0.1 Ξ Reconstruction

Our motivation for studying $\Xi^-K^\pm$ systems is to attempt to better understand the striking difference in the ΛK^+ and ΛK^- data at low k^* (Figure **??**).

The reconstruction of Ξ particles is one level above V0 reconstruction. V0 particles are topologically reconstructed by searching for the charged daughters' tracks into which they decay. With Ξ particles, we search for the V0 particle and charged daughter into which the Ξ decays. In the case of Ξ^-, we search for the Λ (V0) and π^- (track) daughters. We will refer to this π as the "bachelor π".

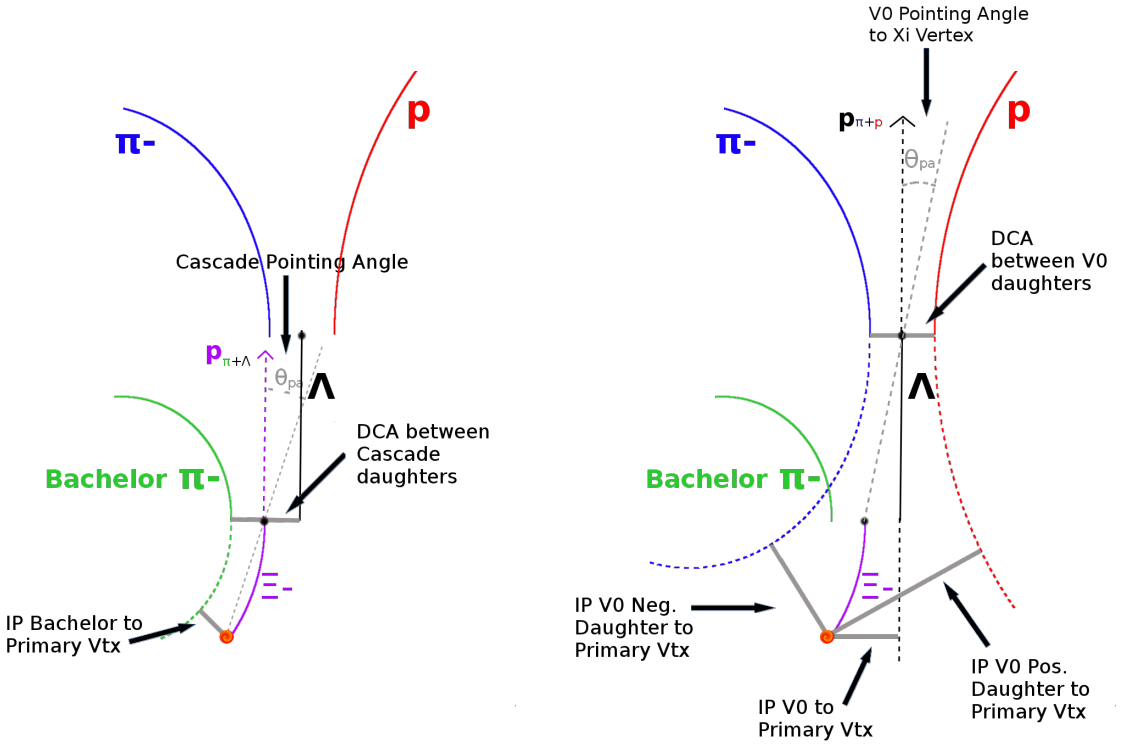
The following cuts were used to select good Ξ^- ($\bar{\Xi}^+$) candidates:

1. Shared Daughter Cut for Ξ Collection
   - Iterate through Ξ collection to ensure that no daughter is used in more than one Ξ candidate
   - Remove any candidate in which the bachelor π is also a daughter of the Λ (implemented in AliFemtoXiTrackPairCut class)

Ξ selection		
$\lvert\eta\rvert$		< 0.8
p_T		> 0.8 GeV/c
$\lvert m_{inv} - m_{PDG}\rvert$		< 3.0 MeV
DCA to prim. vertex		< 0.3 cm
Cosine of pointing angle		> 0.9992
Λ daughter cuts		
DCA to prim. vertex		> 0.2 cm
Cosine of pointing angle		> 0.0
Cosine of pointing angle to Ξ decay vertex		> 0.9993
OnFlyStatus		false
All other Λ and corresponding (π and p) daughter cuts are same as in primary Λ selection, and can be found in Sec. **??**		
Bachelor π cuts		
$\lvert\eta\rvert$		< 0.8
p_T		> 0.0 GeV/c
DCA to prim. vertex		> 0.1 cm
Number of clusters in the TPC		> 70
Daughter status		kTPCrefit
TPC and TOF Nσ Cuts		
$p < 0.5$ GeV/c		N$\sigma_{TPC} < 3$
$p > 0.5$ GeV/c	if TOF & TPC available	N$\sigma_{TPC} < 3$ & N$\sigma_{TOF} < 3$
	else	N$\sigma_{TOF} < 3$

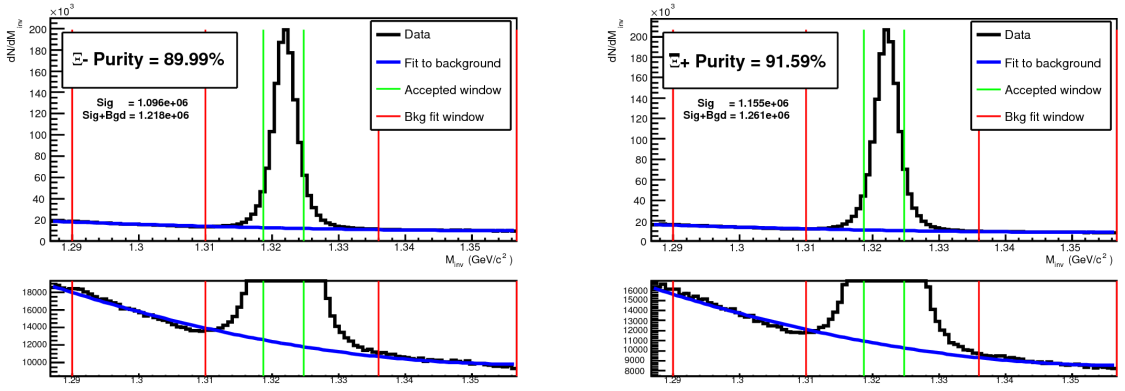
Table 1: Λ selection

The purity of our Ξ and $\bar{\Xi}$ collections are calculated just as those of our V0 collections **??**. Figure 2, which is used to calculate the purity, shows the m_{inv} distribution of our $\Xi(\bar{\Xi})$ candidates just before the final m_{inv} cut. Currently, we have Purity(Ξ^-) $\approx 90\%$ and Purity($\bar{\Xi}^+$) $\approx 92\%$.



(a) Ξ^- reconstruction. (b) Ξ^- daughter reconstruction.

Fig. 1: (Left) Ξ^- reconstruction (DCA to primary vertex for Ξ^- not shown). (Right) Ξ^- daughter reconstruction.



(a) Ξ^- Purity (b) $\bar{\Xi}$ Purity

Fig. 2: Invariant mass (m_{inv}) distribution for all Ξ^- (a) and $\bar{\Xi}^+$ (b) candidates immediately before the final invariant mass cut. The bottom figures are zoomed to show the background with fit. The vertical green lines represent the m_{inv} cuts used in the analyses, the red vertical lines delineate the regions over which the background was fit, and the blue line shows the background fit. These distributions are used to calculate the collection purities, Purity(Ξ^-) $\approx$ 90% and Purity($\bar{\Xi}^+$) $\approx$ 92%.