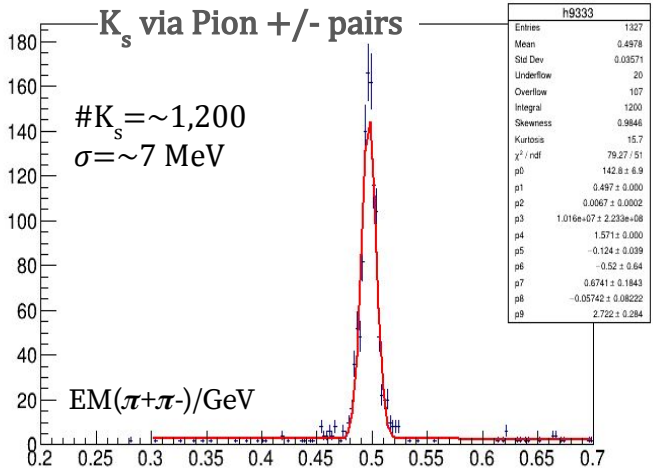
Possible reconstruction of $K_L + p \rightarrow K_L + p$ with uniformly distributed K_L momentum using plugin "fcal_tree" in comparison with "reaction filter".

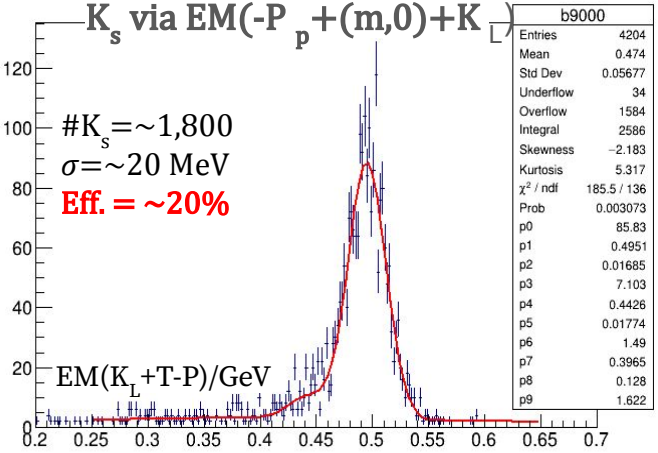
```
hd_root --nthreads=8 --sodir=$HALLD_MY/Linux_Alma9-x86_64-gcc11.4.1/plugins
-PPRINT_PLUGIN_PATHS=1
-PPLUGINS=EVENTRFBUNCH:USE_TAG=KLong -PVERTEX:USEWEIGHTEDAVERAGE=0
-PPLUGINS=monitoring_hists
-PPLUGINS=fcal_tree
hdgeant4_output_smeared.hddm >& deleteme.out ###/dev/null
```

The $K_L + p \rightarrow \mathbf{K_s} + p$ reaction was used to reconstruct the mass of K_s via 4-momentum of P4(K_L) +P4(target)-P4(p).

Similar reconstruction may be done in near future for $K_L + p \rightarrow \mathbf{K_L} + p$

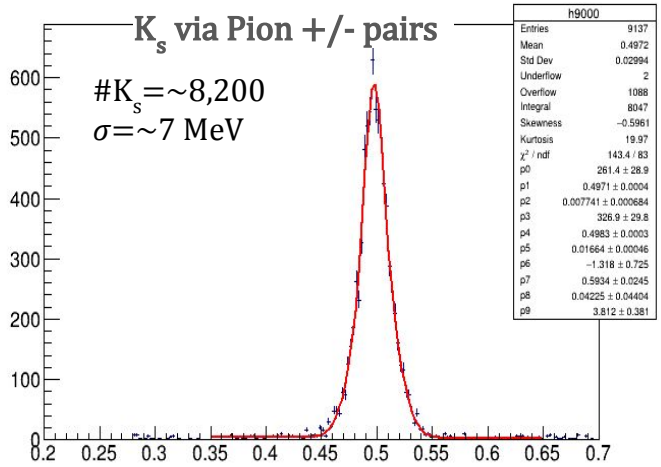
#K_L =10,000 ; beam momentum (0.1,0.6) GeV/c

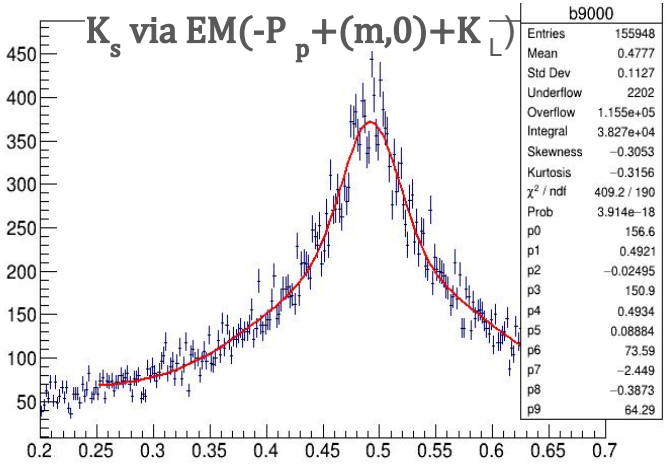




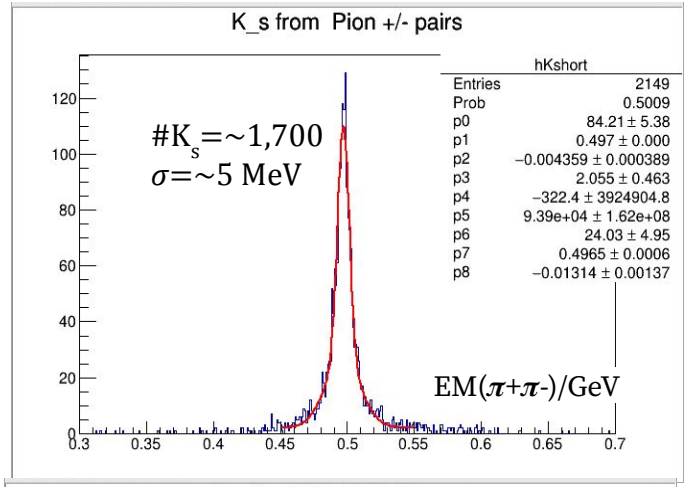
Plugin
#Beam
K-long =
=**0.2** Mpart.

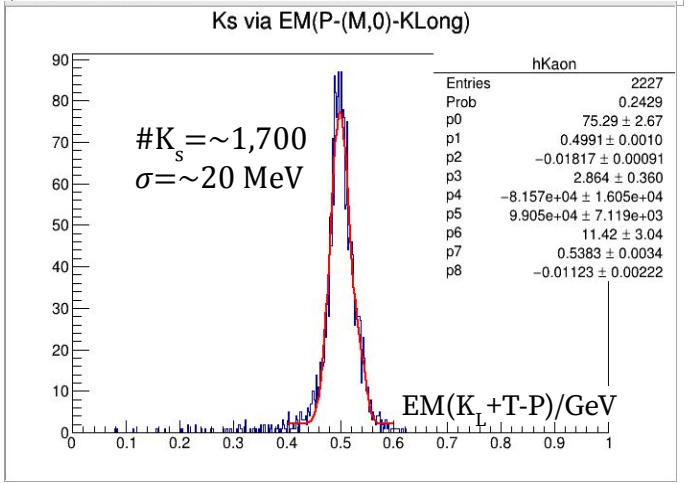
K_L beam momentum (0.6,12.) GeV/c





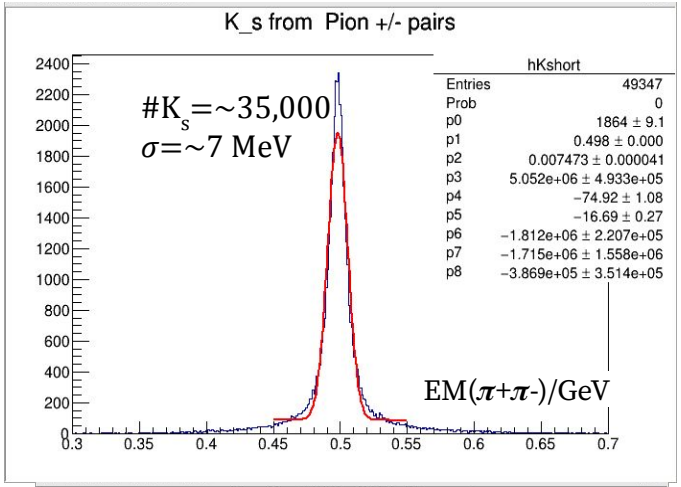
K_L beam momentum (0.1,0.6) GeV/c

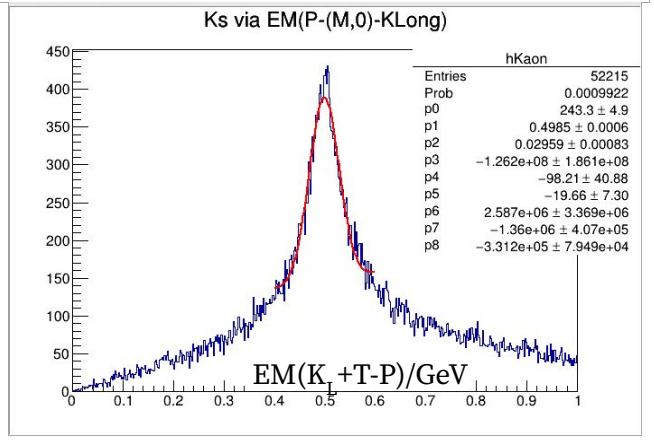




React. Filt.
#Beam
K-Long =
=1 Mpart.

K_L beam momentum (0.6,12.) GeV/c





Using a plugin such as “fcal_tree” we may reconstruct the reaction $K_L + p \rightarrow K_L + p$ with relatively high effectiveness of ~20% in low beam momentum domain (eff.=#reconstructed final kaon/# beam kaons).