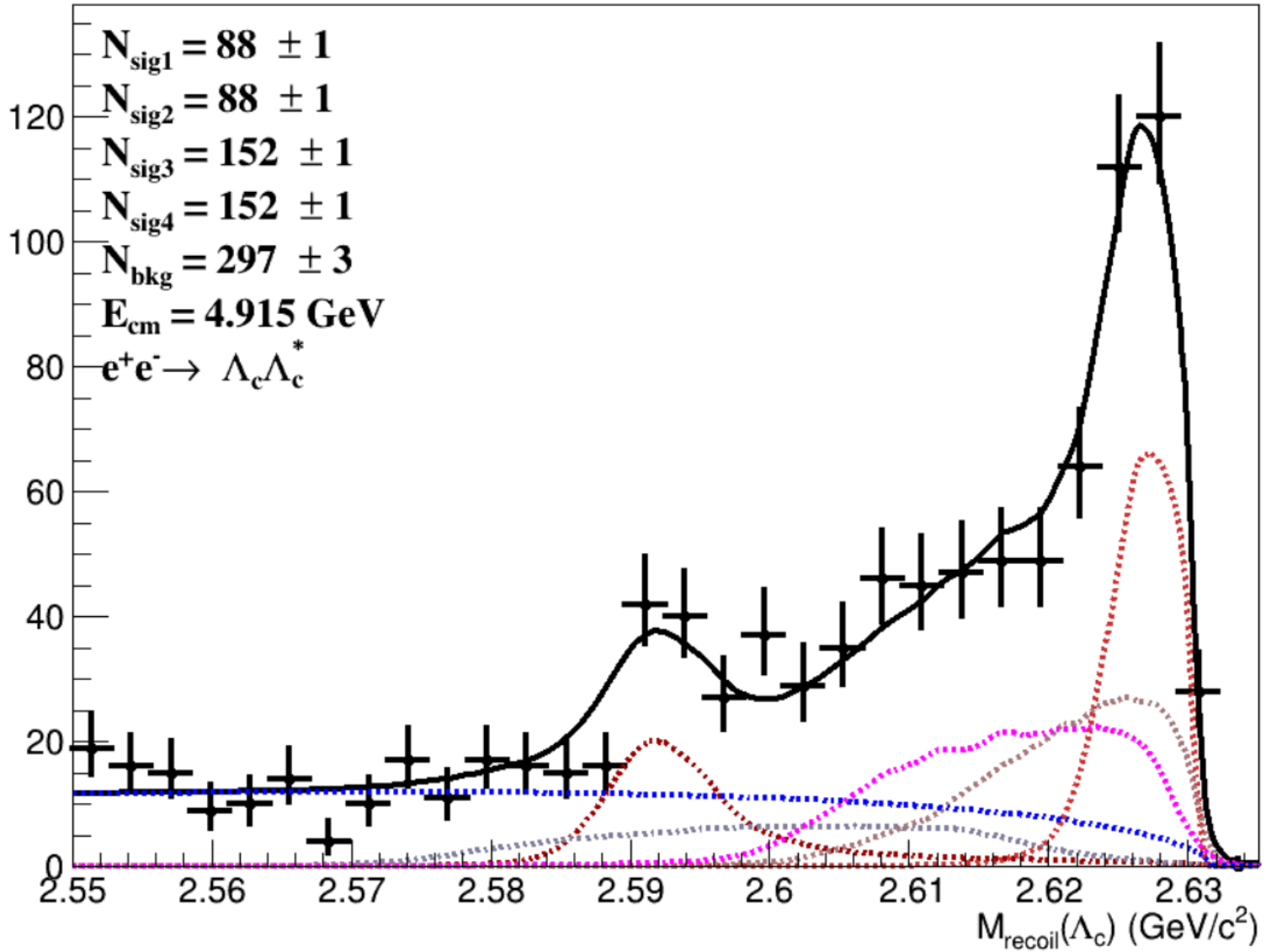
Tag Lc by PKPI channel
Yield of ScSc: 181



Formula:

$$N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = N_{\Sigma_c\bar{\Sigma}_c}^{ST} \bullet Br_i \bullet \varepsilon_i^{ST}$$

$$\sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = N_{\Sigma_c\bar{\Sigma}_c}^{ST} \bullet \sum Br_i\varepsilon_i^{ST}$$

$$N_{\Sigma_c\bar{\Sigma}_c}^{ST,1} \Big/ \sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = Br_1\, \varepsilon_1^{ST} \Big/ \sum Br_i\varepsilon_i^{ST}$$

$$\sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = N_{\Sigma_c\bar{\Sigma}_c}^{ST,1} \bullet \sum Br_i\varepsilon_i^{ST} / B\, r_1\varepsilon_1^{ST}$$

$$N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = Br_i\varepsilon_i^{ST} \bullet \sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} \Big/ \sum Br_i\varepsilon_i^{ST}$$

$e^+e^- \to \Sigma_c^0 \bar{\Sigma}_c^0$

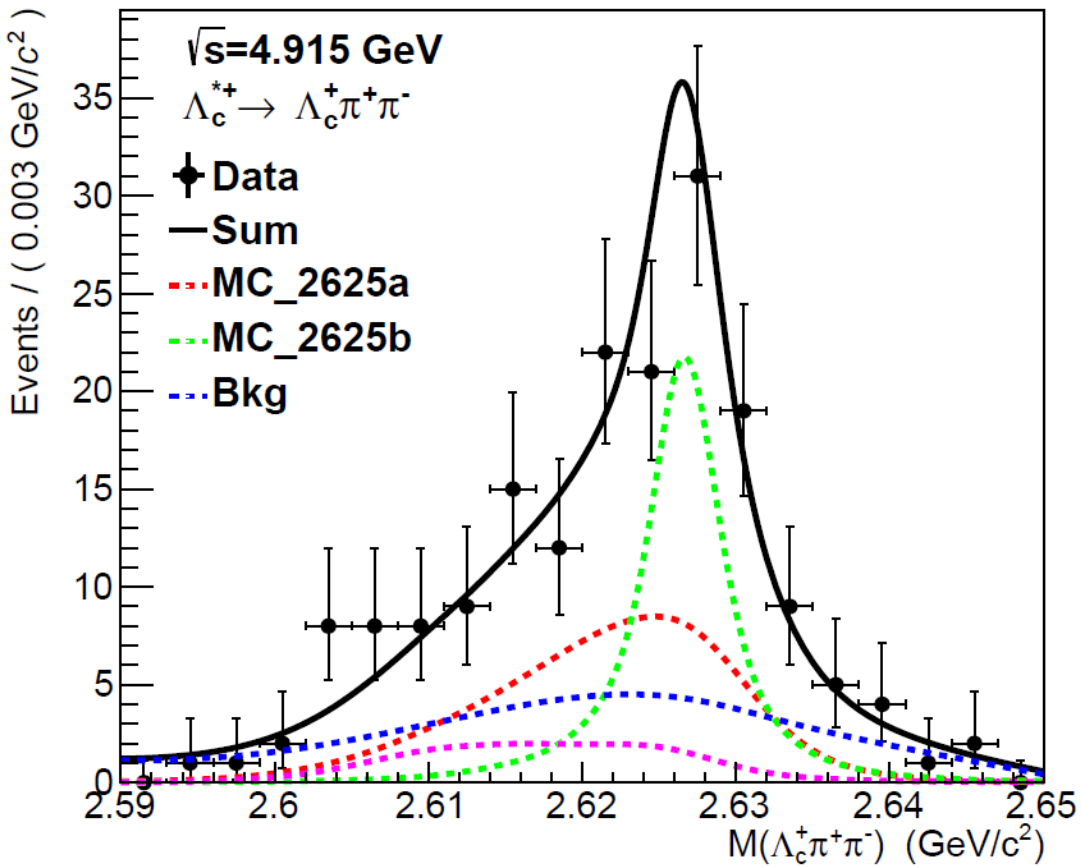
$$N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = Br_i\varepsilon_i^{ST} \bullet \sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} / \sum Br_i\varepsilon_i^{ST}\ ,\ N_{\Sigma_c\bar{\Sigma}_c}^{DT,i} = N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} \bullet \varepsilon_i^{DT}/2$$

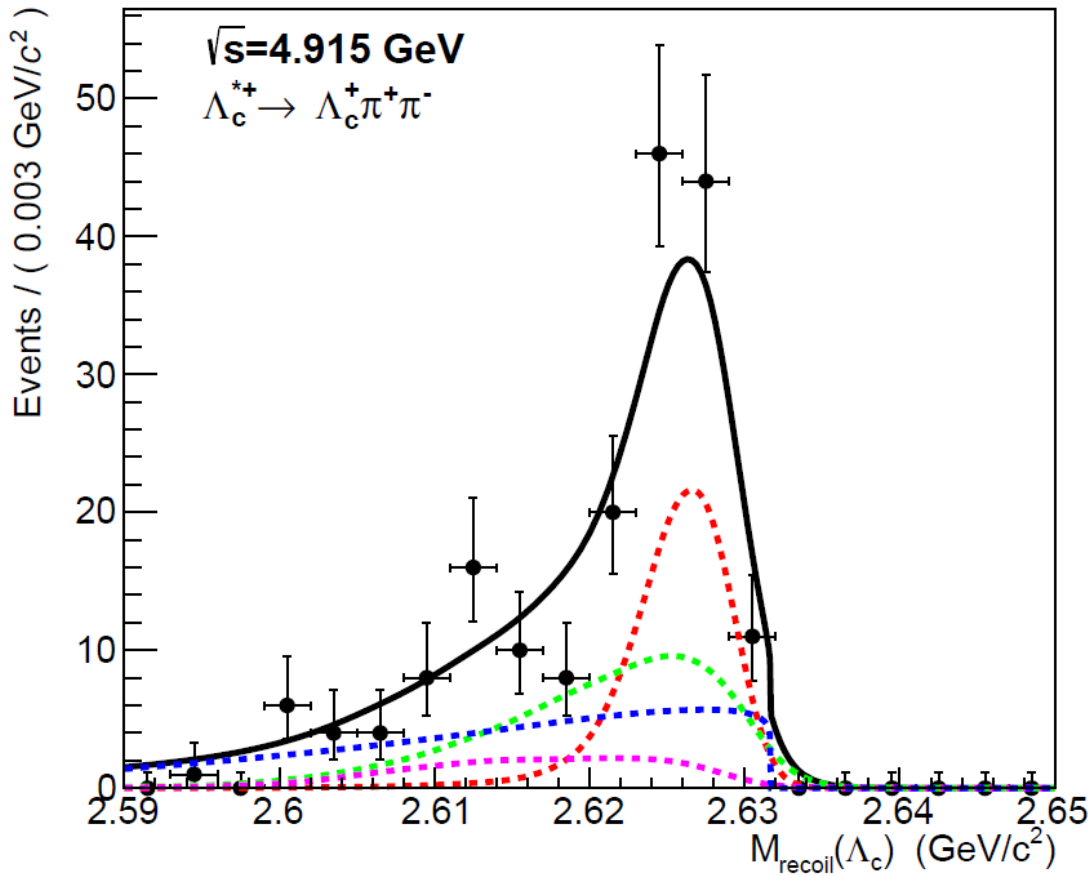
Mode	$\sum Br_i\varepsilon_i^{ST}$	$\sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i}$	$N_{\Sigma_c\bar{\Sigma}_c}^{ST,i}$	ε_i^{DT}	DT Yield
$\Lambda_c^+ \to pK^-\pi^+$	0.087553	166.3454	61	0.445221	13.57925
$\Lambda_c^+ \to pK_S$	0.087553	166.3454	10.76196	0.304821	1.640236
$\Lambda_c^+ \to \Lambda\pi^+$	0.087553	166.3454	5.74236	0.427273	1.226777
$\Lambda_c^+ \to pK^-\pi^+\pi^0$	0.087553	166.3454	33.32958	0.242698	4.044508
$\Lambda_c^+ \to pK_S\pi^0$	0.087553	166.3454	6.057038	0.272727	0.82596
$\Lambda_c^+ \to \Lambda\pi^+\pi^0$	0.087553	166.3454	14.20613	0.370647	2.632728
$\Lambda_c^+ \to pK_S\pi^+\pi^-$	0.087553	166.3454	6.545766	0.320548	1.049116
$\Lambda_c^+ \to \Lambda\pi^+\pi^+\pi^-$	0.087553	166.3454	10.26734	0.26297	1.349999
$\Lambda_c^+ \to \Sigma^0\pi^+$	0.087553	166.3454	4.905331	0.407273	0.998904
$\Lambda_c^+ \to \Sigma^+\pi^+\pi^-$	0.087553	166.3454	13.52986	0.369624	2.500478
				$\sum N_{\Sigma_c\bar{\Sigma}_c}^{DT,i}$	29.84796

$$e^+e^- \to \Sigma_c^{++}\bar{\Sigma}_c^{--}$$

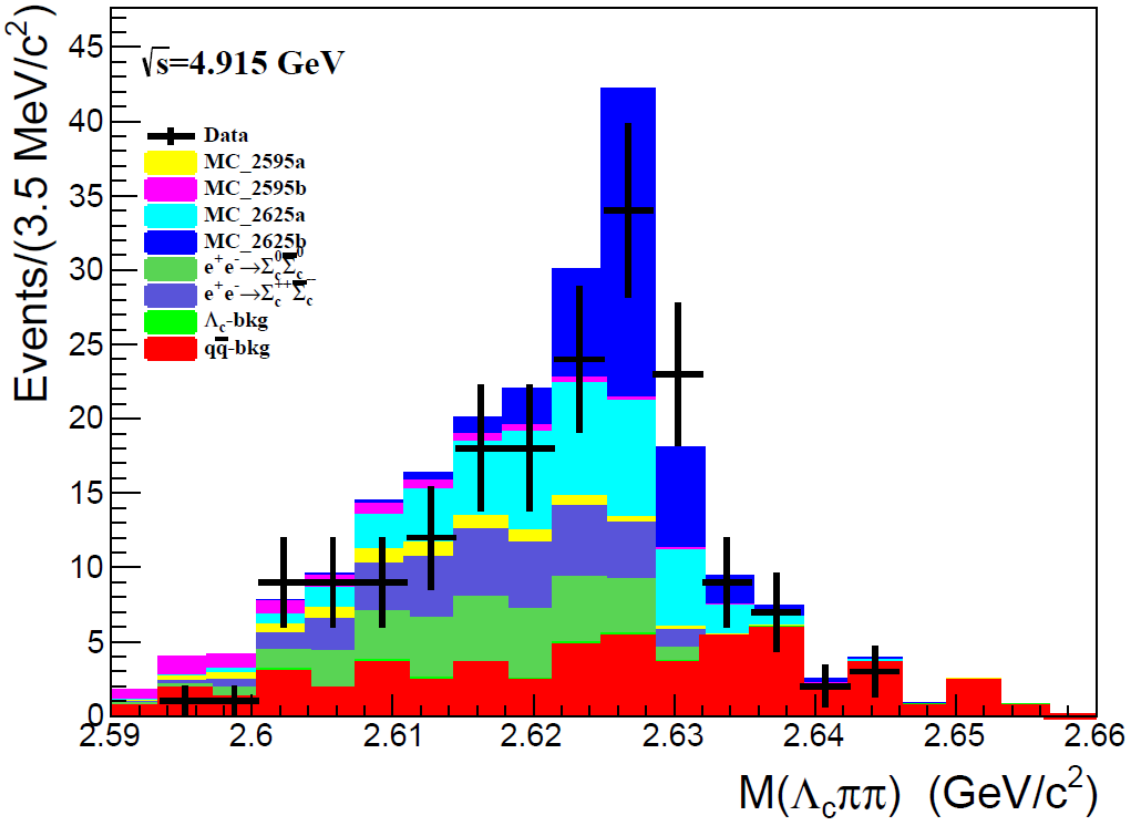
$$N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} = Br_i\varepsilon_i^{ST} \bullet \sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} / \sum Br_i\varepsilon_i^{ST}\ ,\ N_{\Sigma_c\bar{\Sigma}_c}^{DT,i} = N_{\Sigma_c\bar{\Sigma}_c}^{ST,i} \bullet \varepsilon_i^{DT}/2$$

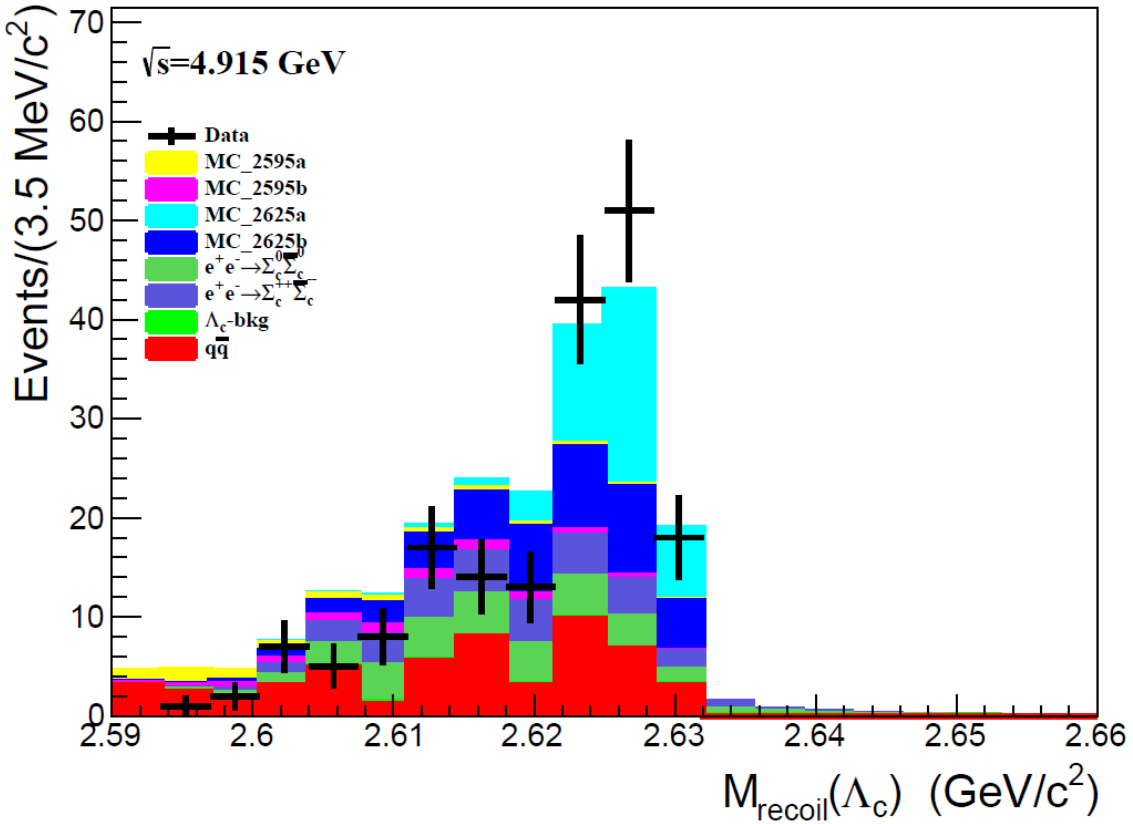
Mode	$\sum Br_i\varepsilon_i^{ST}$	$\sum N_{\Sigma_c\bar{\Sigma}_c}^{ST,i}$	$N_{\Sigma_c\bar{\Sigma}_c}^{ST,i}$	ε_i^{DT}	DT Yield
$\Lambda_c^+ \to pK^-\pi^+$	0.087475	166.6395	61	0.426388	13.00485
$\Lambda_c^+ \to pK_S$	0.087475	166.6395	10.72349	0.317684	1.70334
$\Lambda_c^+ \to \Lambda\pi^+$	0.087475	166.6395	5.934306	0.444444	1.318735
$\Lambda_c^+ \to pK^-\pi^+\pi^0$	0.087475	166.6395	31.9189	0.259912	4.148051
$\Lambda_c^+ \to pK_S\pi^0$	0.087475	166.6395	5.925165	0.316568	0.937859
$\Lambda_c^+ \to \Lambda\pi^+\pi^0$	0.087475	166.6395	15.42362	0.394118	3.039361
$\Lambda_c^+ \to pK_S\pi^+\pi^-$	0.087475	166.6395	6.229283	0.266082	0.82875
$\Lambda_c^+ \to \Lambda\pi^+\pi^+\pi^-$	0.087475	166.6395	9.995987	0.314545	1.572096
$\Lambda_c^+ \to \Sigma^0\pi^+$	0.087475	166.6395	5.048704	0.41637	1.051065
$\Lambda_c^+ \to \Sigma^+\pi^+\pi^-$	0.087475	166.6395	14.44003	0.336306	2.428133
				$\sum N_{\Sigma_c\bar{\Sigma}_c}^{DT,i}$	30.03224


√s=4.915 GeV
$\Lambda_c^{*+} \to \Lambda_c^+ \pi^+ \pi^-$
Data
Sum
MC_2625a
MC_2625b
Bkg
Events / (0.003 GeV/c²)
M($\Lambda_c^+ \pi^+ \pi^-$) (GeV/c²)

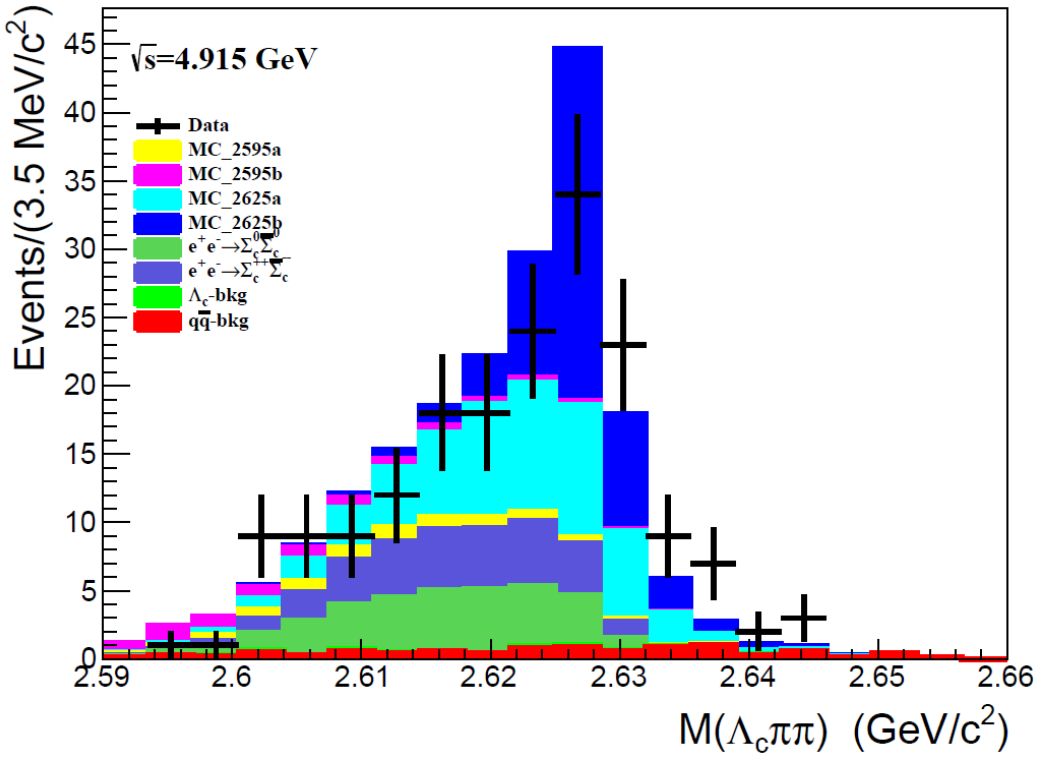

√s=4.915 GeV
$\Lambda_c^{*+} \to \Lambda_c^+ \pi^+ \pi^-$
Events / (0.003 GeV/c²)
$M_{recoil}(\Lambda_c)$ (GeV/c²)

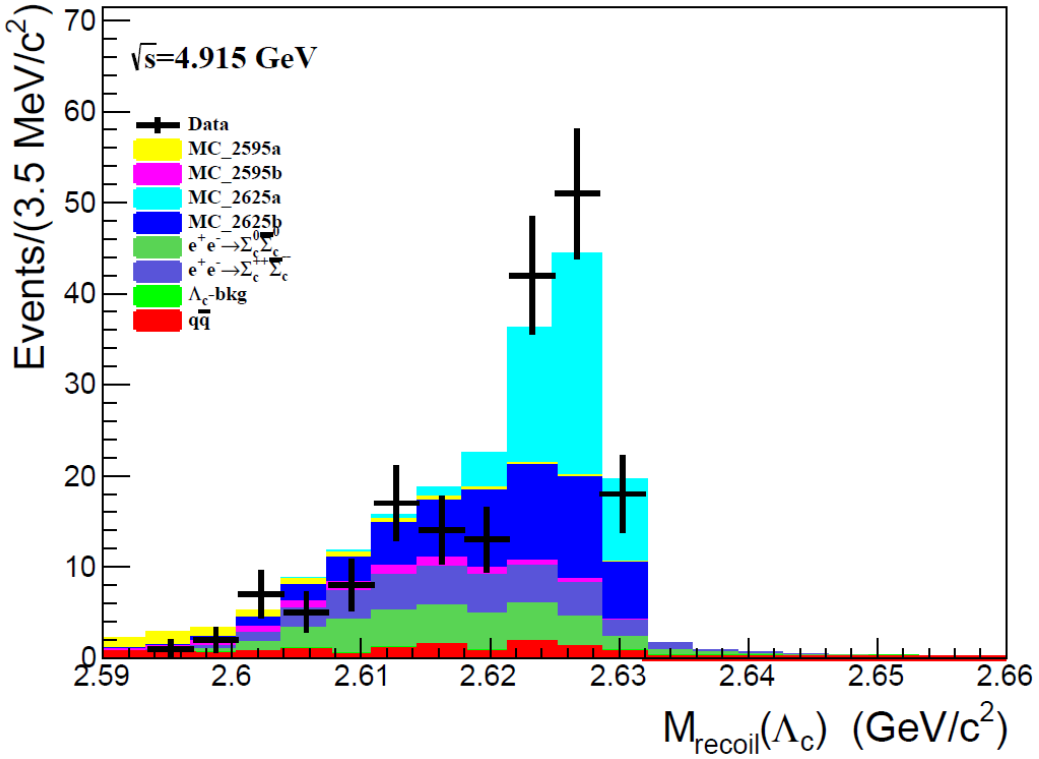
$q\bar{q}$ scaled by the sideband events
Branching Fractions for Lc(2625) scaling: 41%





$q\bar{q}$ scaled by the hadron MC
Branching Fractions for Lc(2625) scaling: 51%





Consistency check between sideband and signal region of hadron MC

- The events in the sideband region can't describe the background distribution in signal region!

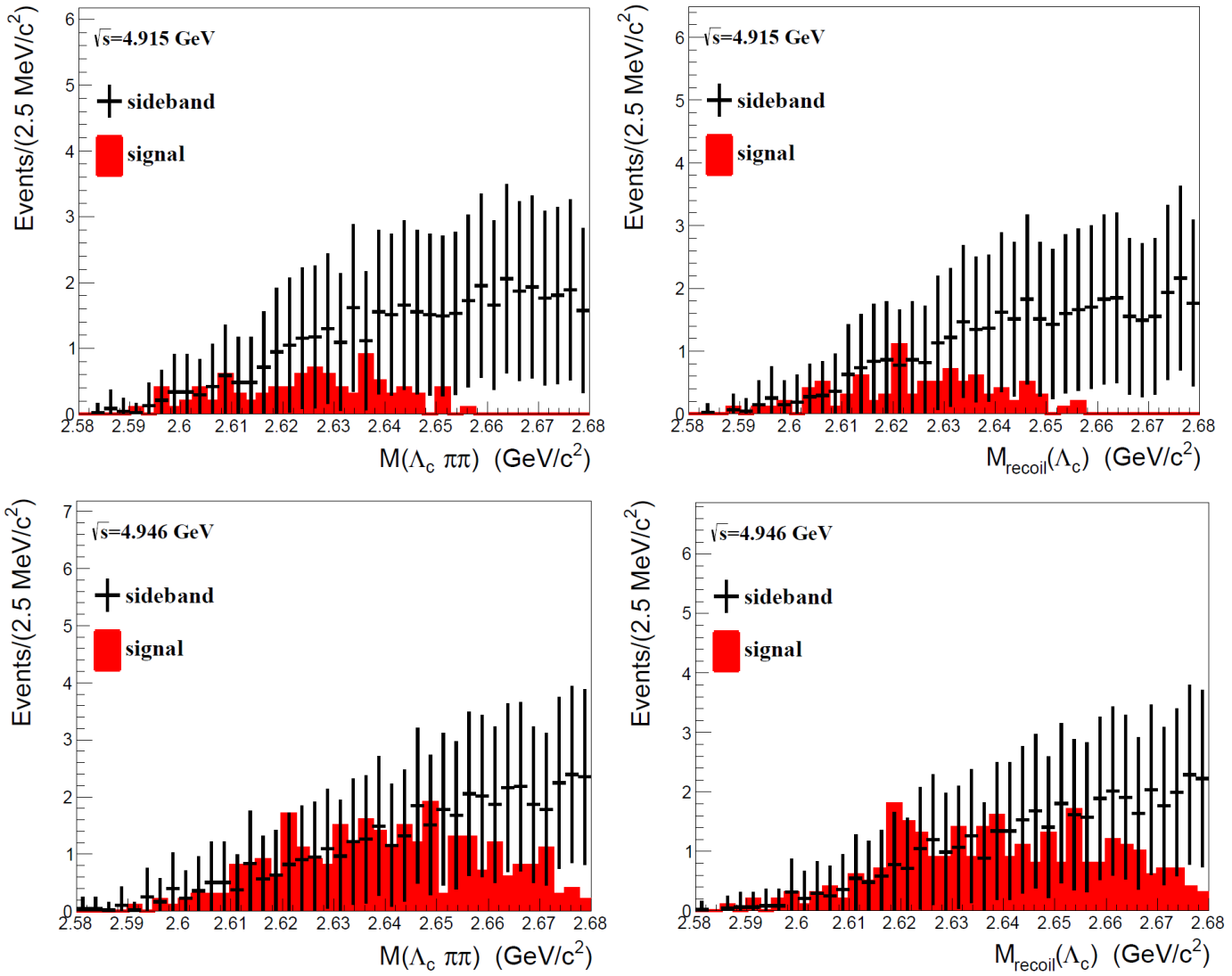


Figure: Comparison of the hadron MC sideband and signal region.

Consistency check between data sideband and inclusive hadron MC

- The shape of hadron MC looks consistent with data within the uncertainty.

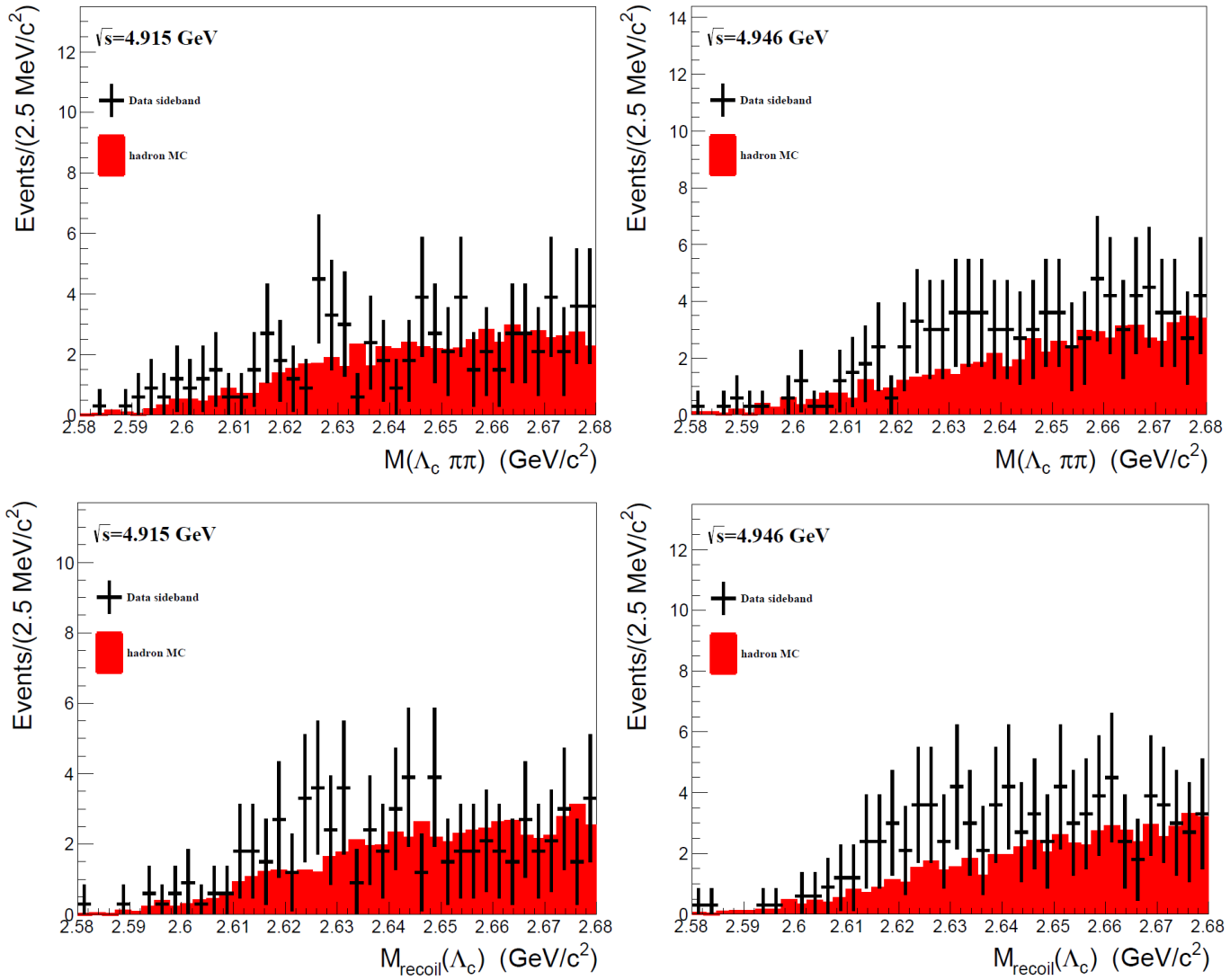
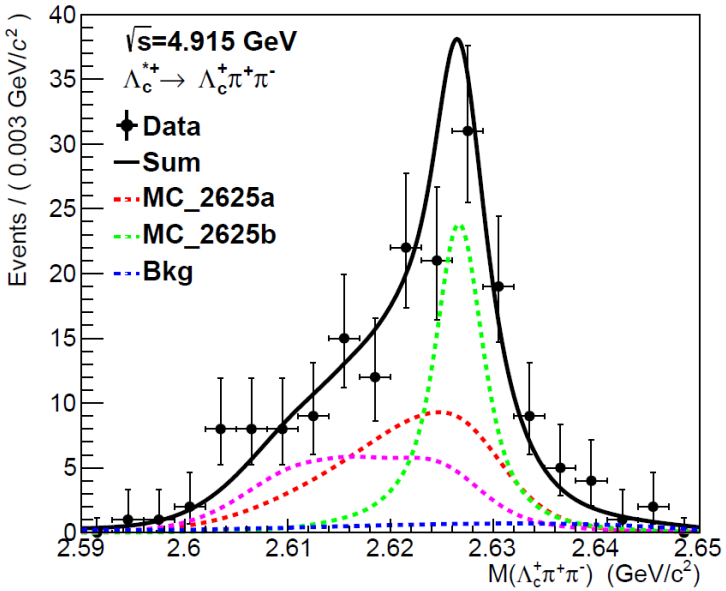
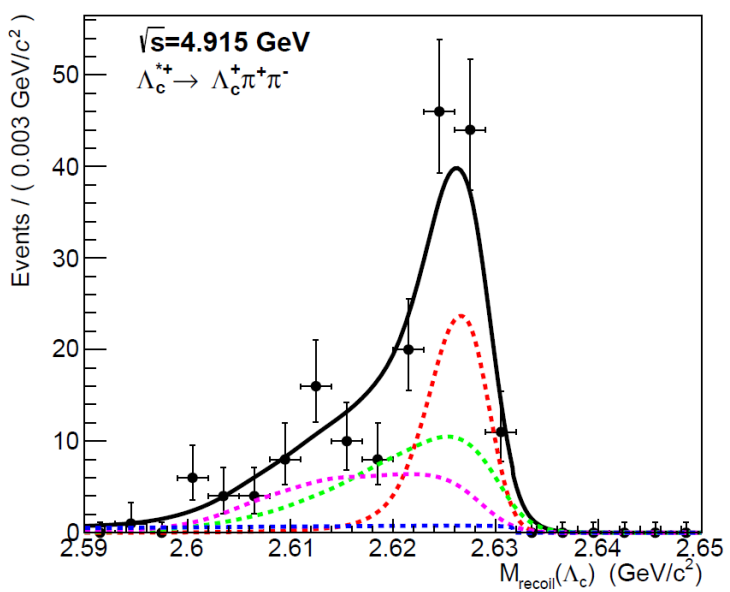


Figure: Comparison of the hadron MC sideband and the Data sideband.

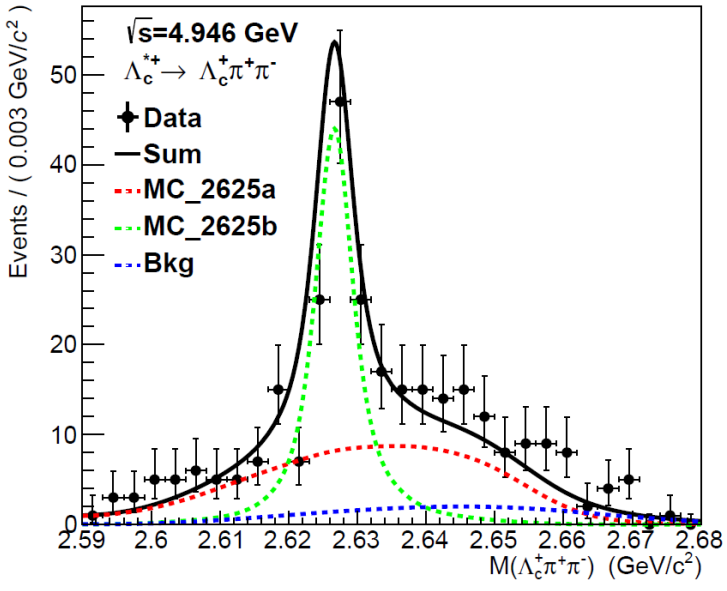


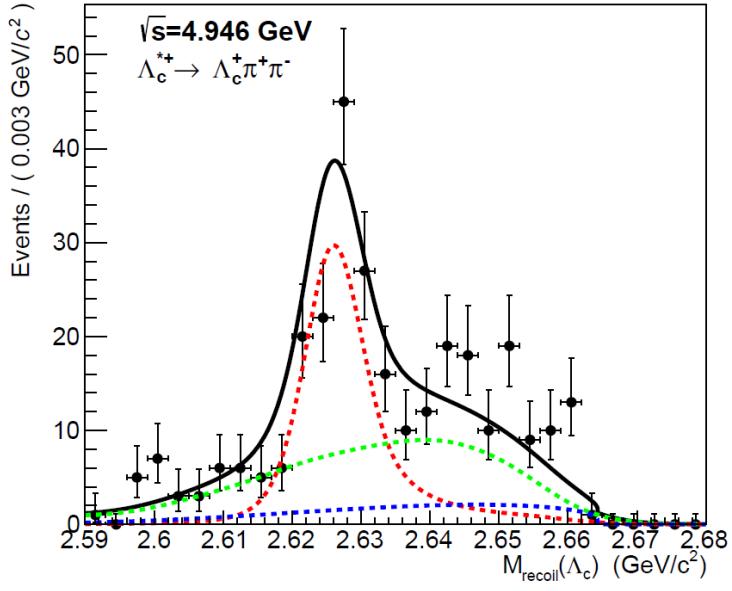


4915					
L	sigma	fVP	fISR	sum(br*effi)	
208.11	40.6	1.055	0.5594	0.021502623	214.4447
					119
					55.49%

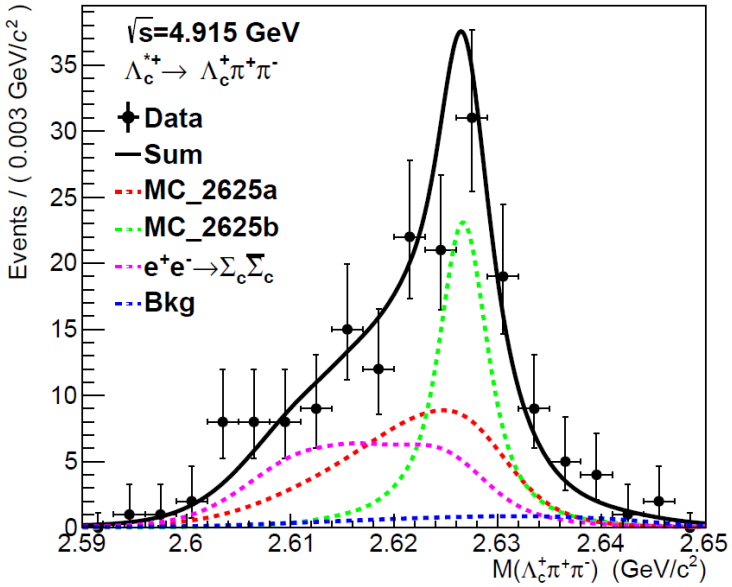
FCN=-1973.8 FROM HESSE STATUS=OK 25 CALLS 215 TOTAL
EDM=1.92962e-05 STRATEGY= 1 ERROR MATRIX ACCURATE

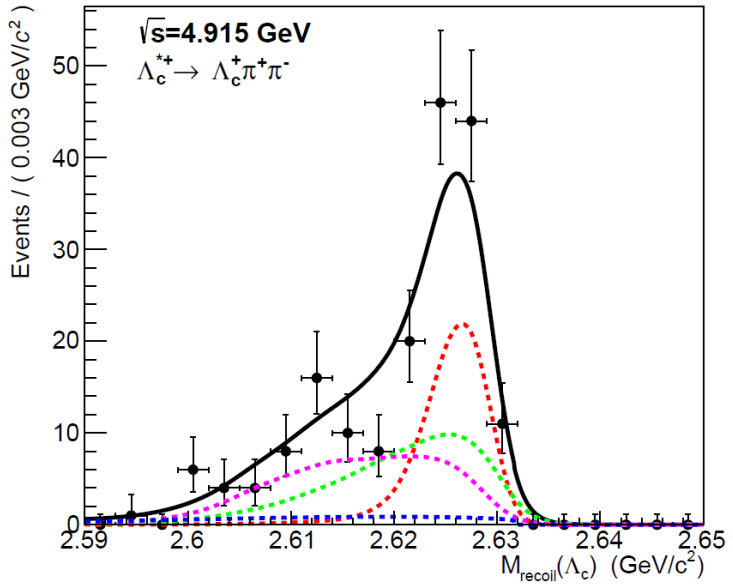
EXT PARAMETER NO.	NAME	VALUE	ERROR	INTERNAL STEP SIZE	INTERNAL VALUE
1	g1	7.18168e-01	8.07361e-01	5.00000e-01	-2.85703e-01
2	m	4.99916e-01	2.27078e-01	8.99546e-03	1.58917e+00
3	nbkg_Sc	4.81749e+01	1.15875e+01	7.00537e-04	-5.81076e-01
4	nsig3_pkpi	2.55397e+01	3.04399e+00	2.35112e-04	-8.64643e-01

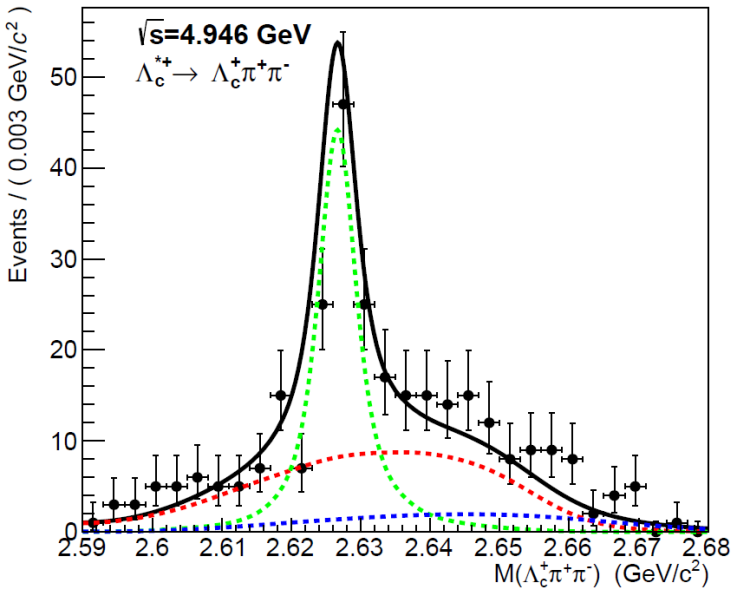


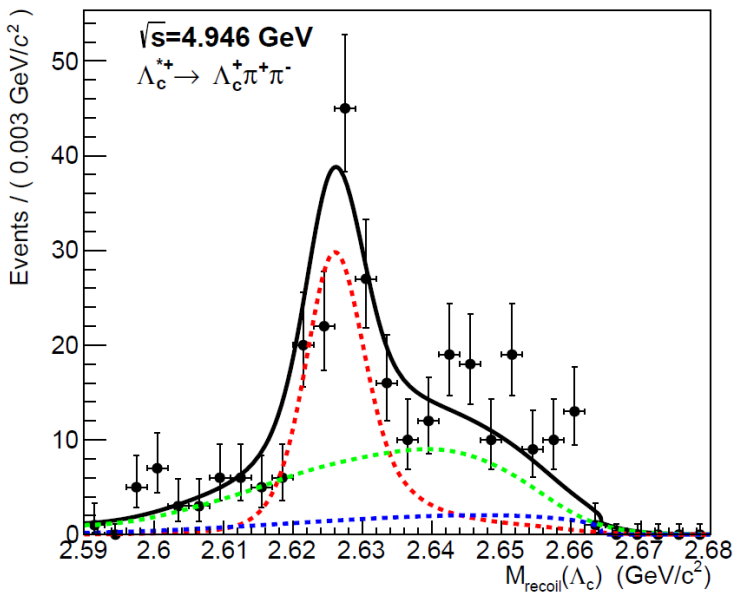


4946					
L	sigma	fVP	fISR	sum(br*effi)	
160.37	87.75	1.055	0.7163	0.022229502	472.7999
					243
					51.40%







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COVARIANCE MATRIX CALCULATED SUCCESSFULLY
FCN=-4655.24 FROM HESSE     STATUS=OK              40 CALLS         350 TOTAL
                     EDM=8.37416e-05    STRATEGY= 1      ERROR MATRIX ACCURATE
 EXT PARAMETER                                   INTERNAL      INTERNAL
 NO.   NAME      VALUE            ERROR          STEP SIZE       VALUE
  1  Br_2625      5.20930e-01   3.07445e-02   5.56567e-04   4.18713e-02
  2  g1           3.81574e-02   8.36324e-02   5.22107e-04  -1.29366e+00
  3  gg1          1.36269e-02   3.40208e-03   1.59129e-04  -1.40552e+00
  4  m            1.47247e-02   4.69519e-03   1.71226e-05   2.94536e-02
  5  mm           6.33969e-05   4.09498e-03   6.29595e-05   1.26794e-04
  6  nbkg_Sc      5.08744e+01   1.07771e+01   1.07335e-03  -5.51127e-01
```