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Lambda-Kaon and Cascade-Kaon Femtoscopy in Pb-Pb Collisions at $\sqrt{s_{NN}} = 2.76$ TeV from the LHC ALICE Experiment

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Abstract

My abstract will be contained here. The abstract will introduce my study and inform the reader about the content of this paper. I will state the problem I tackle, and summarize (in one sentence) why no one else has yet to adequately answered the research question. Next, I will explain (again, in one sentence) how I tackled the research question, and (in one sentence) how I went about doing the research which followed from this big idea (i.e. elaborate on previous sentence). Finally, as a single sentence, I will state the key impact of my research.

We present results from a femtoscopic analysis of Lambda-Kaon correlations in Pb-Pb collisions at $\sqrt{s_{NN}}$ = 2.76 TeV by the ALICE experiment at the LHC. All pair combinations of Λ and $\bar{\Lambda}$ with K^{+}, K^{-} and K^{0}_{S} are analyzed. The femtoscopic correlations are the result of strong final-state interactions, and are fit with a parametrization based on a model by R. Lednicky and V. L. Lyuboshitz[1]. This allows us to both characterize the emission source and measure the scattering parameters for the particle pairs. We observe a large difference in the Λ-K^{+} ($\bar{\Lambda}$-K^{-}) and Λ-K^{-} ($\bar{\Lambda}$-K^{+}) correlations in pairs with low relative momenta ($k^* \lesssim 100$ MeV). Additionally, the average of the Λ-K^{+} ($\bar{\Lambda}$-K^{-}) and Λ-K^{-} ($\bar{\Lambda}$-K^{+}) correlation functions is consistent with our Λ-K^{0}_{S} ($\bar{\Lambda}$-K^{0}_{S}) measurement. The results suggest an effect arising from different quark-antiquark interactions in the pairs, i.e. $s\bar{s}$ in Λ-K^{+} ($\bar{\Lambda}$-K^{-}) and $u\bar{u}$ in Λ-K^{-} ($\bar{\Lambda}$-K^{+}). To gain further insight into this hypothesis, we currently are conducting a Cascade-Kaon femtoscopic analysis.

Contents

List of Figures

1 Introduction

This will be my introduction. Remember, Jai suggested to make each sentence a separate line to make changes easier to track in git. Otherwise, git will treat an entire paragraph as a single line!

And a new paragraph begins with an empty line.

2 Data Sample and Software

2.1 Data Sample

Talk about the data sample

Run list: 170593, 170572, 170388, 170387, 170315, 170313, 170312, 170311, 170309, 170308, 170306, 170270, 170269, 170268, 170230, 170228, 170207, 170204, 170203, 170193, 170163, 170159, 170155, 170091, 170089, 170088, 170085, 170084, 170083, 170081, 170040, 170027, 169965, 169923, 169859, 169858, 169855, 169846, 169838, 169837, 169835, 169591, 169590, 169588, 169587, 169586, 169557, 169555, 169554, 169553, 169550, 169515, 169512, 169506, 169504, 169498, 169475, 169420, 169419, 169418, 169417, 169415, 169411, 169238, 169167, 169160, 169156, 169148, 169145, 169144, 169138, 169099, 169094, 169091, 169045, 169044, 169040, 169035, 168992, 168988, 168826, 168777, 168514, 168512, 168511, 168467, 168464, 168460, 168458, 168362, 168361, 168342, 168341, 168325, 168322, 168311, 168310, 168115, 168108, 168107, 168105, 168076, 168069, 167988, 167987, 167985, 167920, 167915

2.2 Software

Talk about the software

3 Data Selection

3.1 Event Selection and Mixing

The events used in this study were selected with the following criteria:

- Triggers
  - minimum bias (kMB)
  - central (kCentral)
  - semi-central (kSemiCentral)
- z-position of reconstructed event vertex must be within 10 cm of the center of the ALICE detector
- the event must contain at least one particle of each type from the pair of interest

The event mixing was handled by the AliFemtoVertexMultAnalysis class, which only mixes events with like vertex position and centrality. The following criteria were used for event mixing:

- Number of events to mix = 5
- Vertex position bin width = 2 cm
- Centrality bin width = 5

The AliFemtoEventReaderAODChain class is used to read the events. Event flatteneing is not currently used. FilterBit(7). The centrality is determined by the "V0M" method of AliCentrality, set by calling AliFemtoEventReaderAOD::SetUseMultiplicity(kCentrality). I utilize the SetPrimaryVertexCorrectionTPCPoints switch, which causes the reader to shift all TPC points to be relative to the event vertex.

3.2 $K^{\pm}$ Track Selection

Talk about how charged kaons are identified

3.3 V0 Selection

Λ ($\bar{\Lambda}$) and K^0_S are neutral particles which cannot be directly detected, but must instead be reconstructed through detection of their decay products, or daughters. In general, particles which are topologically reconstructed in this fashion are called V0 particles. The class AliFemtoV0TrackCutNSigmaFilter (which is an extension of AliFemtoV0TrackCut) is used to reconstruct the V0s.

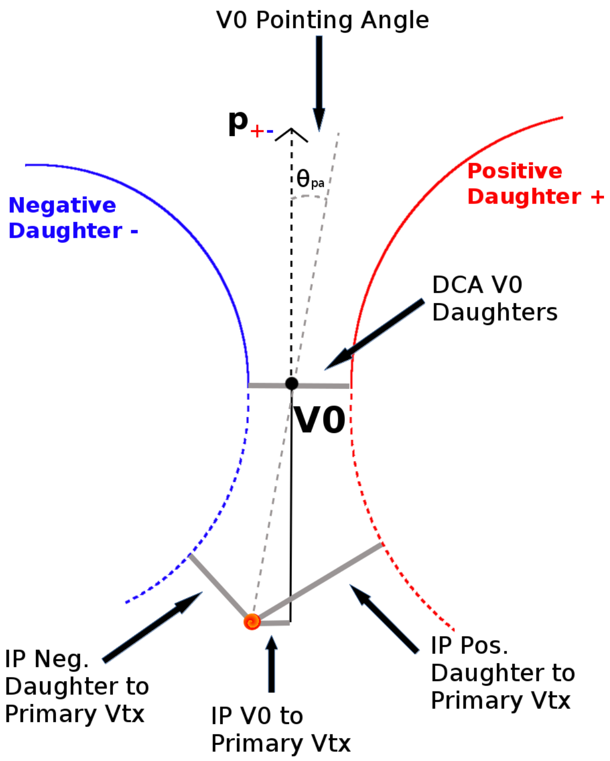

Fig. 1: V0 Reconstruction

3.3.1 Λ Reconstruction

The following cuts were used to select good Λ ($\bar{\Lambda}$) candidates:

1. Cuts Common to Both Daughters
   (a) $|\eta| < 0.8$
   (b) SetTPCnclsDaughters(80)
   (c) SetStatusDaughters(AliESDtrack::kTPCrefic)
   (d) SetMaxDcaV0Daughters(0.4)
2. Pion Specific Daughter Cuts

   (a) $p_T > 0.16$
   (b) DCA to prim vertex > 0.3

3. Proton Specific Daughter Cuts
   (a) $p_T >$
      – 0.5 (p)
      – 0.3 ($\bar{p}$)
   (b) DCA to prim vertex > 0.1

4. Lambda Cuts
   (a) $|\eta| < 0.8$
   (b) $p_T > 0.4$
   (c) $|m_{inv} - m_{PDG}| < 3.8$ MeV
   (d) Cosine of pointing angle > 0.9993
   (e) OnFlyStatus = false
   (f) Decay Length < 60 cm

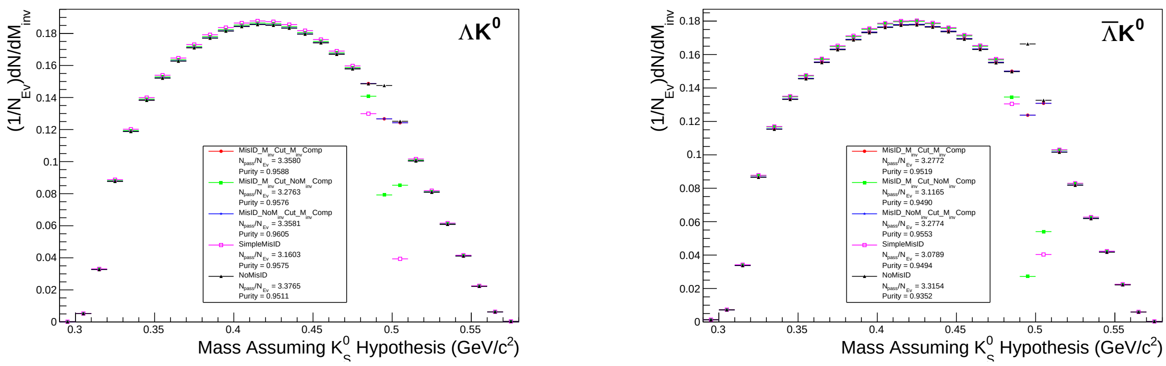

Fig. 2: Mass assuming K^0_S-hypothesis for V0 candidates passing all Λ ($\bar{\Lambda}$) cuts, i.e. assume the daughters are $\pi^+\pi^-$ instead of $p^+\pi^-$ ($\pi^+\bar{p}^-$). The slight peak around m_{inv} = 0.5 GeV/c^2 likely contains misidentified K^0_S particles in our Λ collection. If one simply cuts out the entire peak, good Λ particles will be lost. Ideally, the Λ selection and K^0_S misidentification cuts are selected such that the peak is removed from this plot while leaving the distribution continuous.

3.3.2 K^0_S Reconstruction

The following cuts were used to select good K^0_S candidates:

1. Pion Daughter Cuts
   (a) $|\eta| < 0.8$
   (b) SetTPCnclsDaughters(80)
   (c) SetStatusDaughters(AliESDtrack::kTPCrefic)
   (d) SetMaxDcaV0Daughters(0.3)
   (e) $p_T > 0.15$
   (f) DCA to prim vertex > 0.3

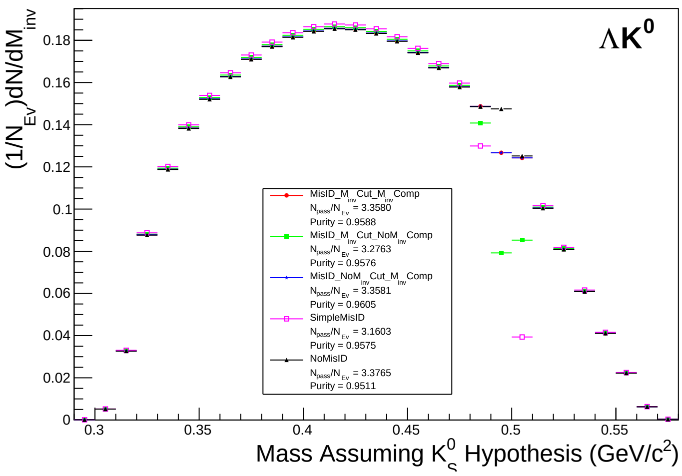

Fig. 3: Mass assuming K^0_S-hypothesis for V0 candidates passing all Λ cuts, i.e. assume the daughters are $\pi^+\pi^-$ instead of $p^+\pi^-$. The slight peak around m_{inv} = 0.5 GeV/c^2 likely contains misidentified K^0_S particles in our Λ collection. If one simply cuts out the entire peak, good Λ particles will be lost. Ideally, the Λ selection and K^0_S misidentification cuts are selected such that the peak is removed from this plot while leaving the distribution continuous.

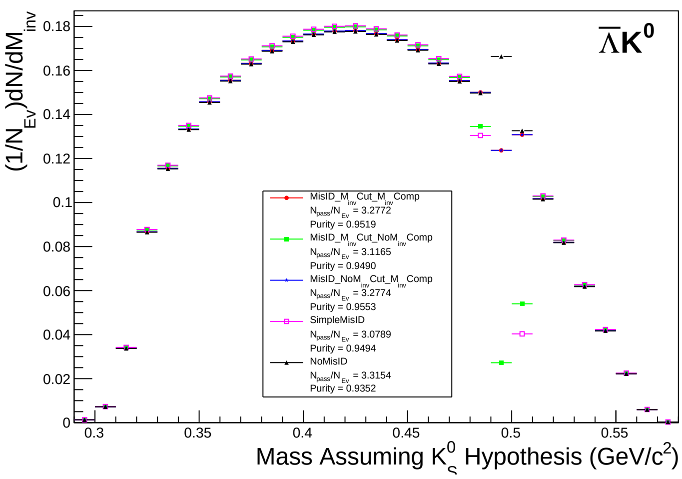

Fig. 4: Mass assuming K^0_S-hypothesis for V0 candidates passing all $\bar{\Lambda}$ cuts, i.e. assume the daughters are $\pi^+\pi^-$ instead of $\pi^+\bar{p}^-$. Similar to Figure 3

2. K^0_S Cuts
   (a) $|\eta| < 0.8$
   (b) $p_T > 0.2$
   (c) $m_{PDG}-$ 13.677 MeV $< m_{inv} < m_{PDG}+$ 2.0323 MeV
   (d) Cosine of pointing angle > 0.9993
   (e) OnFlyStatus = false
   (f) Decay Length $<$ 30 cm

As can be seen in Figures 6 and 7, some misidentified Λ and $\bar{\Lambda}$ particles contaminate our K^0_S sample. Figure 6 shows the mass assuming Λ-hypothesis for V0 candidates passing all K^0_S cuts, i.e. assume the

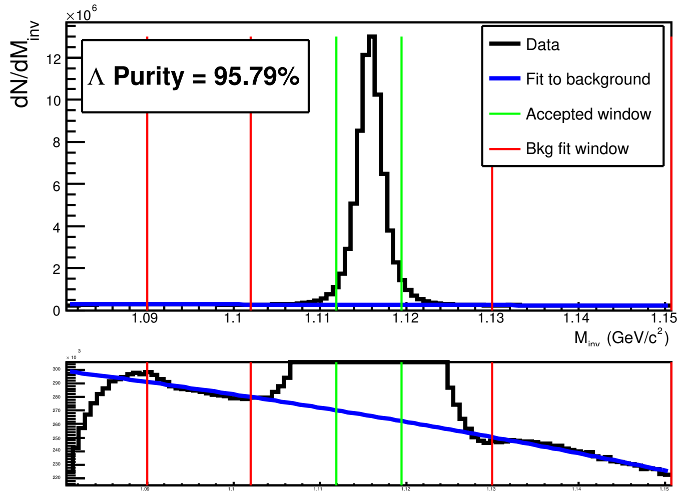

Fig. 5: Λ Purity

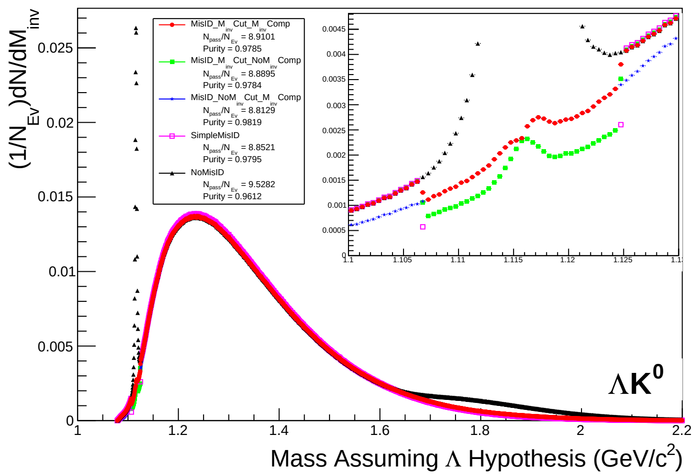

Fig. 6: Mass assuming Λ-hypothesis for V0 candidates passing all K^0_S cuts, i.e. assume the daughters are $p^+\pi^-$ instead of $\pi^+\pi^-$. The peak around m_{inv} = 1.115 GeV/c^2 contains misidentified Λ particles in our K^0_S collection. If one simply cuts out the entire peak, some good K^0_S particles will be lost. Ideally, the K^0_S selection and $\Lambda(\bar{\Lambda})$ misidentification cuts can be selected such that the peak is removed from this plot while leaving the distribution continuous. Also note, the excess around $1.65 < m_{inv} < 2.1$ GeV/c^2 shows misidified $\bar{\Lambda}$ particles in our K^0_S collection.

daughters are $p^+\pi^-$ instead of $\pi^+\pi^-$. Figure 7 is similar, but shows the mass assuming $\bar{\Lambda}$ hypothesis for the same K^0_S collection, i.e. assume the daughters are $\pi^+\bar{p}^-$ instead of $\pi^+\pi^-$. The Λ contamination can be seen in Figure 6, and the $\bar{\Lambda}$ contamination in Figure 7, in the peaks around m_{inv} = 1.115 GeV/c^2. Additionally, the $\bar{\Lambda}$ contamination is visible in Figure 6, and the Λ contamination visible in Figure 7, in the region of excess around $1.65 < m_{inv} < 2.1$ GeV/c^2. This is confirmed as the number of misidentified Λ particles in the sharp peak of Figure 6 (misidentified $\bar{\Lambda}$ particles in the sharp peak of Figure 7) approximately equals the excess found in the $1.65 < m_{inv} < 2.1$ GeV/c^2 region of Figure 7 (Figure 6).

The peak around m_{inv} = 1.115 GeV/c^2 in Figure 6 (Figure 7)contains both misidentified Λ ($\bar{\Lambda}$) particles and good K^0_S. If one simply cuts out the entire peak, some good K^0_S particles will be lost. Ideally, the K^0_S selection and $\Lambda(\bar{\Lambda})$ misidentification cuts can be selected such that the peak is removed from this plot while leaving the distribution continuous. To attempt to remove these Λ and $\bar{\Lambda}$ contaminations without

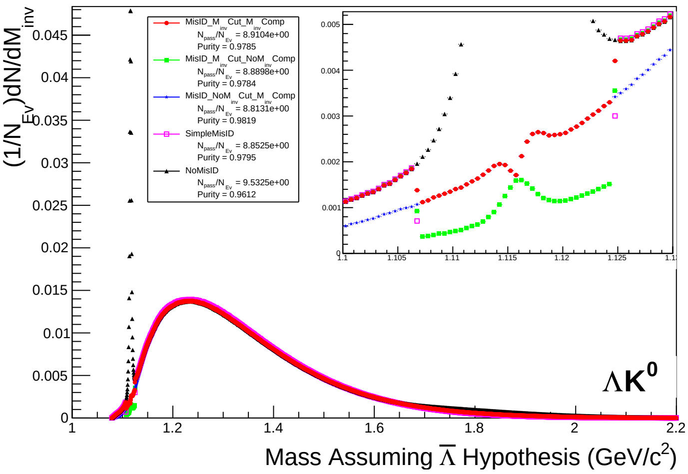

Fig. 7: Mass assuming $\bar{\Lambda}$-hypothesis for V0 candidates passing all K^0_S cuts, i.e. assume the daughters are $\pi^+\bar{p}^-$ instead of $\pi^+\pi^-$. Similar to Figure 6

throwing away good K^0_S particles, the following misidentification cuts are imposed; a K^0_S candidate is rejected if all of the following criteria are satisfied:

- $|m_{inv,\ \Lambda(\bar{\Lambda})\ Hypothesis} - m_{PDG,\ \Lambda(\bar{\Lambda})}| < 9.0$ MeV/c^2
- Positive daughter passes $p^+(\pi^+)$ daughter cut implemented for $\Lambda(\bar{\Lambda})$ reconstruction
- Negative daughter passes $\pi^-(\bar{p}^-)$ daughter cut implemented by $\Lambda(\bar{\Lambda})$ reconstruction

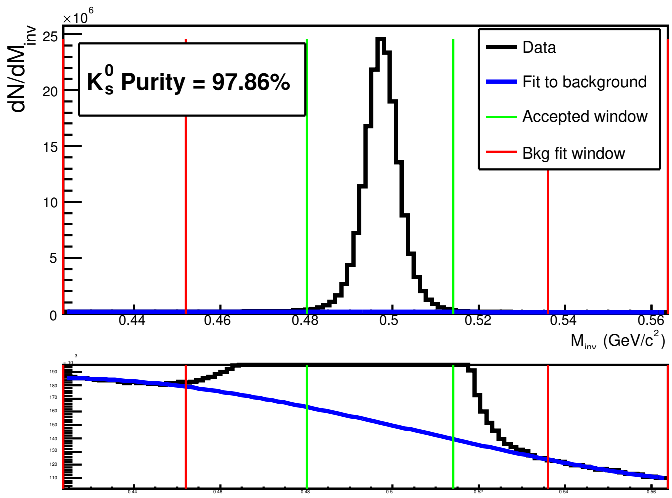

Fig. 8: K^0_S Purity

3.4 Cascade Reconstruction

Talk about reconstruction cascades

3.5 Pair Selection

Some general remarks on forming pairs

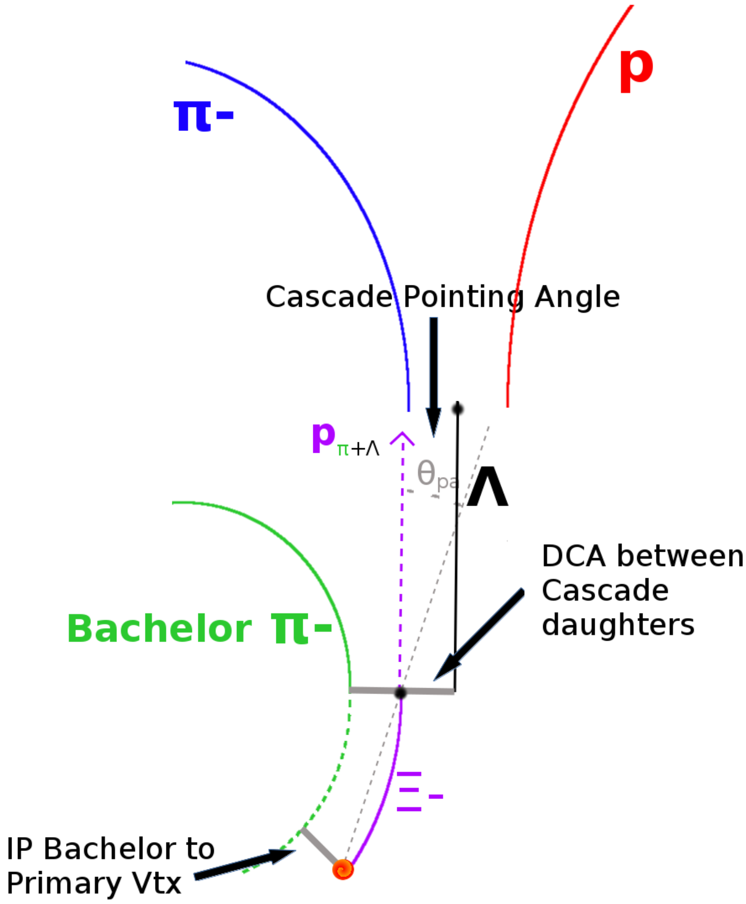

Fig. 9: Ξ Reconstruction

It is important to obtain true particle pairs in the analysis. In particular, contamination from pairs constructed with split or merged tracks can introduce an artificial signal into the correlation function, obscuring the actual physics.

4 Correlation Functions

General remarks about formaton of correlation functions and what information they provide.

5 Fitting

This section will include the Lednicky model and the method used to fit the Cascade study. It will also include momentum resolution, residual correlations, and any other aspects to obtain a good fit

5.1 Model: Lambda-Kaon

Talk about Lednicky model

5.2 Model: Cascade-Kaon

Talk about model

5.3 Momentum Resolution Corrections

Talk about Momentum resolution corrections

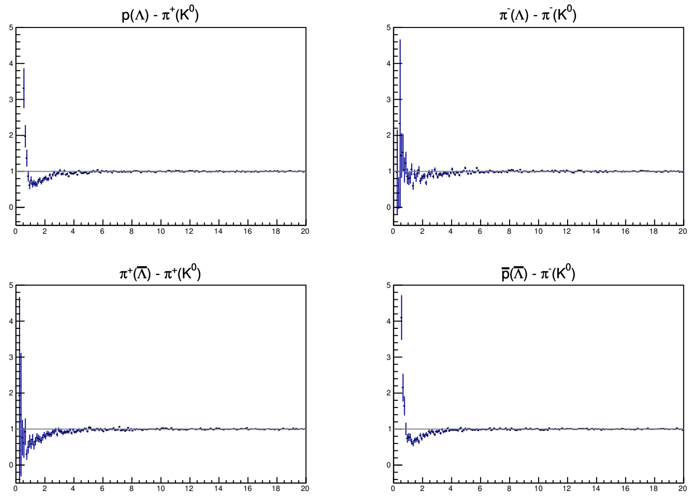

Fig. 10: Avgerage Separation $\Lambda(\bar{\Lambda})\mathrm{K}^0_S$

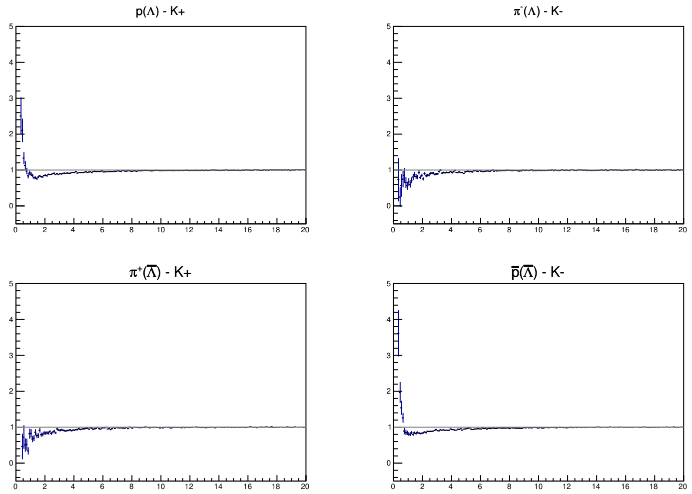

Fig. 11: Avgerage Separation $\Lambda(\bar{\Lambda})\mathrm{K}^{\pm}$

$$C_{fit}(k^*_{Rec}) = \frac{\sum\limits_{k^*_{True}} M_{k^*_{Rec},k^*_{True}} C_{fit}(k^*_{True})}{\sum\limits_{k^*_{True}} M_{k^*_{Rec},k^*_{True}}} \tag{1}$$

5.4 Residual Correlations

Talk about Lednicky model

6 Systematic Errors

This study is currently ongoing. See Table 1.

6.1 Systematic Errors: $\Lambda\mathrm{K}^0_S$

Talk about stuff

DCA $\Lambda(\bar{\Lambda})$

Pair Type	Centrality	p-value	
		4 vs 5 mm	5 vs 6 mm
ΛK^0_S	0-10%	0.36	0.05
	10-30%	0.10	0.37
	30-50%	0.27	6.7e-8
$\bar{\Lambda} K^0_S$	0-10%	0.08	3.2e-4
	10-30%	0.15	0.31
	30-50%	3.7e-3	7.1e-3

Table 1: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA $\Lambda(\bar{\Lambda})$ caption

DCA K^0_S

Pair Type	Centrality	p-value	
		2 vs 3 mm	3 vs 4 mm
ΛK^0_S	0-10%	0.32	0.76
	10-30%	2.1e-3	0.13
	30-50%	0.04	0.06
$\bar{\Lambda} K^0_S$	0-10%	2.8e-7	1.3e-4
	10-30%	0.22	0.62
	30-50%	0.76	0.02

Table 2: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA K^0_S caption

DCA $\Lambda(\bar{\Lambda})$ Daughters

Pair Type	Centrality	p-value	
		3 vs 4 mm	4 vs 5 mm
ΛK^0_S	0-10%	0.39	0.51
	10-30%	0.30	0.84
	30-50%	1.3e-38	8.7e-3
$\bar{\Lambda} K^0_S$	0-10%	0.35	0.07
	10-30%	0.07	0.13
	30-50%	0.44	0.01

Table 3: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA $\Lambda(\bar{\Lambda})$ Daughters

DCA K^0_S Daughters

Pair Type	Centrality	p-value	
		2 vs 3 mm	3 vs 4 mm
ΛK^0_S	0-10%	0.08	0.29
	10-30%	0.01	0.47
	30-50%	6.6e-3	0.82
$\bar{\Lambda} K^0_S$	0-10%	0.38	0.44
	10-30%	0.13	0.25
	30-50%	0.06	0.53

Table 4: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA K^0_S Daughters

$\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle

Pair Type	Centrality	p-value	
		0.9992 vs 0.9993	0.9993 vs 0.9994
ΛK^0_S	0-10%	0.17	0.50
	10-30%	1.2e-3	0.10
	30-50%	5.4e-3	5.6e-9
$\bar{\Lambda} K^0_S$	0-10%	0.87	0.77
	10-30%	0.09	0.13
	30-50%	9.8e-9	0.09

Table 5: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: $\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle

K^0_S Cosine of Pointing Angle

Pair Type	Centrality	p-value	
		0.9992 vs 0.9993	0.9993 vs 0.9994
ΛK^0_S	0-10%	0.02	0.01
	10-30%	0.34	0.63
	30-50%	0.55	1.8e-7
$\bar{\Lambda} K^0_S$	0-10%	0.30	0.18
	10-30%	2.2e-4	0.32
	30-50%	0.41	0.11

Table 6: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: K^0_S Cosine of Pointing Angle

DCA to Primary Vertex of $p^+(\bar{p}^-)$ Daughter of $\Lambda(\bar{\Lambda})$

Pair Type	Centrality	p-value	
		0.5 vs 1 mm	1 vs 2 mm
ΛK^0_S	0-10%	1	0.33
	10-30%	1	0.68
	30-50%	1	0.05
$\bar{\Lambda} K^0_S$	0-10%	1	0.34
	10-30%	1	0.09
	30-50%	1	0.32

Table 7: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA to Primary Vertex of $p^+(\bar{p}^-)$ Daughter of $\Lambda(\bar{\Lambda})$

DCA to Primary Vertex of $\pi^-(\pi^+)$ Daughter of $\Lambda(\bar{\Lambda})$

Pair Type	Centrality	p-value	
		2 vs 3 mm	3 vs 4 mm
ΛK^0_S	0-10%	0.07	0.44
	10-30%	0.03	0.20
	30-50%	9.0e-6	0.10
$\bar{\Lambda} K^0_S$	0-10%	1.4e-3	0.88
	10-30%	0.05	3.3e-3
	30-50%	0.03	1.4e-5

Table 8: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA to Primary Vertex of $\pi^-(\pi^+)$ Daughter of $\Lambda(\bar{\Lambda})$

DCA to Primary Vertex of π^+ Daughter of K^0_S

Pair Type	Centrality	p-value	
		2 vs 3 mm	3 vs 4 mm
ΛK^0_S	0-10%	0.14	9.6e-4
	10-30%	0.07	0.86
	30-50%	0.93	0.11
$\bar{\Lambda} K^0_S$	0-10%	0.06	0.17
	10-30%	0.11	0.69
	30-50%	2.0e-14	0.51

Table 9: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA to Primary Vertex of π^+ Daughter of K^0_S

DCA to Primary Vertex of π^- Daughter of K^0_S

Pair Type	Centrality	p-value	
		2 vs 3 mm	3 vs 4 mm
ΛK^0_S	0-10%	0.15	0.16
	10-30%	0.31	0.12
	30-50%	0.66	0.22
$\bar{\Lambda} K^0_S$	0-10%	1.1e-4	1.7e-14
	10-30%	0.01	0.82
	30-50%	0.44	0.05

Table 10: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: DCA to Primary Vertex of π^- Daughter of K^0_S

Avgerage Separation of Like-Charge Daughters

Pair Type	Daughters		Centrality	p-value	
				5.0 vs 6.0 cm	6.0 vs 7.0 cm
ΛK^0_S	p(Λ)	$\pi^+(K^0_S)$	0-10%	0.00	6.7e-276
			10-30%	1.5e-64	2.0e-10
			30-50%	5.9e-22	9.6e-29
ΛK^0_S	$\pi^-(\Lambda)$	$\pi^-(K^0_S)$	0-10%	3.3e-84	1.6e-10
			10-30%	0.52	5.0e-14
			30-50%	1.1e-8	0.00
$\bar{\Lambda} K^0_S$	$\pi^+(\bar{\Lambda})$	$\pi^+(K^0_S)$	0-10%	1.7e-81	0.88
			10-30%	2.5e-7	4.1e-39
			30-50%	2.2e-16	1.9e-26
$\bar{\Lambda} K^0_S$	$\bar{p}^-(\bar{\Lambda})$	$\pi^-(K^0_S)$	0-10%	0.00	4.3e-17
			10-30%	0.00	8.0e-62
			30-50%	9.3e-112	0.11

Table 11: $\Lambda(\bar{\Lambda})K^0_S$ Analyses: Avgerage Separation of Positive Daughters

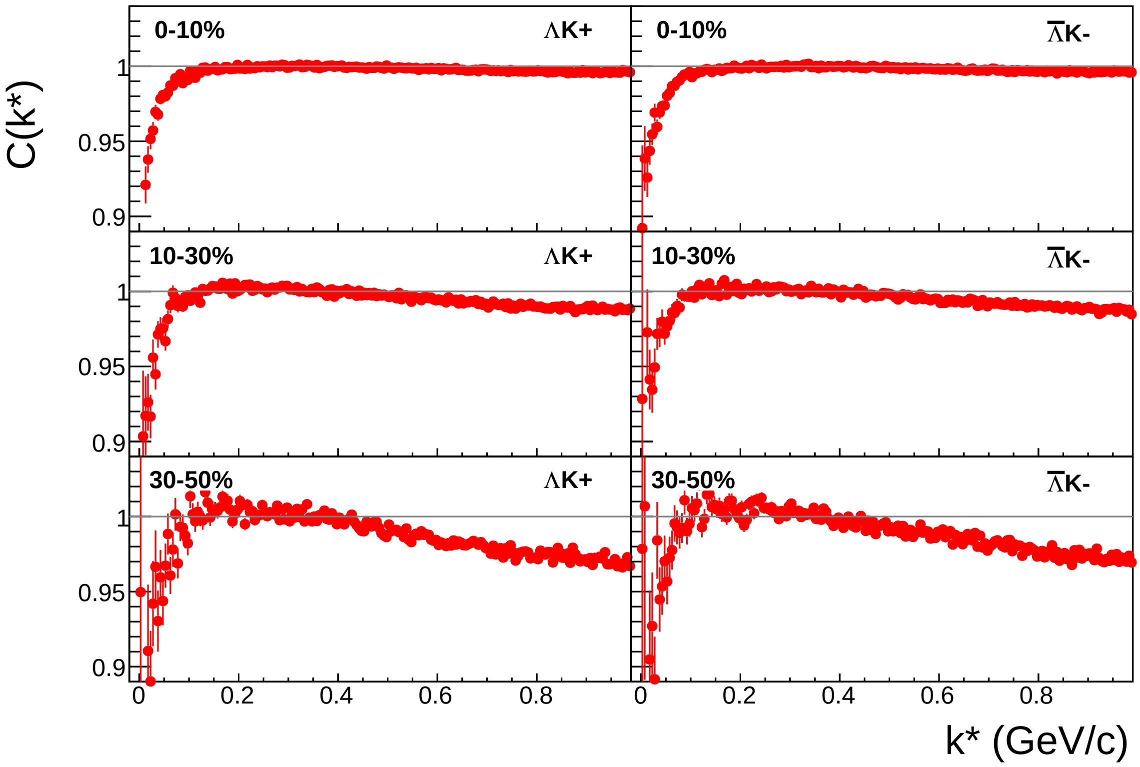

Fig. 12: ΛK^+ and $\bar{\Lambda}K^-$) Correlation Functions

6.2 Systematic Errors: $\Lambda K^{\pm}$

Talk about stuff

7 Results and Discussion

8 To Do

DCA $\Lambda(\bar{\Lambda})$

Pair Type	Centrality	p-value	
		4 vs 5 mm	5 vs 6 mm
ΛK^{+}	0-10%	0.01	3.2e-5
	10-30%	5.9e-3	0.22
	30-50%	0.85	0.84
$\bar{\Lambda}K^{-}$	0-10%	0.15	0.03
	10-30%	3.1e-4	0.42
	30-50%	7.2e-3	0.42
ΛK^{-}	0-10%	0.35	0.05
	10-30%	1.4e-5	5.6e-3
	30-50%	0.05	0.70
$\bar{\Lambda}K^{+}$	0-10%	0.84	0.16
	10-30%	0.16	3.3e-3
	30-50%	2.5e-4	0.20

Table 12: $\Lambda(\bar{\Lambda})K^{\pm}$ Analyses: DCA $\Lambda(\bar{\Lambda})$

DCA $\Lambda(\bar{\Lambda})$ Daughters

Pair Type	Centrality	p-value	
		3 vs 4 mm	4 vs 5 mm
ΛK^{+}	0-10%	0.79	0.06
	10-30%	0.10	0.60
	30-50%	8.4e-3	0.25
$\bar{\Lambda}K^{-}$	0-10%	2.4e-4	0.63
	10-30%	0.06	3.3e-4
	30-50%	0.03	0.04
ΛK^{-}	0-10%	0.70	0.40
	10-30%	0.94	0.04
	30-50%	0.05	9.5e-5
$\bar{\Lambda}K^{+}$	0-10%	0.09	0.04
	10-30%	0.10	0.17
	30-50%	0.10	0.43

Table 13: $\Lambda(\bar{\Lambda})K^{\pm}$ Analyses: DCA $\Lambda(\bar{\Lambda})$ Daughters

$\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle

Pair Type	Centrality	p-value	
		0.9992 vs 0.9993	0.9993 vs 0.9994
ΛK^+	0-10%	0.08	6.2e-3
	10-30%	8.7e-4	0.06
	30-50%	0.31	1.1e-3
$\bar{\Lambda}K^-$	0-10%	0.98	0.92
	10-30%	0.06	1.4e-16
	30-50%	0.47	0.40
ΛK^-	0-10%	1.0e-4	6.3e-3
	10-30%	5.7e-5	2.3e-3
	30-50%	1.9e-3	6.5e-3
$\bar{\Lambda}K^+$	0-10%	0.08	0.01
	10-30%	0.09	0.04
	30-50%	0.39	0.34

Table 14: $\Lambda(\bar{\Lambda})K^{\pm}$ Analyses: $\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle

DCA to Primary Vertex of $p^+(\bar{p}^-)$ Daughter of $\Lambda(\bar{\Lambda})$

Pair Type	Centrality	p-value	
		0.5 vs 1.0 mm	1.0 vs 2.0 mm
ΛK^+	0-10%	1	5.5e-3
	10-30%	1	0.15
	30-50%	1	0.13
$\bar{\Lambda}K^-$	0-10%	1	0.16
	10-30%	1	0.55
	30-50%	1	0.03
ΛK^-	0-10%	1	0.30
	10-30%	1	0.70
	30-50%	1	0.44
$\bar{\Lambda}K^+$	0-10%	1	0.40
	10-30%	1	0.67
	30-50%	1	0.03

Table 15: $\Lambda(\bar{\Lambda})K^{\pm}$ Analyses: DCA to Primary Vertex of $p^+(\bar{p}^-)$ Daughter of $\Lambda(\bar{\Lambda})$

DCA to Primary Vertex of $\pi^-(\pi^+)$ Daughter of $\Lambda(\bar{\Lambda})$

Pair Type	Centrality	p-value	
		2.0 vs 3.0 mm	3.0 vs 4.0 mm
ΛK$^+$	0-10%	0.01	0.15
	10-30%	0.28	0.08
	30-50%	1.9e-8	6.1e-4
$\bar{\Lambda}$K$^-$	0-10%	0.55	0.36
	10-30%	0.38	0.31
	30-50%	8.4e-4	0.03
ΛK$^-$	0-10%	7.7e-3	0.35
	10-30%	0.01	4.0e-3
	30-50%	0.02	0.06
$\bar{\Lambda}$K$^+$	0-10%	0.12	0.01
	10-30%	0.63	4.1e-3
	30-50%	6.2e-11	0.44

Table 16: $\Lambda(\bar{\Lambda})$K$^{\pm}$ Analyses: DCA to Primary Vertex of $\pi^-(\pi^+)$ Daughter of $\Lambda(\bar{\Lambda})$

Average Separation of $\Lambda(\bar{\Lambda})$ Daughter With Same Charge as K$^{\pm}$

Pair Type	Daughter	Track	Centrality	p-value	
				7.0 vs 8.0 cm	8.0 vs 9.0 cm
ΛK$^+$	p(Λ)	K$^+$	0-10%	2.1e-41	1.9e-186
			10-30%	0.86	0.61
			30-50%	0.999	0.10
$\bar{\Lambda}$K$^-$	$\bar{p}^-(\bar{\Lambda})$	K$^-$	0-10%	3.7e-78	0.00
			10-30%	1.4e-27	9.6e-62
			30-50%	0.00	4.4e-3
ΛK$^-$	$\pi^-(\Lambda)$	K$^-$	0-10%	1.0e-236	5.1e-243
			10-30%	6.2e-17	4.6e-43
			30-50%	0.09	0.99
$\bar{\Lambda}$K$^+$	$\pi^+(\bar{\Lambda})$	K$^+$	0-10%	1.4e-76	6.9e-46
			10-30%	4.7e-14	0.61
			30-50%	3.0e-14	3.3e-4

Table 17: $\Lambda(\bar{\Lambda})$K^0_S Analyses: Average Separation of $\Lambda(\bar{\Lambda})$ Daughter With Same Charge as K$^{\pm}$

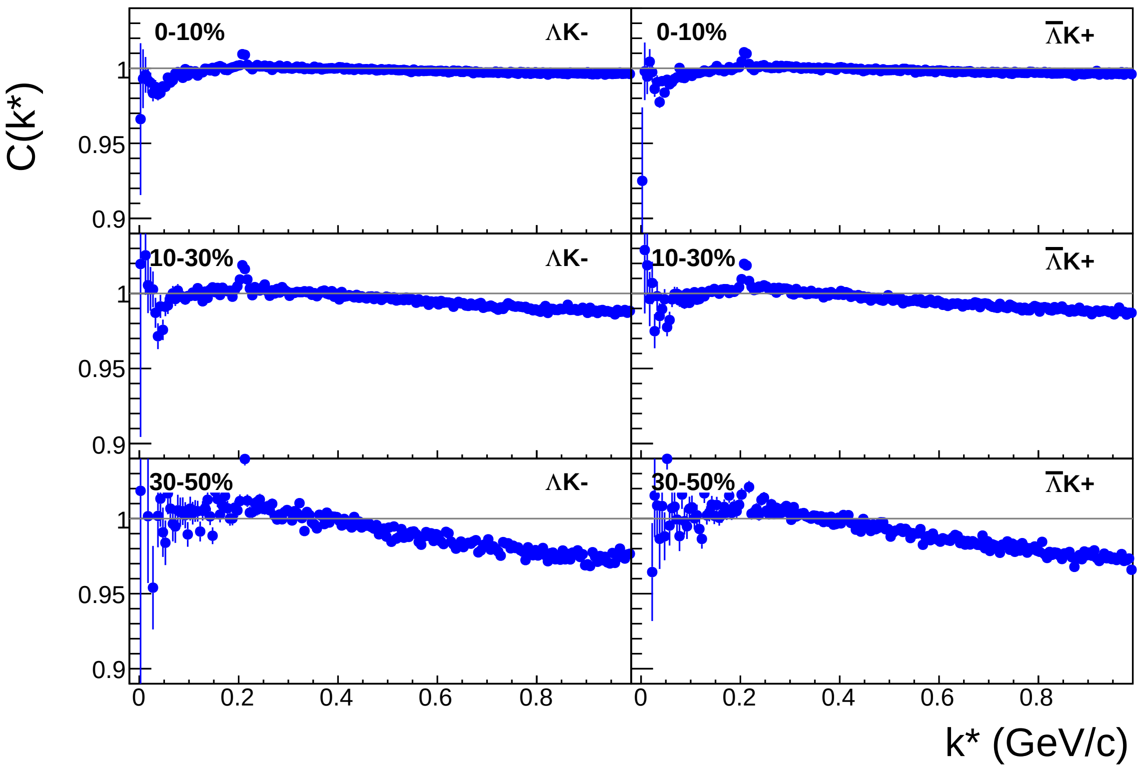

Fig. 13: ΛK^{-} and $\bar{\Lambda}K^{+}$ Correlation Functions) CorrelationFunctions

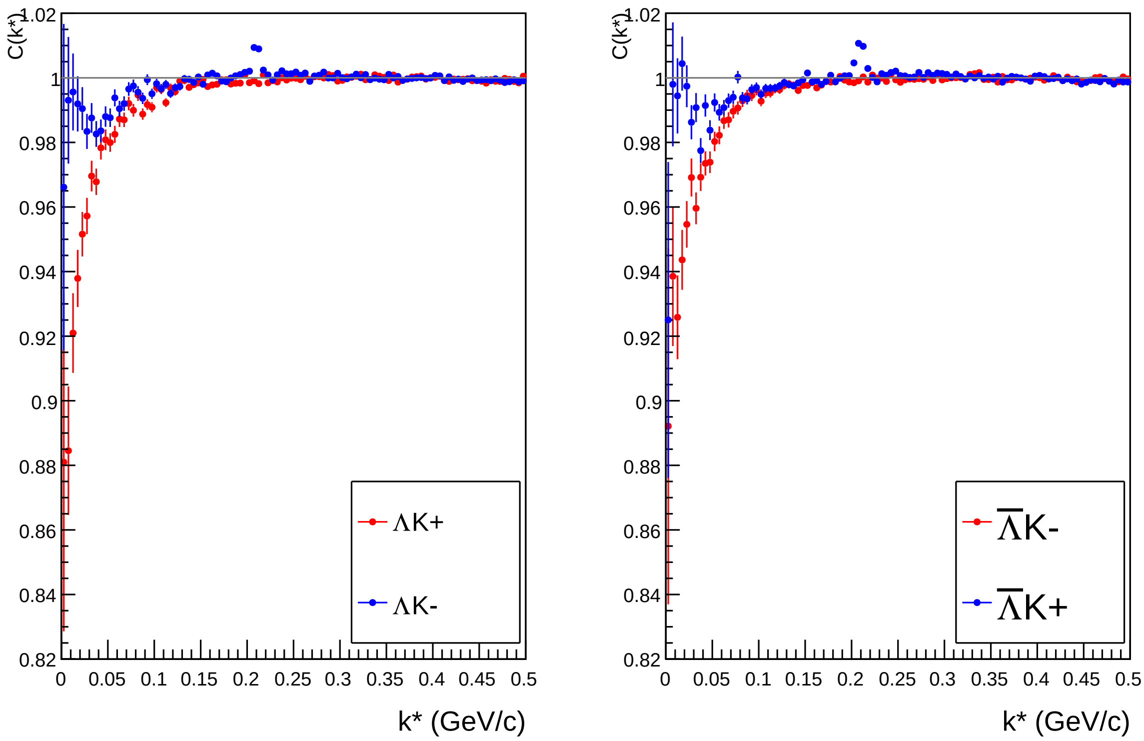

Fig. 14: All $\Lambda(\bar{\Lambda})K^{\pm}$ Correlation Functions for 0-10 Centrality

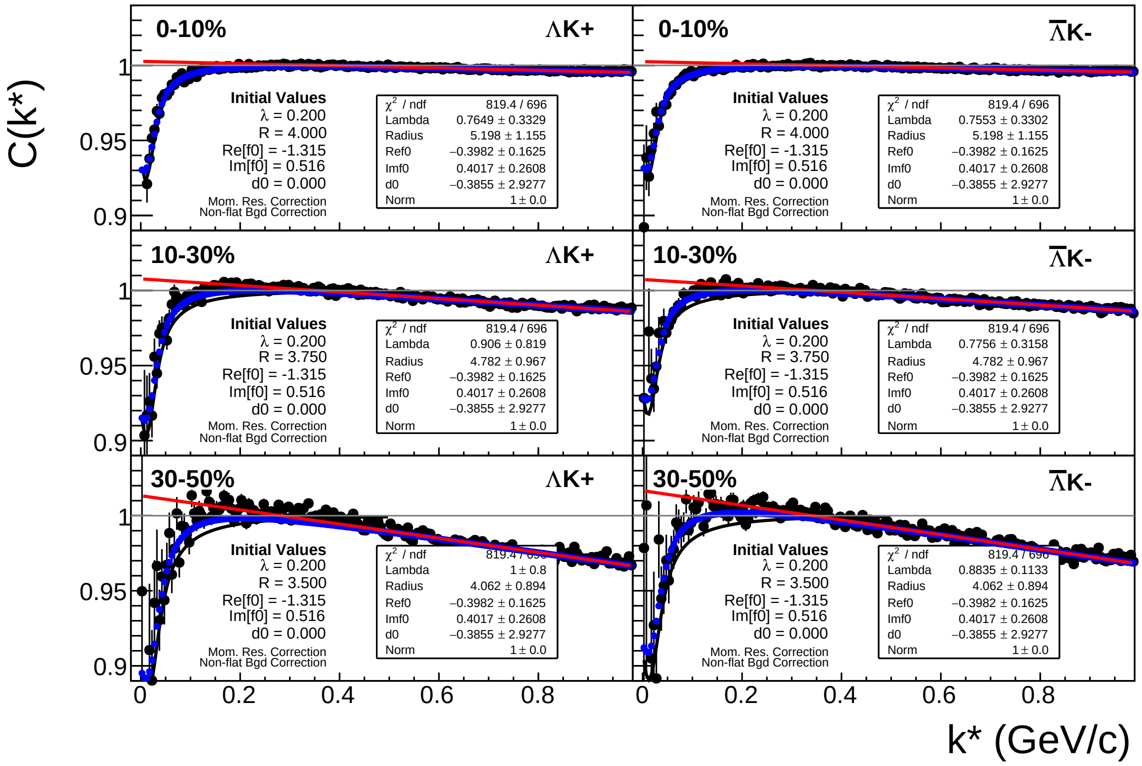

Fig. 15: $\Lambda K^{+}(\bar{\Lambda}K^{-})$ Fits

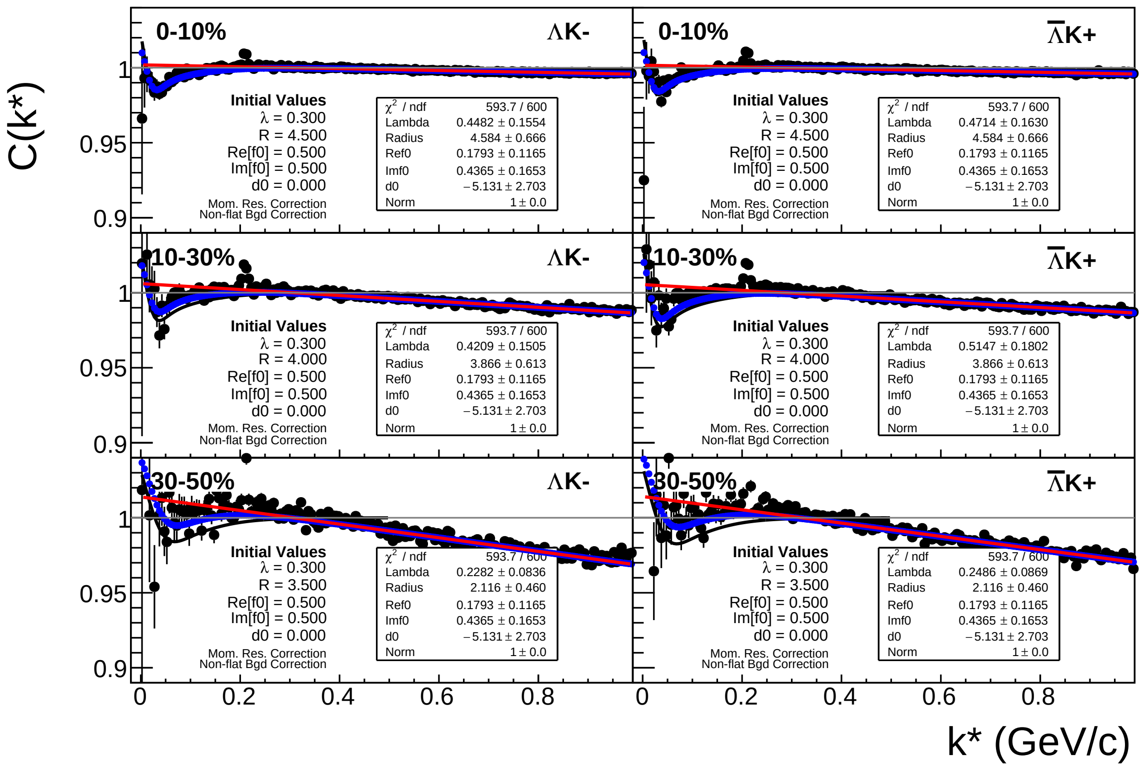

Fig. 16: $\Lambda K^{-}(\bar{\Lambda}K^{+})$ Fits