1 Systematic Errors

In order to understand the systematic uncertainties of our data, the analysis code was run many times using slightly different values for a number of important cuts, and the results were compared. To quantify the systematic errors on the data, all correlation functions built using all varied cut values were bin-by-bin averaged, and the resulting variance of each bin was taken as the systematic error. The cuts included in the systematic study, as well as the values used in the variations, are shown in Tab. 1 (ΛK^0_S) and Tab. 2 ($\Lambda K^{\pm}$). Note, the central value corresponds to that used in the analysis.

Similarly, the fit parameters extracted from all of these correlation functions were averaged, and the resulting variances were taken as the systematic errors for the fit parameters. As with the systematic errors on the data, this was performed for all varied cut values. Additionally, a systematic analysis was done on our fit method through varying our k^* fit range, as well as varying our modeling of the non-femtoscopic background. Our choice of k^* fit range was varied by $\pm$ 25%. As previously stated, the non-femtoscopic backgrounds are modeled using the THERMINATOR 2 simulation for the $\Lambda K^{\pm}$ analyses, and with a linear form for the ΛK^0_S system. To study the contribution of this choice to our systematic errors, we modeled the backgrounds of all of our systems by fitting to the data with a with a linear, quadratic, and Gaussian form. Additionally, we modeled the backgrounds of all systems with a polynomial fit to the THERMINATOR simulation, scaled to match the data. The resulting uncertainties in the extracted parameter sets were combined with our uncertainties arising from our particle and pair cuts.

1.1 Systematic Errors: ΛK^0_S

1.1.1 Particle and Pair Cuts

The cuts included in the systematic study, as well as the values used in the variations, are listed below. Note, the central value corresponds to that used in the analysis.

ΛK^0_S systematics

DCA $\Lambda(\bar{\Lambda})$	4, 5, 6 mm
DCA K^0_S	2, 3, 4 mm
DCA $\Lambda(\bar{\Lambda})$ Daughters	3, 4, 5 mm
DCA K^0_S Daughters	2, 3, 4 mm
$\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle	0.9992, 0.9993, 0.9994
K^0_S Cosine of Pointing Angle	0.9992, 0.9993, 0.9994
DCA to Primary Vertex of $p(\bar{p})$ Daughter of $\Lambda(\bar{\Lambda})$	0.5, 1, 2 mm
DCA to Primary Vertex of $\pi^-(\pi^+)$ Daughter of $\Lambda(\bar{\Lambda})$	2, 3, 4 mm
DCA to Primary Vertex of π^+ Daughter of K^0_S	2, 3, 4 mm
DCA to Primary Vertex of π^- Daughter of K^0_S	2, 3, 4 mm
Average Separation of Like-Charge Daughters	5, 6, 7 cm

Table 1: ΛK^0_S systematics

1.1.2 Non-Flat Background

We fit our non-flat background with a linear function. To study the contribution of this choice to our systematic errors, we also fit with a quadratic and Gaussian form. The resulting uncertainties are combined with the uncertainties arising from our particle cuts.

1.1.3 Fit Range

Our choice of k^* fit range was varied by $\pm$ 25%. The resulting uncertainties in the extracted parameter sets were combined with our uncertainties arising from our particle and pair cuts.

1.2 Systematic Errors: ΛK$^{\pm}$

1.2.1 Particle and Pair Cuts

The cuts included in the systematic study, as well as the values used in the variations, are listed below. Note, the central value corresponds to that used in the analysis.

ΛK$^{\pm}$ systematics

DCA $\Lambda(\bar{\Lambda})$	4, 5, 6 mm
DCA $\Lambda(\bar{\Lambda})$ Daughters	3, 4, 5 mm
$\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle	0.9992, 0.9993, 0.9994
DCA to Primary Vertex of $p(\bar{p})$ Daughter of $\Lambda(\bar{\Lambda})$	0.5, 1, 2 mm
DCA to Primary Vertex of $\pi^-(\pi^+)$ Daughter of $\Lambda(\bar{\Lambda})$	2, 3, 4 mm
Average Separation of $\Lambda(\bar{\Lambda})$ Daughter with Same Charge as K$^{\pm}$	7, 8, 9 cm
Max. DCA to Primary Vertex in Transverse Plane of K$^{\pm}$	1.92, 2.4, 2.88
Max. DCA to Primary Vertex in Longitudinal Direction of K$^{\pm}$	2.4, 3.0, 3.6

Table 2: ΛK$^{\pm}$ systematics

1.2.2 Non-Flat Background

We fit our non-flat background with a linear function. To study the contribution of this choice to our systematic errors, we also fit with a quadratic and Gaussian form. The resulting uncertainties are combined with the uncertainties arising from our particle cuts.

1.2.3 Fit Range

Our choice of k^* fit range was varied by $\pm$ 25%. The resulting uncertainties in the extracted parameter sets were combined with our uncertainties arising from our particle and pair cuts.

1.3 Systematic Errors: ΞK$^{\pm}$

1.3.1 Particle and Pair Cuts

The cuts included in the systematic study, as well as the values used in the variations, are listed below. Note, the central value corresponds to that used in the analysis.

Ξ^{-}K$^{\pm}$ systematics

Max. DCA $\Xi(\bar{\Xi})$	2, 3, 4 mm
Max. DCA $\Xi(\bar{\Xi})$ Daughters	2, 3, 4 mm
Min. $\Xi(\bar{\Xi})$ Cosine of Pointing Angle to Primary Vertex	0.9991, 0.9992, 0.9993
Min. $\Lambda(\bar{\Lambda})$ Cosine of Pointing Angle to $\Xi(\bar{\Xi})$ Decay Vertex	0.9992, 0.9993, 0.9994
Min. DCA Bachelor π	0.5, 1, 2 mm
Min. DCA $\Lambda(\bar{\Lambda})$	1, 2, 3 mm
Max. DCA $\Lambda(\bar{\Lambda})$ Daughters	3, 4, 5 mm
Min. DCA to Primary Vertex of $p(\bar{p})$ Daughter of $\Lambda(\bar{\Lambda})$	0.5, 1, 2 mm
Min. DCA to Primary Vertex of $\pi^{-}(\pi^{+})$ Daughter of $\Lambda(\bar{\Lambda})$	2, 3, 4 mm
Min. Average Separation of $\Lambda(\bar{\Lambda})$ Daughter and K$^{\pm}$ with like charge	7, 8, 9 cm
Min. Average Separation of Bachelor π and K$^{\pm}$ with like charge	7, 8, 9 cm
Max. DCA to Primary Vertex in Transverse Plane of K$^{\pm}$	1.92, 2.4, 2.88
Max. DCA to Primary Vertex in Longitudinal Direction of K$^{\pm}$	2.4, 3.0, 3.6

Table 3: Ξ^{-}K$^{\pm}$ systematics