

Cross Check between DTagAlg(Mine) and DsmSingAlg(Xinyu)

Mode	Mine	DsmSingAlg(Xinyu)
$K_S K$	22542	22542
$KK\pi$	115391	115391
$K_S K\pi^0$	12891	12891
$KK\pi\pi^0$	58827	58827
$K_S K\pi\pi$	13031	13031
$\pi\pi\pi$	35148	35148
$\pi\eta$	15332	15332
$\pi\pi^0\eta$	34405	34405
$\pi\eta'(\pi\pi\eta)$	11785	11785
$\pi\eta'(\gamma\rho)$	18304	18304
$K\pi\pi$	34665	34665

## DTagAlg

From all pion tracks,  $P_\pi > 0.1$  GeV

For pion tracks from  $K_S$ , use mdcTrack() to do  $dz$  and  $\cos\theta$  cut.

-----

$\chi_P \text{ vertex fit} < 100$

$0.487 < m_{\text{vertex fit } K_S} < 0.511$

For photon from  $\pi^0$ , do not use dang > 10 cut  
PS: Pi0EtaToGGRecAlg.PhotonApplyDangCut = true;

For photon from  $\pi^0$ , reject both photons in Endcap  
PS: Pi0EtaToGGRecAlg.RejectBothInEndcap = false;

## DsmSingAlg

From pion tracks from  $D_S$  directly,  $P_\pi > 0.1$  GeV(After boost)

For pion tracks from  $K_S$ , use mdcKalTrack() to do  $dz$  and  $\cos\theta$  cut.

$P_{K_S} = P_{\pi^+} + P_{\pi^-}$  before vertex fit  
and cut  $0.398 < m_{K_S} < 0.598$

-----

$0.487 < m_{\text{second vertex fit } K_S} < 0.511$

For all photon from  $\pi^0$ , use dang > 10 cut

-----

## DTagAlg

For photon from  $\eta$ , do not use  $dang > 10$  cut  
PS: Pi0EtaToGGRecAlg.PhotonApplyDangCut = true;

For photon from  $\eta$ , reject both photons in Endcap  
PS: Pi0EtaToGGRecAlg.RejectBothInEndcap = false;

Sum the momentum of final states to  
get the momentum of  $D_s$  directly

For  $P_{\pi^0} > 0.1$  GeV, sum the momentum of  
photon directly

-----

-----

## DsmSingAlg

For all photon from  $\eta$ , use  $dang > 10$  cut

-----

Do second vertex fit for  $K_s$  and KinematicFit for  $\pi^0$   
then sum the momentum of final states to get the  
momentum of  $D_s$

For  $P_{\pi^0} > 0.1$  GeV, sum the momentum of  
photon after kinematicFit.

Sum the momentum of pion from  $K_s$  and veto its mass  
(0.468, 0.528) GeV in  $D_s^+ \rightarrow \pi^+ \pi^- \pi^+$  mode and  
 $D_s^+ \rightarrow K^+ \pi^- \pi^+$  GeV (have added)

Sum the momentum of pi0(after kinematicFit) and pion  
from  $\rho$  and require its mass in (0.62, 0.92) GeV in  
 $D_s^+ \rightarrow \pi^+ \pi^0 \eta$  mode

# Summary

- ✓ Now I have checked that the results from DTagAlg package can be the same as DsmSingAlg package.
- ✓ My code which I use now doesn't contain code BUGs.
- ✓ Some adjustments will be applied:
  - From pion tracks from  $D_s$  directly,  $P_\pi > 0.1$  GeV(After boost)
  - For  $P_{\pi^0} > 0.1$  GeV, sum the momentum of photon after kinematicFit.
  - Sum the momentum of pion from  $K_s$  and veto its mass (0.468, 0.528) GeV in  $D_s^+ \rightarrow K^+ \pi^- \pi^+ \text{ GeV}$ .
- ✓ Some changes will be applied:
  - Pi0EtaToGGRecAlg.PhotonApplyDangCut = true;
  - Pi0EtaToGGRecAlg.RejectBothInEndcap = false;
  - Sum the momentum of pion from  $K_s$  and veto its mass (0.468, 0.528) GeV in  $D_s^+ \rightarrow \pi^+ \pi^- \pi^+ \text{ mode}$

