Secondary Vertex Reconstruction for Short and Long-live Particles

$D_0 \to K\pi\pi^0$ **and** $K_s^0 \to \pi^+\pi^-$

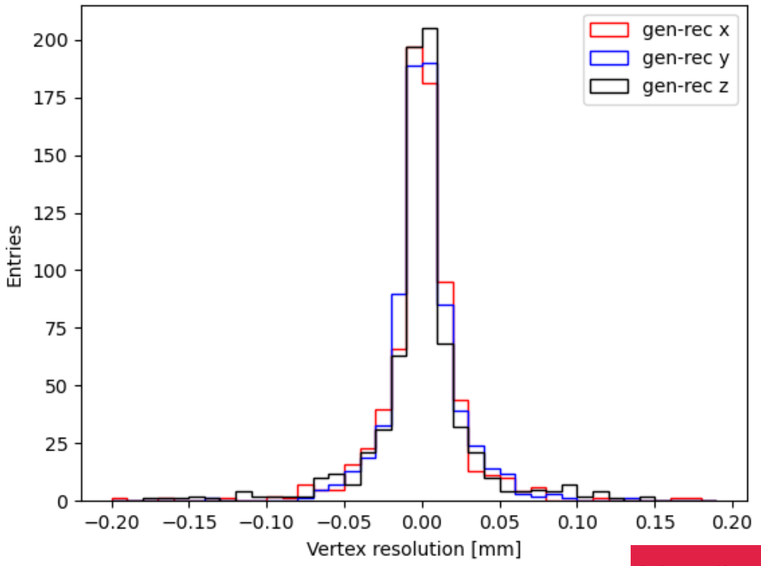
C.Zhang/14Feb2025

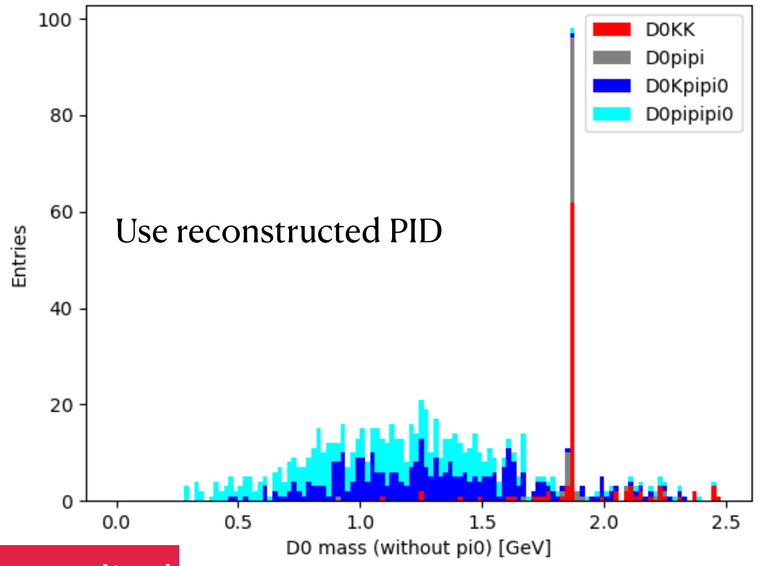
$D_0 \to K\pi\pi^0$ (E91_eebb events)

- Together with other relevant processes, $D_0 \to KK, \pi\pi, \pi\pi\pi^0$

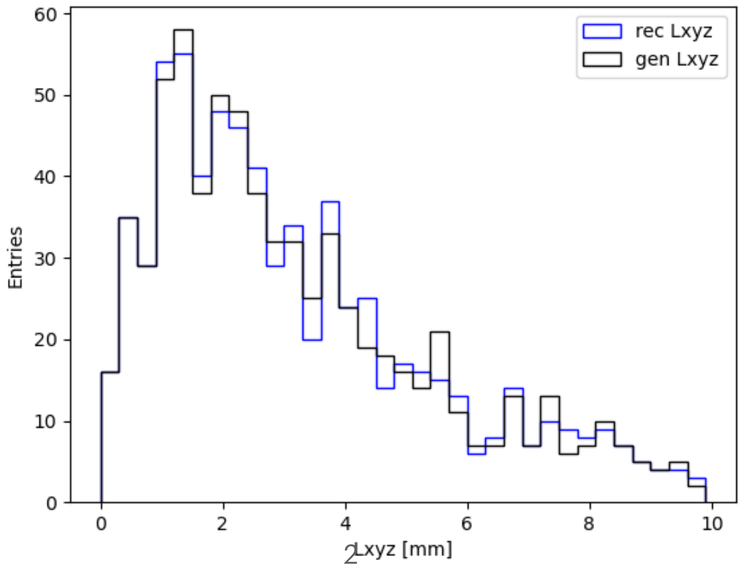
	Global efficiency	SV algorithm efficiency	
Events with two tracks reconstructed	94 %		
Vertex reconstructed	87 %	93 %	7% tracks used by prim vtx
Detector-cut	83 %	88 %	R(firsthit1 & 2) > R(vtx)
Kinematic-cut	82 %	87 %	(p1+p2) dot vtx > 0
Prefit-cut	75 %	80 %	Before fitting, chi2<100 (dof=1)
Postfit-cut	74 %	79 %	After fitting, Chi2<10 (dof=1)

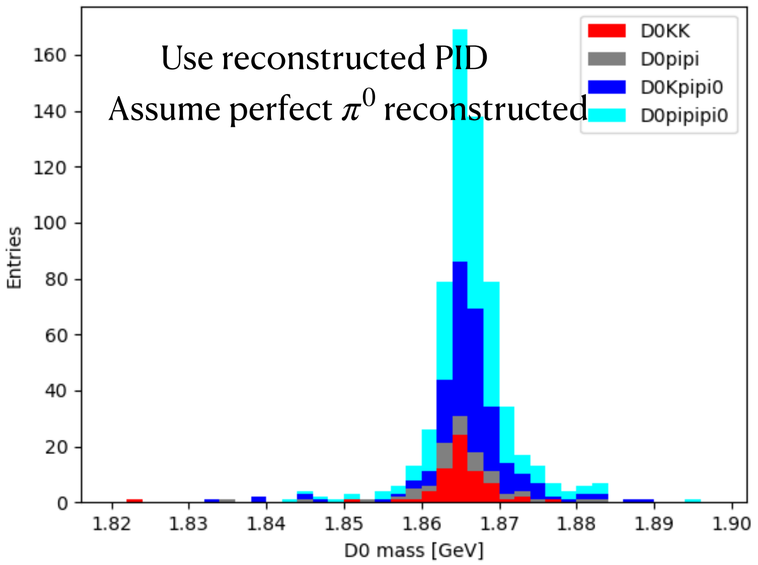
- Todo
  - Look into purity/background, go forward to the analysis





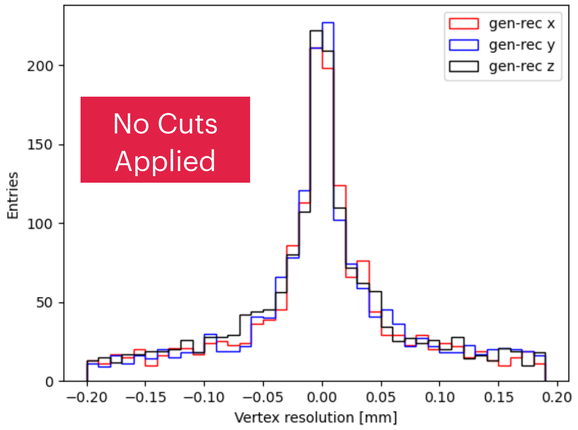
No Cuts Applied

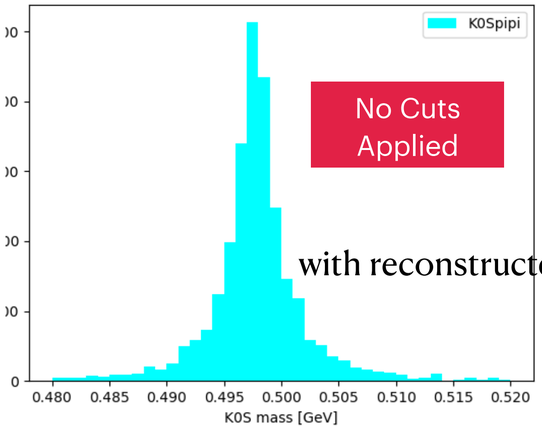




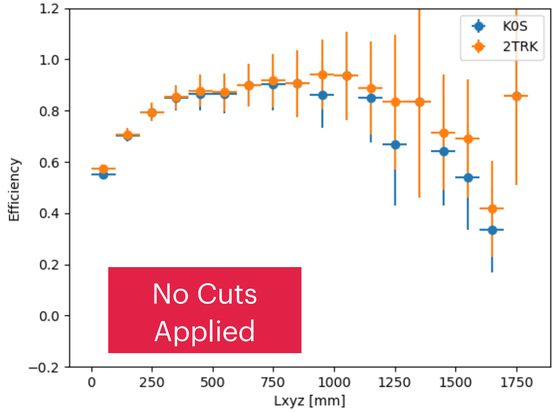
$K^0_S \to \pi^-\pi^+$ (E91_eebb events)

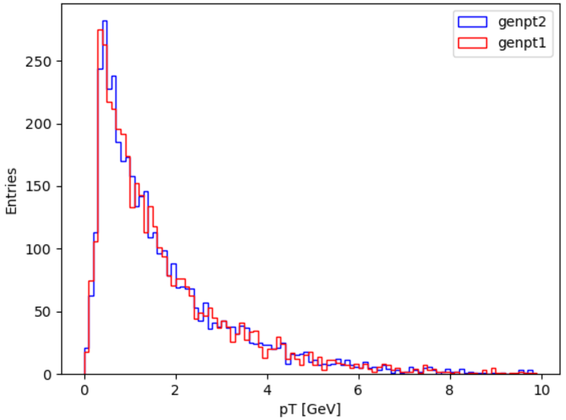
	Global efficiency	SV algorithm efficiency	
Events with two tracks reconstructed	68 % (from complete-tracks)		Compare to CDR, 74% (Zqq events)
Vertex reconstructed	66 %	98 % (from secondary tracks)	(in CDR, after several cuts, 80%)
Detector-cut	59 %	88 %	R(first-hit 1 & 2) > R(vtx)
Kinematic-cut	56 %	83 %	(p1+p2) dot vtx > 0
Prefit-cut	49.2 %	73 %	Before fitting, chi2<100 (dof=1)
Postfit-cut	48.7%	72 %	After fitting, Chi2<10 (dof=1),

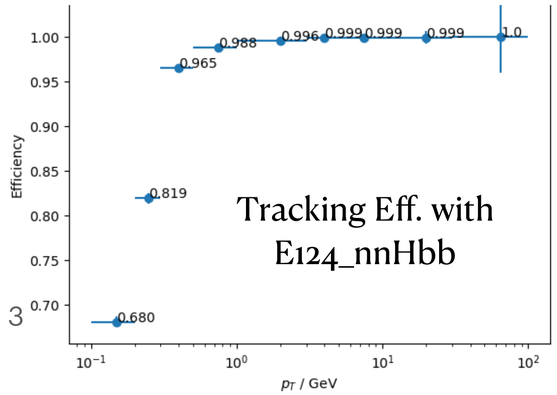




with reconstructed PID







Tracking Eff. with E124_nnHbb

- Todo
  - Prefit-cut to be optimised