0.0.1 Results: ΛK_S^0 and $\Lambda K^\pm$: 10 Residual Correlations Included in Fit
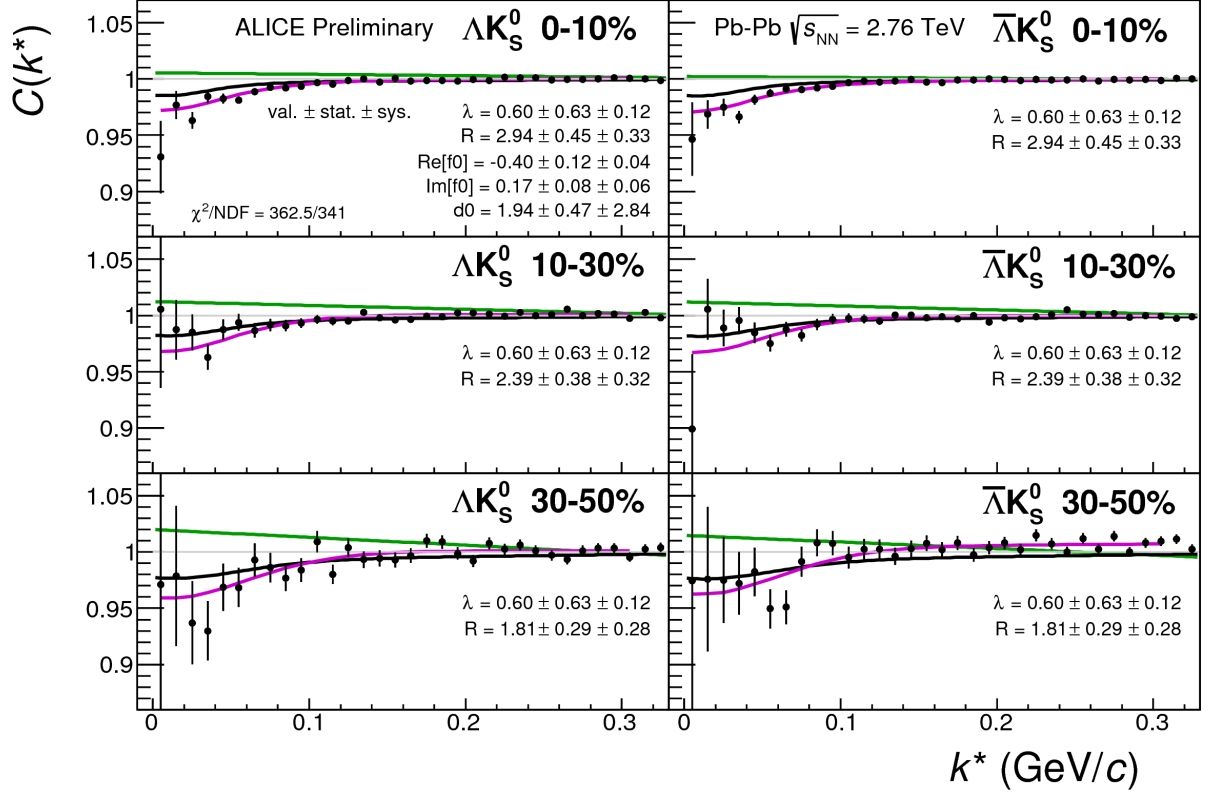

Fig. 1: Fits, with 10 residual correlations included, to the ΛK_S^0 (left) and $\bar{\Lambda} K_S^0$ (right) data for the centralities 0-10% (top), 10-30% (middle), and 30-50% (bottom). The lines represent the statistical errors, while the boxes represent the systematic errors. Each has unique λ and 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].
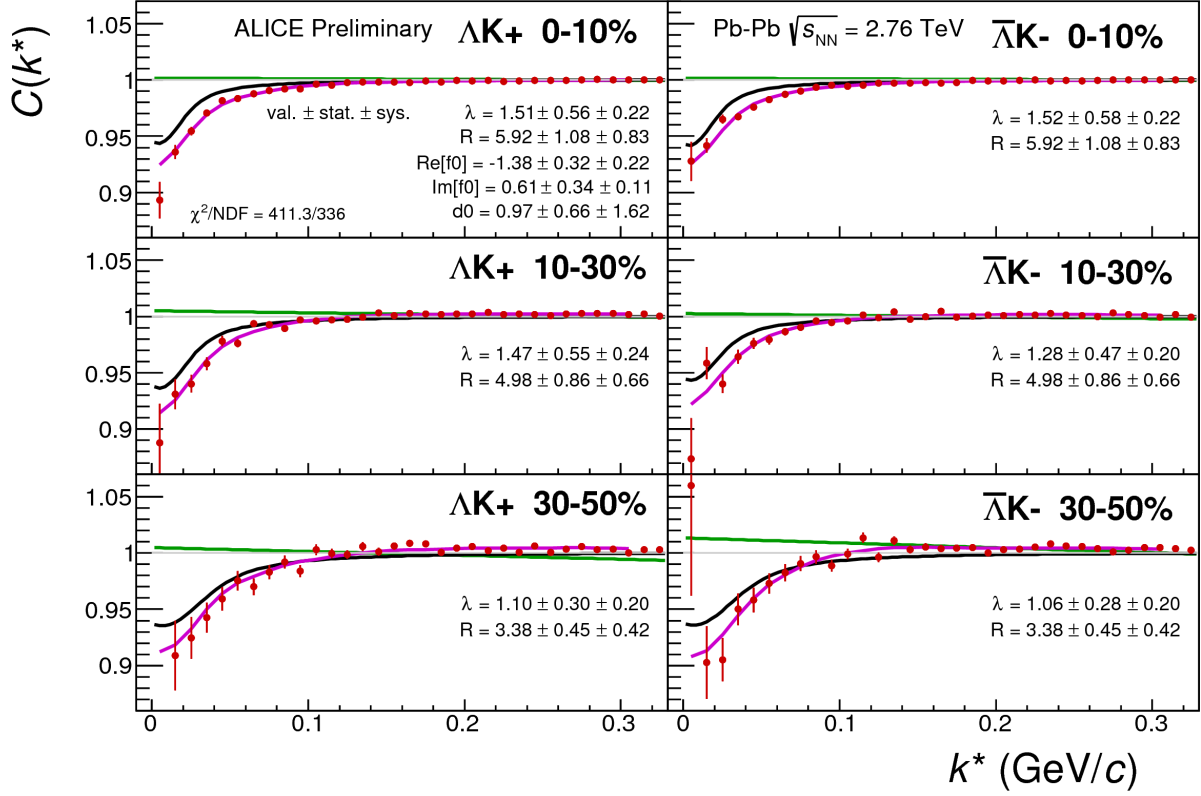
Fig. 2: Fits, with 10 residual correlations included, to the ΛK^+ (left) and $\bar{\Lambda} K^-$ (right) data for the centralities 0-10% (top), 10-30% (middle), and 30-50% (bottom). The lines represent the statistical errors, while the boxes represent the systematic errors. Each has unique λ and normalization 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, with 10 residual correlations included, 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.
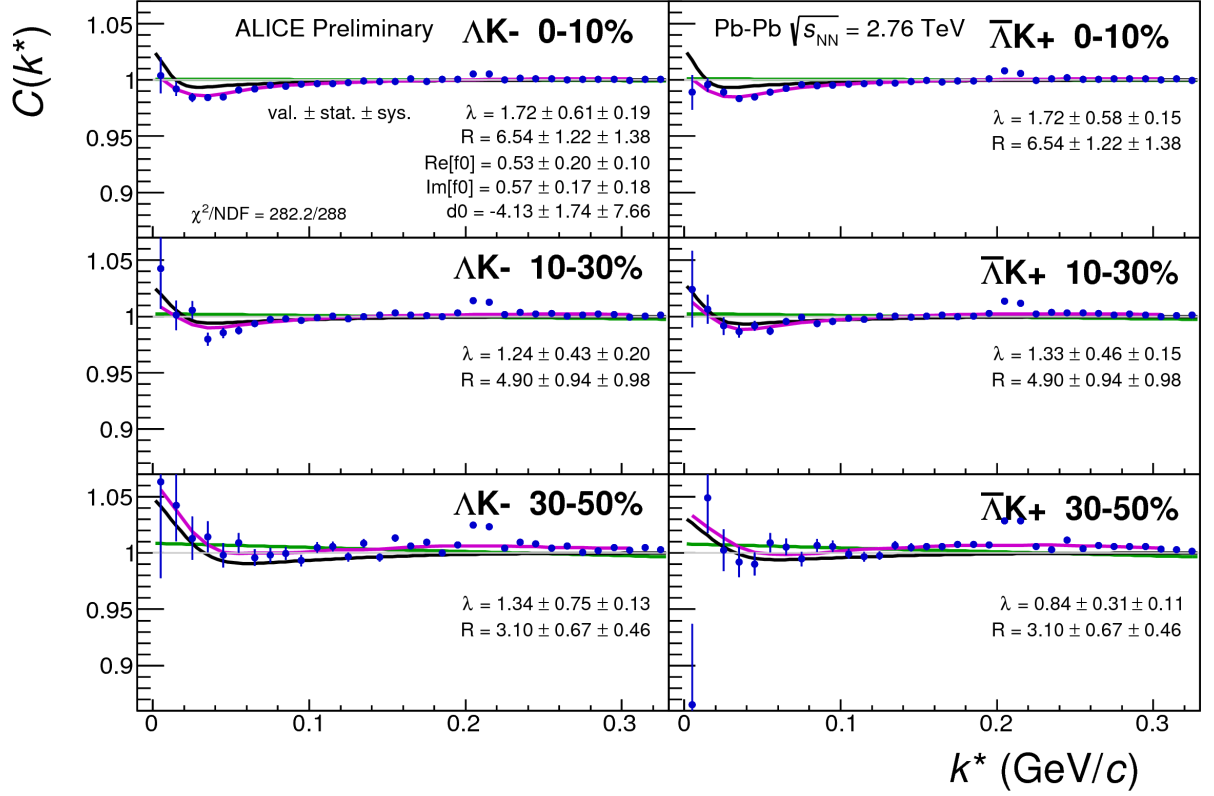
Fit Results $\Lambda(\bar{\Lambda})K_S^0$

Pair Type	Centrality	Fit Parameters				
		λ	R	$\mathbb{R}f_0$	$\mathbb{I}f_0$	d_0
ΛK_S^0	0-10%		2.94 ± 0.45 (stat.) ± 0.35 (sys.)			
	10-30%		2.39 ± 0.38 (stat.) ± 0.25 (sys.)			
	30-50%	0.60 ± 0.63 (stat.) ± 0.17 (sys.)	1.81 ± 0.29 (stat.) ± 0.12 (sys.)	-0.40 ± 0.12 (stat.) ± 0.17 (sys.)	0.17 ± 0.08 (stat.) ± 0.12 (sys.)	1.94 ± 0.47 (stat.) ± 0.77 (sys.)
$\bar{\Lambda} K_S^0$	0-10%		2.94 ± 0.45 (stat.) ± 0.35 (sys.)			
	10-30%		2.39 ± 0.38 (stat.) ± 0.25 (sys.)			
	30-50%		1.81 ± 0.29 (stat.) ± 0.12 (sys.)			

Table 1: Fit Results $\Lambda(\bar{\Lambda})K_S^0$, with 10 residual correlations included. Each pair is fit simultaneously with its conjugate (ie. ΛK_S^0 with $\bar{\Lambda}K_S^0$) 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%	1.51 ± 0.56 (stat.) ± 0.27 (sys.)	5.92 ± 1.08 (stat.) ± 0.51 (sys.)			
	10-30%	1.47 ± 0.55 (stat.) ± 0.31 (sys.)	4.98 ± 0.86 (stat.) ± 0.40 (sys.)			
	30-50%	1.10 ± 0.30 (stat.) ± 0.27 (sys.)	3.38 ± 0.45 (stat.) ± 0.28 (sys.)	-1.38 ± 0.32 (stat.) ± 0.34 (sys.)	0.61 ± 0.34 (stat.) ± 0.20 (sys.)	0.97 ± 0.66 (stat.) ± 0.42 (sys.)
$\bar{\Lambda} K^-$	0-10%	1.52 ± 0.58 (stat.) ± 0.33 (sys.)	5.92 ± 1.08 (stat.) ± 0.51 (sys.)			
	10-30%	1.28 ± 0.47 (stat.) ± 0.25 (sys.)	4.98 ± 0.86 (stat.) ± 0.40 (sys.)			
	30-50%	1.06 ± 0.28 (stat.) ± 0.16 (sys.)	3.38 ± 0.45 (stat.) ± 0.28 (sys.)			
ΛK^-	0-10%	1.72 ± 0.61 (stat.) ± 0.28 (sys.)	6.54 ± 1.22 (stat.) ± 0.90 (sys.)			
	10-30%	1.24 ± 0.43 (stat.) ± 0.25 (sys.)	4.90 ± 0.94 (stat.) ± 0.64 (sys.)			
	30-50%	1.34 ± 0.75 (stat.) ± 0.42 (sys.)	3.10 ± 0.67 (stat.) ± 0.40 (sys.)	0.53 ± 0.20 (stat.) ± 0.15 (sys.)	0.57 ± 0.17 (stat.) ± 0.11 (sys.)	-4.13 ± 1.74 (stat.) ± 1.53 (sys.)
$\bar{\Lambda} K^+$	0-10%	1.72 ± 0.58 (stat.) ± 0.31 (sys.)	6.54 ± 1.22 (stat.) ± 0.90 (sys.)			
	10-30%	1.33 ± 0.46 (stat.) ± 0.26 (sys.)	4.90 ± 0.94 (stat.) ± 0.64 (sys.)			
	30-50%	0.84 ± 0.31 (stat.) ± 0.31 (sys.)	3.10 ± 0.67 (stat.) ± 0.40 (sys.)			

Table 2: Fit Results $\Lambda(\bar{\Lambda})K^{\pm}$, with 10 residual correlations included.. 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 **??**).

Fit Parameters (value $\pm$ statistical error $\pm$ systematic error)				
Pair Type	**Centrality**	**R**		
ΛK^+ & $\bar{\Lambda}K^-$	0-10%	$5.92 \pm 1.08 \pm 0.51$		
	10-30%	$4.98 \pm 0.86 \pm 0.40$		
	30-50%	$3.38 \pm 0.45 \pm 0.28$		
		$\Re f_0$	$\Im f_0$	d_0
		$-1.38 \pm 0.32 \pm 0.34$	$0.61 \pm 0.34 \pm 0.20$	$0.97 \pm 0.66 \pm 0.42$
ΛK^- & $\bar{\Lambda}K^+$	0-10%	$6.54 \pm 1.22 \pm 0.90$		
	10-30%	$4.90 \pm 0.94 \pm 0.64$		
	30-50%	$3.10 \pm 0.67 \pm 0.40$		
		$\Re f_0$	$\Im f_0$	d_0
		$0.53 \pm 0.20 \pm 0.15$	$0.57 \pm 0.17 \pm 0.11$	$-4.13 \pm 1.74 \pm 1.53$
ΛK_S^0 & $\bar{\Lambda}K_S^0$	0-10%	$2.94 \pm 0.45 \pm 0.35$		
	10-30%	$2.39 \pm 0.38 \pm 0.25$		
	30-50%	$1.81 \pm 0.29 \pm 0.12$		
		$\Re f_0$	$\Im f_0$	d_0
		$-0.40 \pm 0.12 \pm 0.17$	$0.17 \pm 0.08 \pm 0.12$	$1.94 \pm 0.47 \pm 0.77$

Table 3: Fit Results $\Lambda(\bar{\Lambda})K^\pm$ and $\Lambda(\bar{\Lambda})K_S^0$, with 10 residual correlations included. (λ parameters not shown). This table is a condensed version of Tables 1 and 2
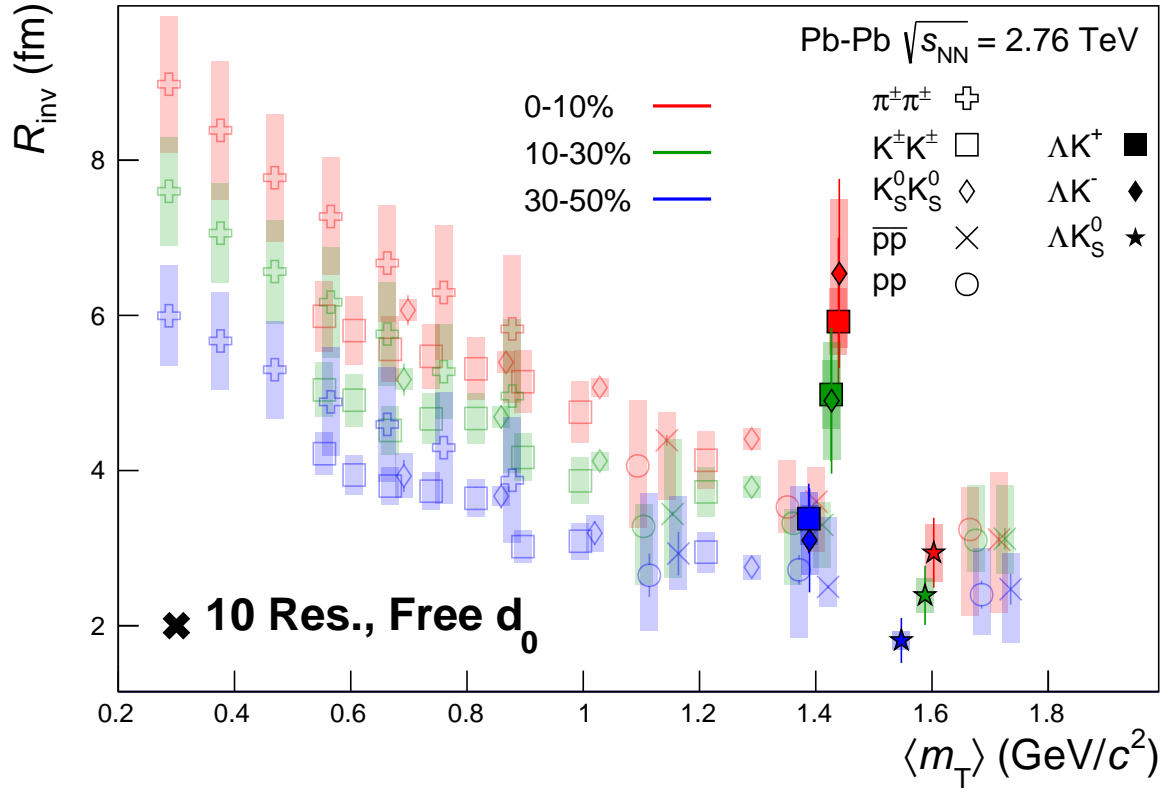
Fig. 4: 10 residual correlations in ΛK fits. Extracted fit R_{inv} parameters as a function of pair transverse mass (m_{T}) for various pair systems over several centralities. The ALICE published data [**?**] is shown with transparent, open symbols. The new ΛK results are shown with opaque, filled symbols. In the left, the ΛK^+ (with it's conjugate pair) results are shown separately from the ΛK^- (with it's conjugate pair) results. In the right, all $\Lambda K^\pm$ results are averaged.