0.1 Results: ΛK^0_S and $\Lambda K^{\pm}$

Figures 1, 2, and 3 (Section **??**) show experimental data with fits for all studied centralities for ΛK^0_S with $\bar{\Lambda}K^0_S$, ΛK^+ with $\bar{\Lambda}K^-$, and ΛK^- with $\bar{\Lambda}K^+$, respectively. The parameter sets extracted from the fits can be found in Tables 1 and 2. All correlation functions were normalized in the range $0.32 < k^* < 0.40$ GeV/c, and fit in the range $0.0 < k^* < 0.30$ GeV/c. For the ΛK^- and $\bar{\Lambda}K^+$ analyses, the region $0.19 < k^* < 0.23$ GeV/c was excluded from the fit to exclude the bump caused by the Ω^- resonance. The non-flat background was fit with a linear form from $0.6 < k^* < 0.9$ GeV/c. The theoretical fit function was then multiplied by this background during the fitting process.

In the figures (1, 2, and 3), the black solid line represents the "raw" fit, i.e. not corrected for momentum resolution effects nor non-flat background. The green line shows the fit to the non-flat background. The purple points show the fit after momentum resolution and non-flat background corrections have been applied. The initial values of the parameters is listed, as well as the final fit values with uncertainties.

For the ΛK^0_S fits, R was restricted to [2.0, 10.0 fm] and Λ was restricted to [0.1, 0.8]. This gave the lowest χ^2 value, but loosening this restriction changes the fit parameters slightly. Notice, the 10-30% radius is at its limit, as is λ from the 30-50% ΛK^0_S analysis. This accounts for the 0.000 systematic uncertainty of the 10-30% R value currently quoted in Table 1. An estimate for this uncertainty should be included in the next version of this note. In the future, we may need to throw out the 30-50% data from the fit, but this is not ideal.

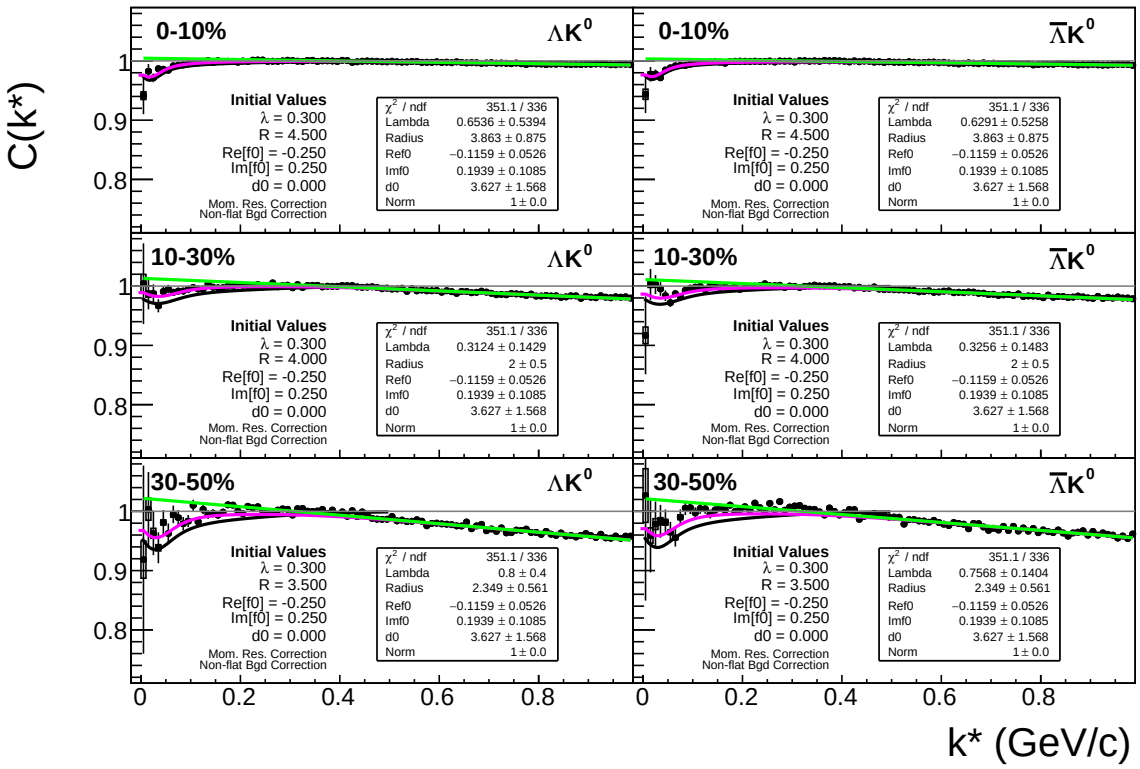

Fig. 1: Fits to the ΛK^0_S (left) and $\bar{\Lambda} K^0_S$ (right) data for the centralities 0-10% (top), 10-30% (middle), and 30-50% (bottom). The lines represent the statistical errors, while the boxes represent the systematic errors. Each has unique λ and normalization parameters. The radii are shared amongst like centralities; the scattering parameters ($\mathbb{R}f_0$, $\mathbb{I}f_0$, d_0) are shared amongst all. The black solid line represents the "raw" fit, i.e. not corrected for momentum resolution effects nor non-flat background. The green line shows the fit to the non-flat background. The purple points show the fit after momentum resolution and non-flat background corrections have been applied. The initial values of the parameters is listed, as well as the final fit values with uncertainties. Here, R was restricted to [2.,10.] and Λ was restricted to [0.1,0.8].

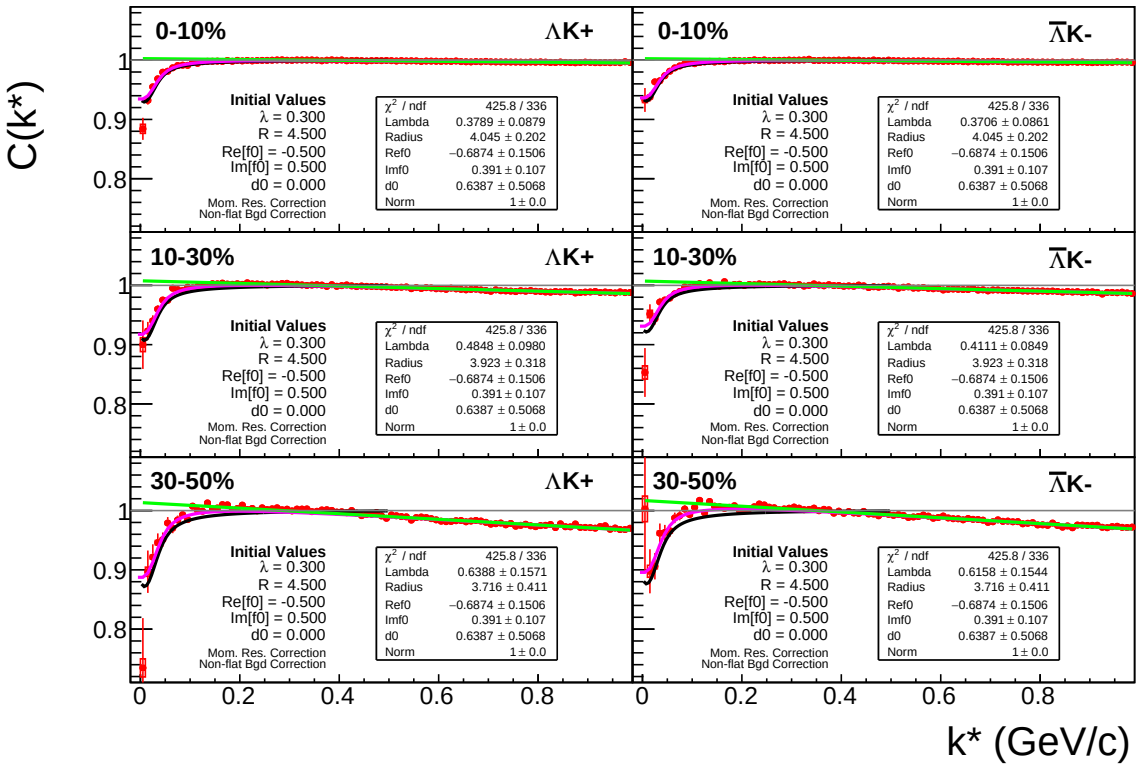

Fig. 2: Fits to the ΛK^+ (left) and $\bar{\Lambda} K^-$ (right) data for the centralities 0-10% (top), 10-30% (middle), and 30-50% (bottom). The lines represent the statistical errors, while the boxes represent the systematic errors. Each has unique λ and normalization parameters. The radii are shared amongst like centralities; the scattering parameters ($\mathbb{R}f_0$, $\mathbb{I}f_0$, d_0) are shared amongst all. The black solid line represents the "raw" fit, i.e. not corrected for momentum resolution effects nor non-flat background. The green line shows the fit to the non-flat background. The purple points show the fit after momentum resolution and non-flat background corrections have been applied. The initial values of the parameters is listed, as well as the final fit values with uncertainties.

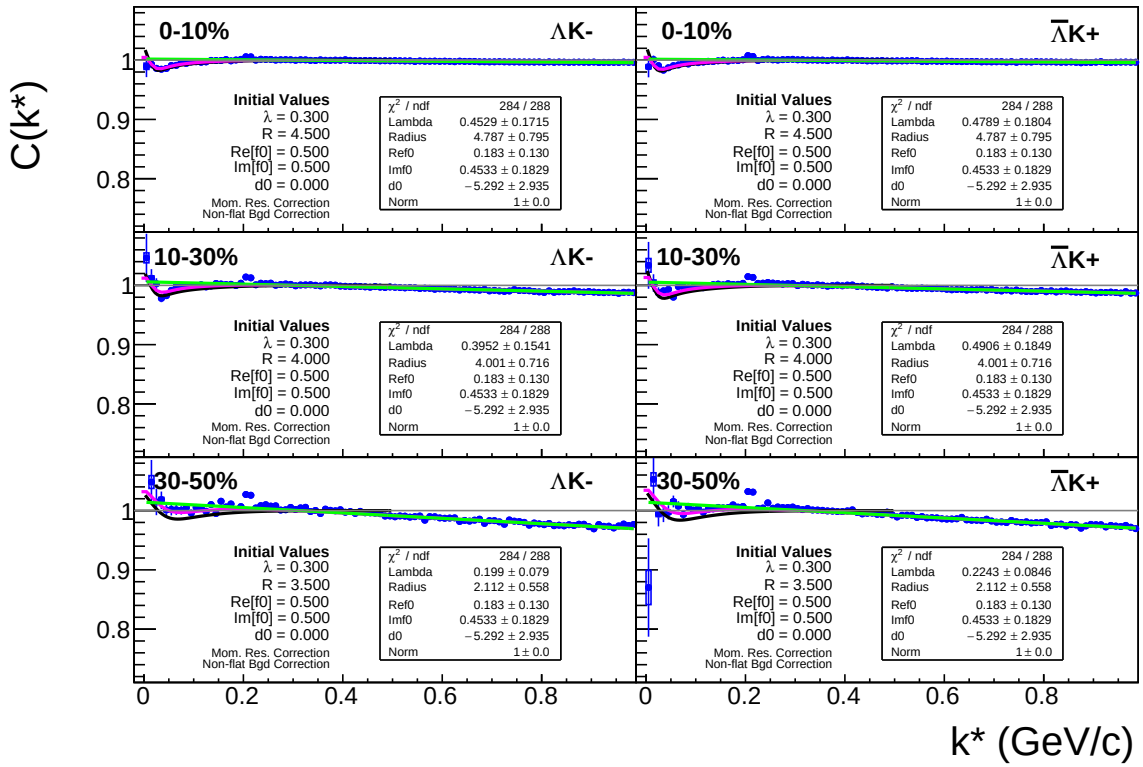

Fig. 3: Fits to the ΛK^-(left) with $\bar{\Lambda}K^+$ (right) data for the centralities 0-10% (top), 10-30% (middle), and 30-50% (bottom). The lines represent the statistical errors, while the boxes represent the systematic errors. Each has unique λ and normalization parameters. The radii are shared amongst like centralities; the scattering parameters ($\mathbb{R}f_0$, $\mathbb{I}f_0$, d_0) are shared amongst all. The black solid line represents the "raw" fit, i.e. not corrected for momentum resolution effects nor non-flat background. The green line shows the fit to the non-flat background. The purple points show the fit after momentum resolution and non-flat background corrections have been applied. The initial values of the parameters is listed, as well as the final fit values with uncertainties.

Fit Results $\Lambda(\bar{\Lambda})K^0_S$

Pair Type	Centrality	Fit Parameters				
		λ	R	$\mathbb{R}f_0$	$\mathbb{I}f_0$	d_0
ΛK^0_S	0-10%	0.654 ± 0.539 (stat.) ± 0.074 (sys.)	3.863 ± 0.875 (stat.) ± 0.324 (sys.)	-0.116 ± 0.053 (stat.) ± 0.094 (sys.)	0.194 ± 0.109 (stat.) ± 0.056 (sys.)	3.627 ± 1.568 (stat.) ± 0.890 (sys.)
	10-30%	0.312 ± 0.143 (stat.) ± 0.020 (sys.)	2.000 ± 0.500 (stat.) ± 0.000 (sys.)			
	30-50%	0.800 ± 0.400 (stat.) ± 0.124 (sys.)	2.349 ± 0.561 (stat.) ± 0.230 (sys.)			
$\bar{\Lambda}K^0_S$	0-10%	0.623 ± 0.526 (stat.) ± 0.058 (sys.)	3.863 ± 0.875 (stat.) ± 0.324 (sys.)			
	10-30%	0.326 ± 0.148 (stat.) ± 0.021 (sys.)	2.000 ± 0.500 (stat.) ± 0.000 (sys.)			
	30-50%	0.757 ± 0.140 (stat.) ± 0.093 (sys.)	2.349 ± 0.561 (stat.) ± 0.230 (sys.)			

Table 1: Fit Results $\Lambda(\bar{\Lambda})K^0_S$. Each pair is fit simultaneously with its conjugate (ie. ΛK^0_S with $\bar{\Lambda}K^0_S$) across all centralities (0-10%, 10-30%, 30-50%), for a total of 6 simultaneous analyses in the fit. Each analysis has a unique λ and normalization parameter. The radii are shared between analyses of like centrality, as these should have similar source sizes. The scattering parameters ($\mathbb{R}f_0$, $\mathbb{I}f_0$, d_0) are shared amongst all. The fit is done on the data with only statistical error bars. The errors marked as "stat." are those returned by MINUIT. The errors marked as "sys." are those which result from my systematic analysis (as outlined in Section **??**).

Fit Results $\Lambda(\bar{\Lambda})K^{\pm}$

Pair Type	Centrality	Fit Parameters				
		λ	R	$\mathbb{R}f_0$	$\mathbb{I}f_0$	d_0
ΛK^+	0-10%	0.379 ± 0.088 (stat.) ± 0.205 (sys.)	4.045 ± 0.202 (stat.) ± 1.076 (sys.)	-0.687 ± 0.151 (stat.) ± 0.107 (sys.)	0.391 ± 0.107 (stat.) ± 0.212 (sys.)	0.639 ± 0.507 (stat.) ± 2.378 (sys.)
	10-30%	0.485 ± 0.098 (stat.) ± 0.157 (sys.)	3.923 ± 0.318 (stat.) ± 0.926 (sys.)			
	30-50%	0.639 ± 0.157 (stat.) ± 0.092 (sys.)	3.716 ± 0.411 (stat.) ± 0.460 (sys.)			
$\bar{\Lambda}K^-$	0-10%	0.371 ± 0.086 (stat.) ± 0.193 (sys.)	4.045 ± 0.202 (stat.) ± 1.076 (sys.)			
	10-30%	0.411 ± 0.085 (stat.) ± 0.116 (sys.)	3.923 ± 0.318 (stat.) ± 0.926 (sys.)			
	30-50%	0.616 ± 0.154 (stat.) ± 0.071 (sys.)	3.716 ± 0.411 (stat.) ± 0.460 (sys.)			
ΛK^-	0-10%	0.453 ± 0.172 (stat.) ± 0.080 (sys.)	4.787 ± 0.795 (stat.) ± 0.270 (sys.)	0.183 ± 0.130 (stat.) ± 0.074 (sys.)	0.453 ± 0.183 (stat.) ± 0.162 (sys.)	-5.292 ± 2.935 (stat.) ± 3.748 (sys.)
	10-30%	0.395 ± 0.154 (stat.) ± 0.052 (sys.)	4.001 ± 0.716 (stat.) ± 0.215 (sys.)			
	30-50%	0.199 ± 0.079 (stat.) ± 0.031 (sys.)	2.112 ± 0.558 (stat.) ± 0.176 (sys.)			
$\bar{\Lambda}K^+$	0-10%	0.479 ± 0.180 (stat.) ± 0.082 (sys.)	4.787 ± 0.180 (stat.) ± 0.270 (sys.)			
	10-30%	0.491 ± 0.185 (stat.) ± 0.061 (sys.)	4.001 ± 0.716 (stat.) ± 0.215 (sys.)			
	30-50%	0.224 ± 0.085 (stat.) ± 0.029 (sys.)	2.112 ± 0.558 (stat.) ± 0.176 (sys.)			

Table 2: Fit Results $\Lambda(\bar{\Lambda})K^{\pm}$ Each pair is fit simultaneously with its conjugate (ie. ΛK^+ with $\bar{\Lambda}K^-$ and ΛK^- with $\bar{\Lambda}K^+$) across all centralities (0-10%, 10-30%, 30-50%), for a total of 6 simultaneous analyses in the fit. Each analysis has a unique λ and normalization parameter. The radii are shared between analyses of like centrality, as these should have similar source sizes. The scattering parameters ($\mathbb{R}f_0$, $\mathbb{I}f_0$, d_0) are shared amongst all. The fit is done on the data with only statistical error bars. The errors marked as "stat." are those returned by MINUIT. The errors marked as "sys." are those which result from my systematic analysis (as outlined in Section **??**).