrow \pi^-\Xi^0, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Xi^0 \rightarrow \pi^0\Lambda, \Lambda \rightarrow \pi^0n$	$\pi^0\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	3	7847	186984
7	$J/\psi \rightarrow \Xi^+\Xi^{*-}, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^{*-} \rightarrow \pi^0\Xi^-, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Xi^- \rightarrow \pi^-\Lambda, \Lambda \rightarrow \pi^-p$	$\pi^0\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	5	6934	193918
8	$J/\psi \rightarrow \Xi^0\Xi^{*0}, \Xi^0 \rightarrow \pi^0\Lambda, \Xi^{*0} \rightarrow \pi^-\Xi^+, \Lambda \rightarrow \pi^-p, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	20	5115	199033
9	$J/\psi \rightarrow \eta_c\gamma, \eta_c \rightarrow \Xi^+\Xi^-, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Lambda \rightarrow \pi^-p$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}\gamma$	14	3685	202718
10	$J/\psi \rightarrow \Xi^+\Xi^{*-}, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^{*-} \rightarrow \pi^0\Xi^-, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Xi^- \rightarrow \pi^-\Lambda, \Lambda \rightarrow \pi^0n$	$\pi^0\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	16	3555	206273
11	$J/\psi \rightarrow \pi^-\bar{\Lambda}\Sigma^{*+}, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Sigma^{*+} \rightarrow \pi^+\Lambda, \Lambda \rightarrow \pi^-p$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	9	2921	209194
12	$J/\psi \rightarrow \Xi^0\Xi^{*0}, \Xi^0 \rightarrow \pi^0\Lambda, \Xi^{*0} \rightarrow \pi^-\Xi^+, \Lambda \rightarrow \pi^0n, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	41	2576	211770
13	$J/\psi \rightarrow \Sigma^{*+}\bar{\Sigma}^{*-}, \Sigma^{*+} \rightarrow \pi^+\Lambda, \bar{\Sigma}^{*-} \rightarrow \pi^-\bar{\Lambda}, \Lambda \rightarrow \pi^-p, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	27	2226	213996
14	$J/\psi \rightarrow \Xi^-\bar{\Xi}^{*+}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Xi}^{*+} \rightarrow \pi^0\Xi^+, \Lambda \rightarrow \pi^-p, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	28	1968	215964
15	$J/\psi \rightarrow \eta_c\gamma, \eta_c \rightarrow \Xi^+\Xi^-, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Lambda \rightarrow \pi^0n$	$\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}\gamma$	15	1841	217805
16	$J/\psi \rightarrow \pi^-\bar{\Lambda}\Sigma^{*+}, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Sigma^{*+} \rightarrow \pi^+\Lambda, \Lambda \rightarrow \pi^0n$	$\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	62	1715	219520
17	$J/\psi \rightarrow \Sigma^{*+}\bar{\Sigma}^{*-}, \Sigma^{*+} \rightarrow \pi^+\Lambda, \bar{\Sigma}^{*-} \rightarrow \pi^-\bar{\Lambda}, \Lambda \rightarrow \pi^0n, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	21	1436	220956
18	$J/\psi \rightarrow \Xi^-\bar{\Xi}^{*+}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Xi}^{*+} \rightarrow \pi^+\Xi^0, \Lambda \rightarrow \pi^-p, \Xi^0 \rightarrow \pi^0\bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	38	1237	222193
19	$J/\psi \rightarrow \bar{\Sigma}^{*+}\Sigma^{*-}, \bar{\Sigma}^{*+} \rightarrow \pi^+\bar{\Lambda}, \Sigma^{*-} \rightarrow \pi^-\Lambda, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Lambda \rightarrow \pi^-p$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	17	1137	223330
20	$J/\psi \rightarrow \Xi^-\bar{\Xi}^{*+}, \Xi^- \rightarrow \pi^-\Lambda, \bar{\Xi}^{*+} \rightarrow \pi^0\Xi^+, \Lambda \rightarrow \pi^0n, \Xi^+ \rightarrow \pi^+\bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^0\pi^0\pi^+\pi^+\pi^-\bar{p}\bar{p}$	24	1073	224403
21	$J/\psi \rightarrow \pi^+\Sigma^{*-}\bar{\Lambda}, \Sigma^{*-} \rightarrow \pi^-\Lambda, \bar{\Lambda} \rightarrow \pi^+\bar{p}, \Lambda \rightarrow \pi^-p$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	43	858	225261
22	$J/\psi \rightarrow \Lambda\bar{\Lambda}\gamma, \Lambda \rightarrow \pi^-p, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^+\pi^-\bar{p}\bar{p}\gamma$	58	819	226080
23	$J/\psi \rightarrow \pi^+\Lambda\bar{\Sigma}^{*-}, \Lambda \rightarrow \pi^-p, \bar{\Sigma}^{*-} \rightarrow \pi^-\bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+\bar{p}$	$\pi^+\pi^+\pi^-\pi^-\bar{p}\bar{p}$	12	743	226823

Background Analysis

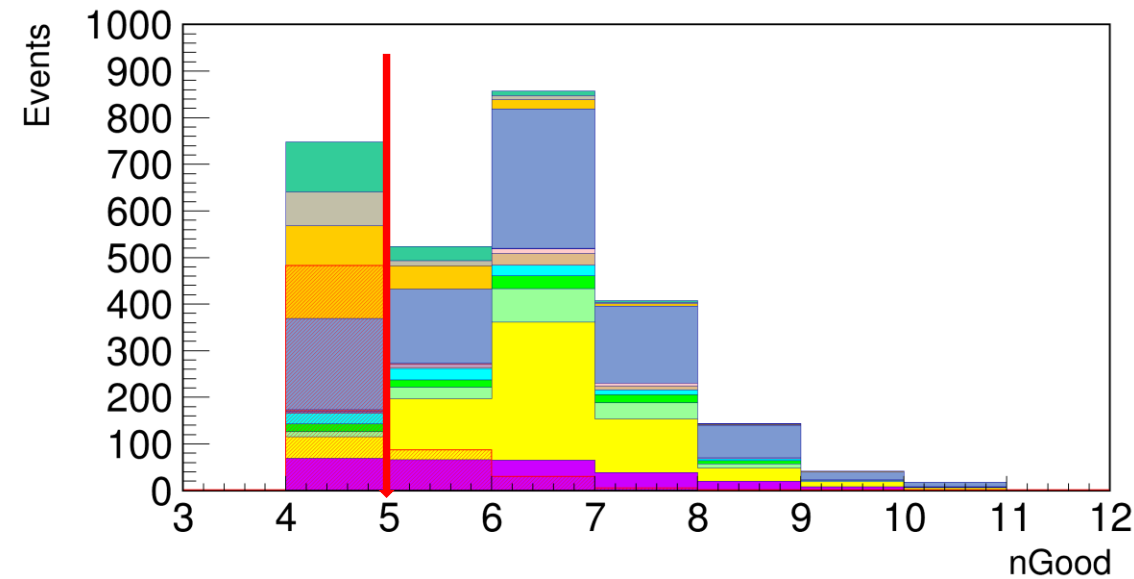


24	$J/\psi \rightarrow \pi^0 \Delta^{++} \bar{\Delta}^{++}, \Delta^{++} \rightarrow \pi^+ p, \bar{\Delta}^{++} \rightarrow \pi^- \bar{p}$	$\pi^0 \pi^+ \pi^- p \bar{p}$	53	743	227566
25	$J/\psi \rightarrow \Xi^0 \Xi^{*0}, \Xi^0 \rightarrow \pi^0 \bar{\Lambda}, \Xi^{*0} \rightarrow \pi^+ \Xi^-, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Xi^- \rightarrow \pi^- \Lambda, \Lambda \rightarrow \pi^- p$	$\pi^0 \pi^+ \pi^+ \pi^- \pi^- p \bar{p}$	72	729	228295
26	$J/\psi \rightarrow K_S^0 n \bar{\Lambda}, K_S^0 \rightarrow \pi^+ \pi^-, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^+ \pi^- n \bar{p}$	10	721	229016
27	$J/\psi \rightarrow \Sigma^- \bar{\Sigma}^{*+}, \Sigma^- \rightarrow \pi^- n, \bar{\Sigma}^{*+} \rightarrow \pi^+ \bar{\Sigma}^0, \bar{\Sigma}^0 \rightarrow \bar{\Lambda} \gamma, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^+ \pi^- n \bar{p} \gamma$	26	714	229730
28	$J/\psi \rightarrow \bar{\Sigma}^{*+} \Sigma^{*-}, \bar{\Sigma}^{*+} \rightarrow \pi^+ \bar{\Lambda}, \Sigma^{*-} \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^0 n$	$\pi^0 \pi^+ \pi^+ \pi^- n \bar{p}$	29	661	230391
29	$J/\psi \rightarrow \pi^- \bar{\Lambda} \Sigma^+, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Sigma^+ \rightarrow \pi^+ n$	$\pi^+ \pi^+ \pi^- n \bar{p}$	46	635	231026
30	$J/\psi \rightarrow \Xi^- \bar{\Xi}^{*+}, \Xi^- \rightarrow \pi^- \Lambda, \bar{\Xi}^{*+} \rightarrow \pi^+ \bar{\Xi}^0, \Lambda \rightarrow \pi^0 n, \bar{\Xi}^0 \rightarrow \pi^0 \bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^0 \pi^0 \pi^+ \pi^+ \pi^- n \bar{p}$	30	626	231652
31	$J/\psi \rightarrow \Sigma^{*0} \bar{\Sigma}^{*0}, \Sigma^{*0} \rightarrow \pi^+ \Sigma^-, \bar{\Sigma}^{*0} \rightarrow \pi^0 \bar{\Lambda}, \Sigma^- \rightarrow \pi^- n, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^0 \pi^+ \pi^+ \pi^- n \bar{p}$	39	596	232248
32	$J/\psi \rightarrow \Xi^0 \bar{\Xi}^0, \Xi^0 \rightarrow \pi^0 \Lambda, \bar{\Xi}^0 \rightarrow \pi^0 \bar{\Lambda}, \Lambda \rightarrow \pi^- p, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^0 \pi^0 \pi^+ \pi^- p \bar{p}$	42	531	232779
33	$J/\psi \rightarrow \bar{\Sigma}^{*+} \Sigma^{*-}, \bar{\Sigma}^{*+} \rightarrow \pi^+ \bar{\Sigma}^0, \Sigma^{*-} \rightarrow \pi^- \Lambda, \bar{\Sigma}^0 \rightarrow \bar{\Lambda} \gamma, \Lambda \rightarrow \pi^- p, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p} \gamma$	77	510	233289
34	$J/\psi \rightarrow \pi^+ \Sigma^{*-} \bar{\Lambda}, \Sigma^{*-} \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^0 n$	$\pi^0 \pi^+ \pi^+ \pi^- n \bar{p}$	22	503	233792
35	$J/\psi \rightarrow \bar{\Xi}^+ \Xi^-, \bar{\Xi}^+ \rightarrow \pi^+ \bar{\Lambda}, \Xi^- \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^0 n, \pi^0 \rightarrow e^+ e^- \gamma^F$	$e^+ e^- \pi^+ \pi^+ \pi^- n \bar{p} \gamma^F$	66	456	234248
36	$J/\psi \rightarrow \pi^+ \Lambda \bar{\Sigma}^{*-}, \Lambda \rightarrow \pi^0 n, \bar{\Sigma}^{*-} \rightarrow \pi^- \bar{\Lambda}, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^0 \pi^+ \pi^+ \pi^- n \bar{p}$	94	439	234687
37	$J/\psi \rightarrow K^{*-} p \bar{\Lambda}, K^{*-} \rightarrow \pi^- \bar{K}^0, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \bar{K}^0 \rightarrow K_S^0, K_S^0 \rightarrow \pi^+ \pi^-$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p}$	117	426	235113
38	$J/\psi \rightarrow \pi^- \bar{\Xi}^+ \Xi^0, \bar{\Xi}^+ \rightarrow \pi^+ \bar{\Lambda}, \Xi^0 \rightarrow \pi^0 \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^- p$	$\pi^0 \pi^+ \pi^+ \pi^- \pi^- p \bar{p}$	48	398	235511
39	$J/\psi \rightarrow \pi^- \bar{\Sigma}^{*+} \Lambda, \bar{\Sigma}^{*+} \rightarrow \pi^+ \bar{\Sigma}^0, \Lambda \rightarrow \pi^- p, \bar{\Sigma}^0 \rightarrow \bar{\Lambda} \gamma, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p} \gamma$	82	395	235906
40	$J/\psi \rightarrow \pi^- \bar{\Sigma}^{*+} \Lambda, \bar{\Sigma}^{*+} \rightarrow \pi^+ \bar{\Lambda}, \Lambda \rightarrow \pi^- p, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p}$	51	356	236262
41	$J/\psi \rightarrow \bar{\Xi}^+ \Xi^- \gamma, \bar{\Xi}^+ \rightarrow \pi^+ \bar{\Lambda}, \Xi^- \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^- p$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p} \gamma$	55	353	236615
42	$J/\psi \rightarrow \pi^0 \pi^+ \pi^- p \bar{p}$	$\pi^0 \pi^+ \pi^- p \bar{p}$	59	348	236963
43	$J/\psi \rightarrow \bar{\Xi}^0 \Xi^{*0}, \bar{\Xi}^0 \rightarrow \pi^0 \bar{\Lambda}, \Xi^{*0} \rightarrow \pi^+ \Xi^-, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Xi^- \rightarrow \pi^- \Lambda, \Lambda \rightarrow \pi^0 n$	$\pi^0 \pi^0 \pi^+ \pi^+ \pi^- n \bar{p}$	60	347	237310
44	$J/\psi \rightarrow \bar{\Xi}^+ \Xi^- \gamma^f, \bar{\Xi}^+ \rightarrow \pi^+ \bar{\Lambda}, \Xi^- \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^- p$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p} \gamma^f$	105	314	237624
45	$J/\psi \rightarrow \Sigma^{*0} \bar{\Sigma}^{*0}, \Sigma^{*0} \rightarrow \pi^0 \Lambda, \bar{\Sigma}^{*0} \rightarrow \pi^0 \bar{\Lambda}, \Lambda \rightarrow \pi^- p, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^0 \pi^0 \pi^+ \pi^- p \bar{p}$	110	302	237926
46	$J/\psi \rightarrow \bar{K}^* n \bar{\Lambda}, \bar{K}^* \rightarrow \pi^+ K^-, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^+ K^- n \bar{p}$	96	291	238217
47	$J/\psi \rightarrow \bar{\Sigma}^{*+} \Sigma^{*-}, \bar{\Sigma}^{*+} \rightarrow \pi^+ \bar{\Sigma}^0, \Sigma^{*-} \rightarrow \pi^- \Lambda, \bar{\Sigma}^0 \rightarrow \bar{\Lambda} \gamma, \Lambda \rightarrow \pi^0 n, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^0 \pi^+ \pi^+ \pi^- n \bar{p} \gamma$	101	271	238488
48	$J/\psi \rightarrow \pi^0 \bar{\Xi}^+ \Xi^-, \bar{\Xi}^+ \rightarrow \pi^+ \bar{\Lambda}, \Xi^- \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^- p$	$\pi^0 \pi^+ \pi^+ \pi^- \pi^- p \bar{p}$	63	269	238757
49	$J/\psi \rightarrow \bar{\Xi}^+ \Xi^-, \bar{\Xi}^+ \rightarrow \pi^+ \bar{\Lambda}, \Xi^- \rightarrow \pi^- \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow n \gamma$	$\pi^+ \pi^+ \pi^- n \bar{p} \gamma$	100	266	239023
50	$J/\psi \rightarrow \Sigma^0 \bar{\Sigma}^0, \Sigma^0 \rightarrow \Lambda \gamma, \bar{\Sigma}^0 \rightarrow \bar{\Lambda} \gamma, \Lambda \rightarrow \pi^- p, \bar{\Lambda} \rightarrow \pi^+ \bar{p}$	$\pi^+ \pi^- p \bar{p} \gamma \gamma$	45	242	239265
51	$J/\psi \rightarrow \pi^- \bar{\Sigma}^0 \Sigma^{*+}, \bar{\Sigma}^0 \rightarrow \bar{\Lambda} \gamma, \Sigma^{*+} \rightarrow \pi^+ \Lambda, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Lambda \rightarrow \pi^- p$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p} \gamma$	18	240	239505
52	$J/\psi \rightarrow \pi^- \bar{\Lambda} \Sigma^{*+}, \bar{\Lambda} \rightarrow \pi^+ \bar{p}, \Sigma^{*+} \rightarrow \pi^+ \Sigma^0, \Sigma^0 \rightarrow \Lambda \gamma, \Lambda \rightarrow \pi^- p$	$\pi^+ \pi^+ \pi^- \pi^- p \bar{p} \gamma$	153	235	239740

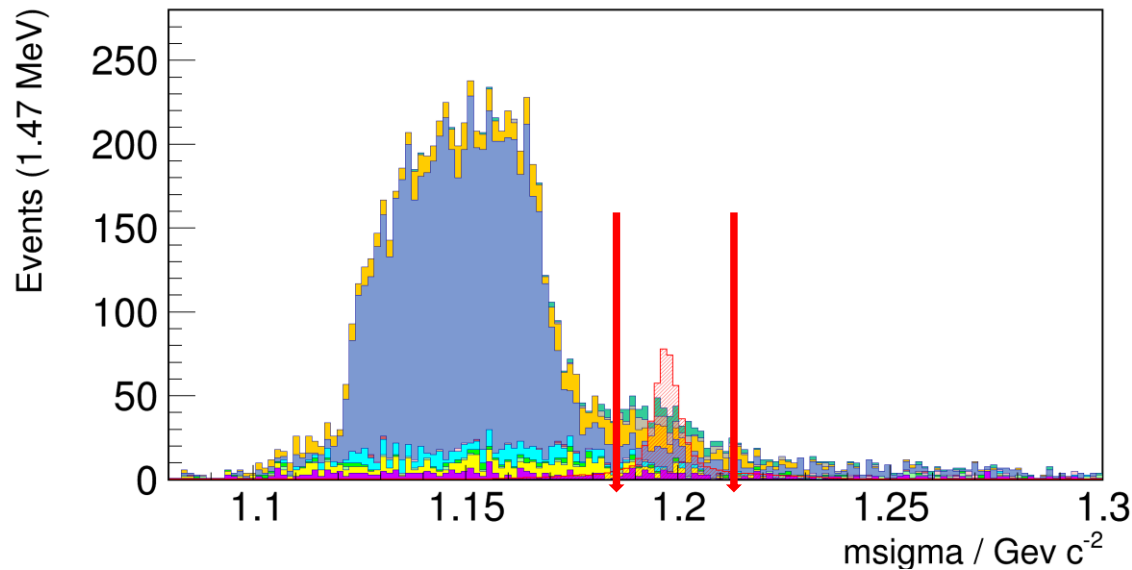
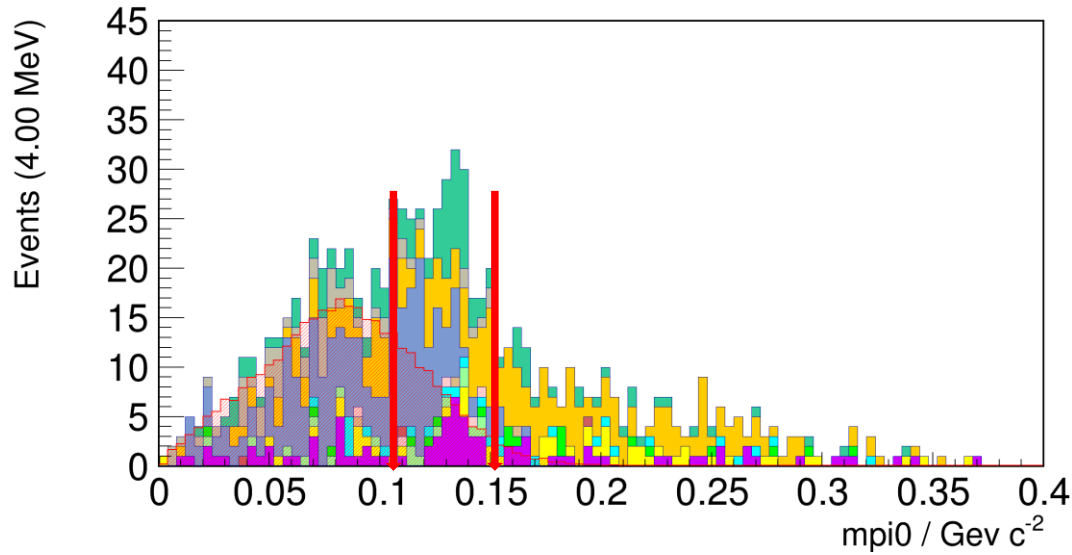
Background Analysis



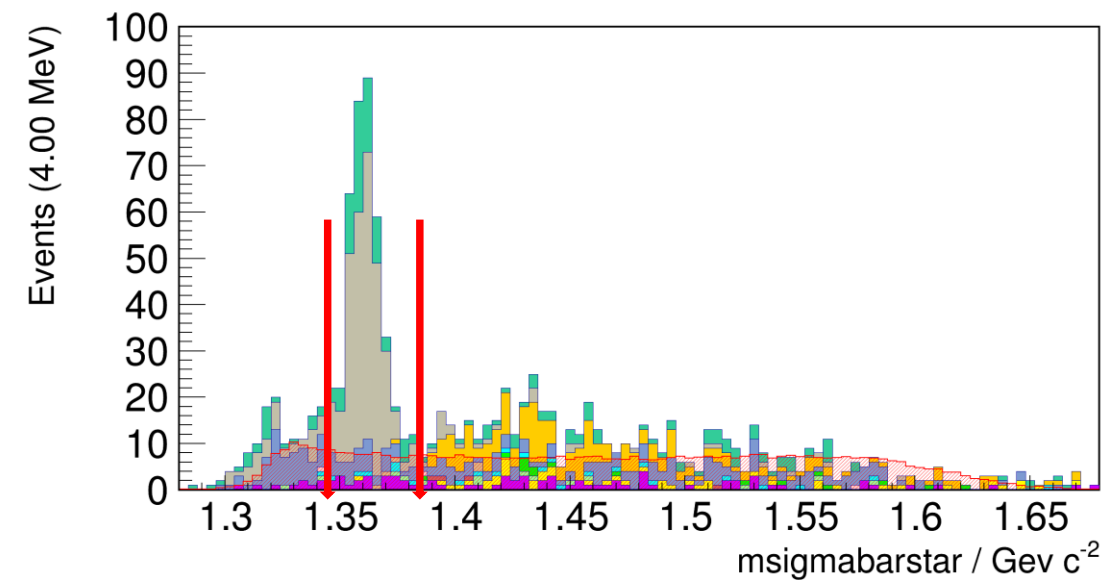
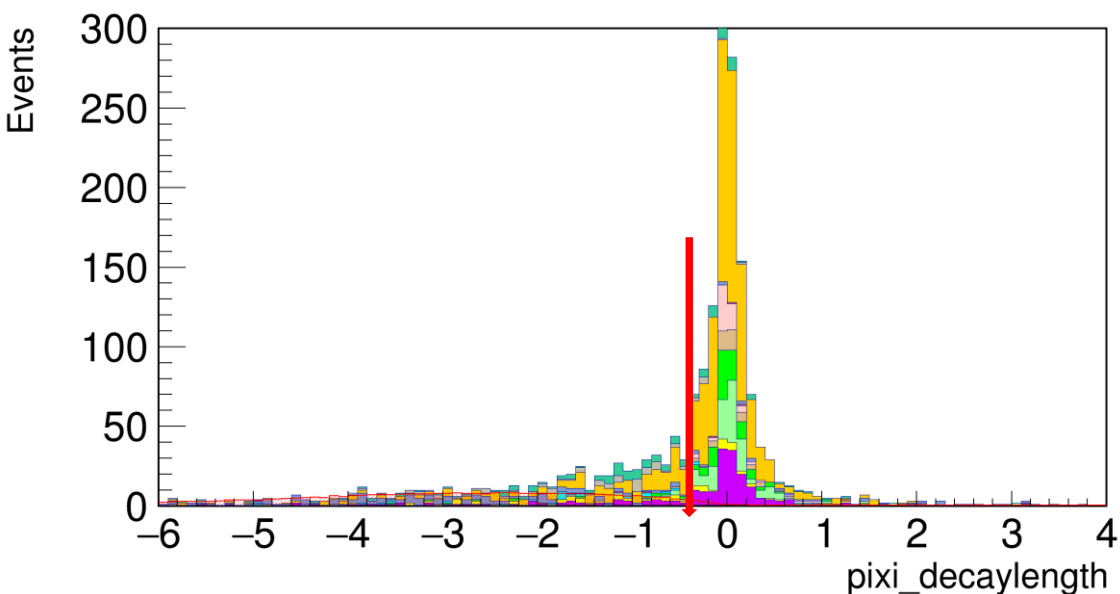
Signal MC scale(0.01)



Background Analysis



Background Analysis





All cut

- $\chi^2 > 30$
- $nGood > 4$
- $0.116\text{Gev} < m_{\pi^0} < 0.148\text{Gev}$
- $m_{\Sigma^-} < 1.185\text{Gev}$ or $m_{\Sigma^-} > 1.22\text{Gev}$
- DecayLength of vertex fit $\pi^+ \bar{\Xi}^+ > -0.5$
- $1.342\text{Gev} < m_{\bar{\Sigma}^{*+}} < 1.38\text{Gev}$



Thanks



	Signal MC
	Others
	$\bar{\Xi}^+ \Xi^{*-}$
	$\pi^+ \pi^- \Lambda^+ \Lambda^-$
	$\Xi^0 \bar{\Xi}^{*0}$
	$\eta_c \gamma$
	$\pi^- \Lambda \Sigma^{*+}$
	$\Sigma^{*+} \bar{\Sigma}^-$
	$\Lambda \bar{\Lambda} \gamma$
	$\bar{\Xi}^+ \Xi^-$, $\Xi^- \rightarrow \Lambda \pi^-$
	$\bar{\Xi}^+ \Xi^{*-} \rightarrow \Lambda \bar{\Lambda} \pi^0 \pi^+ \pi^-$
	$\Sigma^- \Sigma^{*+}$
	some $\Sigma^- \rightarrow n \pi^-$