Update on $D \to hh\pi^0$ decays @ CEPC

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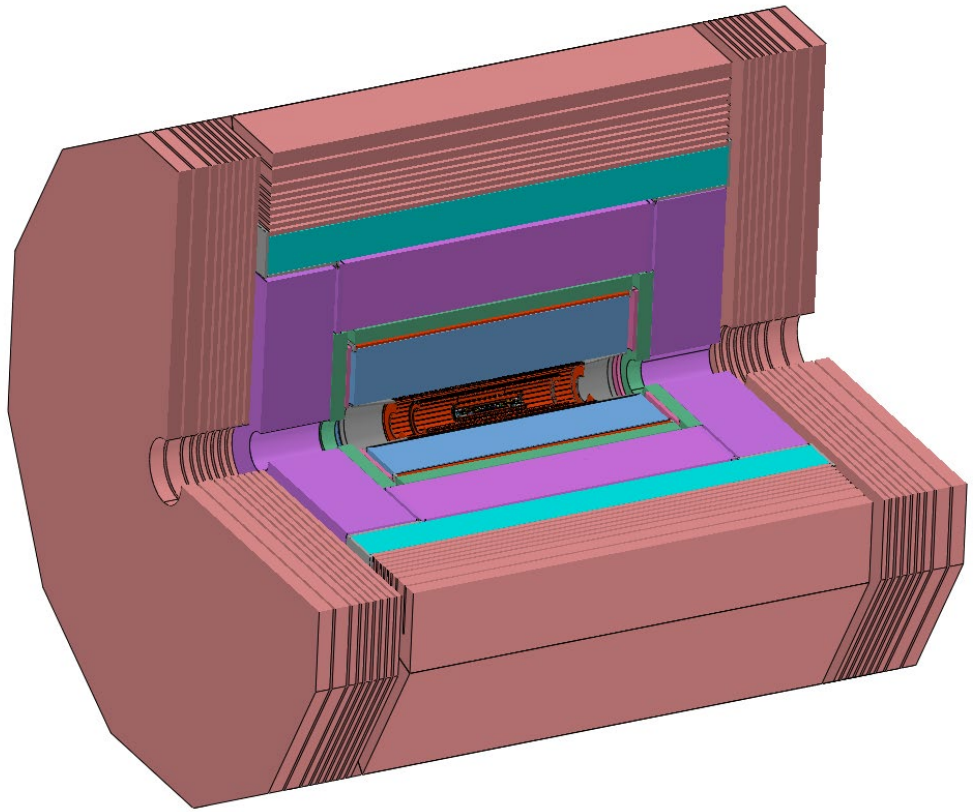
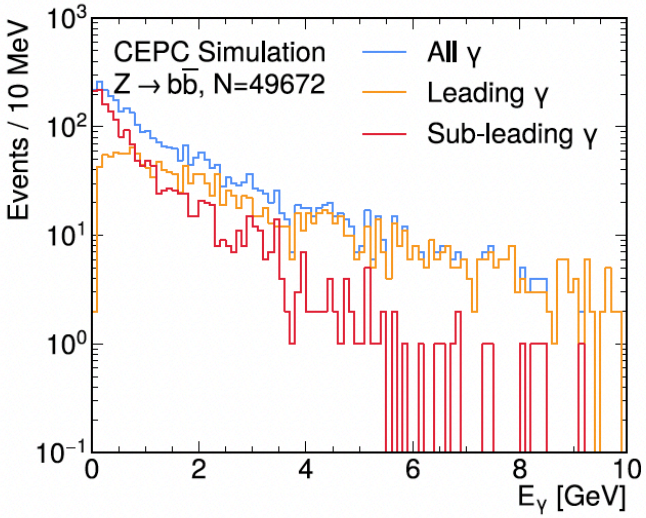


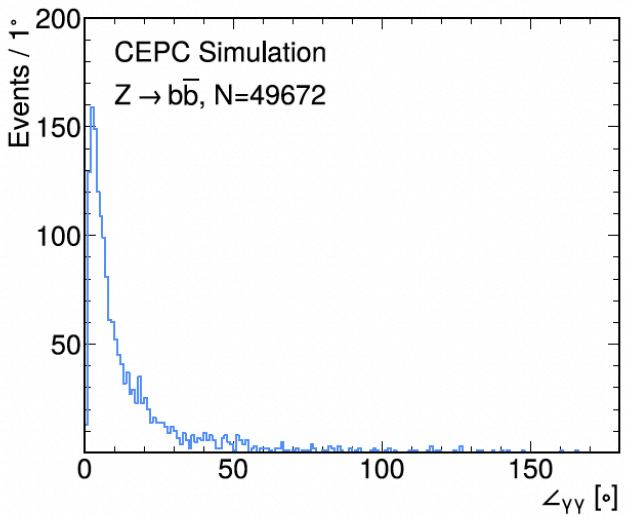
Reconstruct $D \to hh\pi^0$ decays at CEPC detector

- MC sample produced from $e^+e^- \to Z \to b\bar{b}$ at $\sqrt{s} = 91.2$ GeV
  - /cefs/higgs/zhangkl/Production/25036/E91.2_eebb/Reco/rec_E91.2_eebb_*.root
  - The version of CEPCSW is tdr.25.3.2
- Test with 160k collisions
  - Number of truth D^0: 211231
  - Number of truth $D^0 \to K^-\pi^+\pi^0$: 23842
  - Number of truth $D^0 \to \pi^-\pi^+\pi^0$: 3215

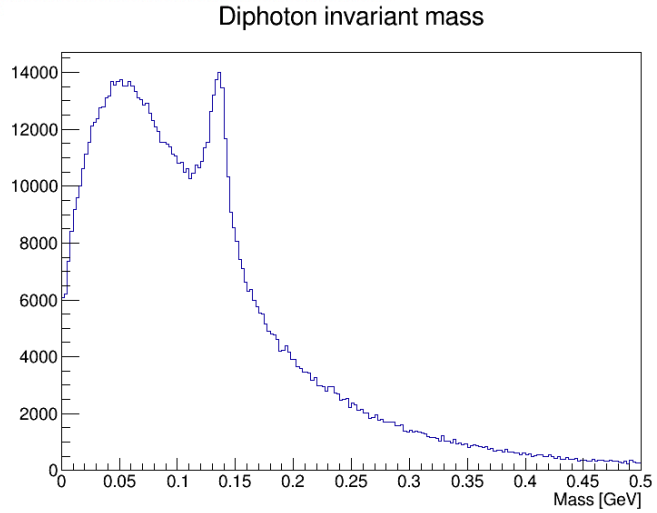
Step 1: π^0 reconstruction

- Truth distribution of γ energy and open angle between 2 γ's



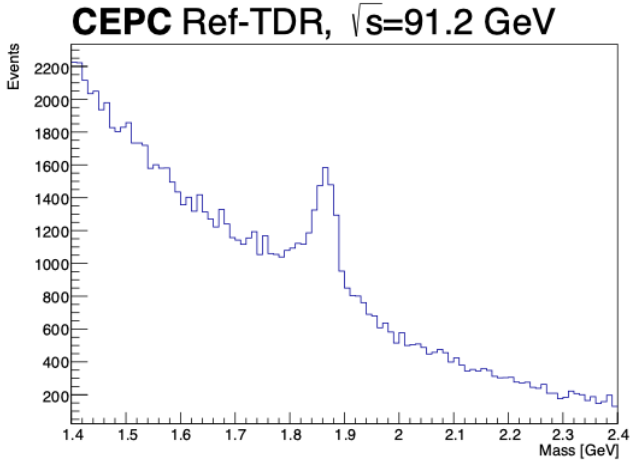


- Select one γ in PFOs with E > 0.5 GeV, then combine a second γ within 10 degrees of open angle
  - Select diphoton between 0.12 and 0.15 GeV as π^0s

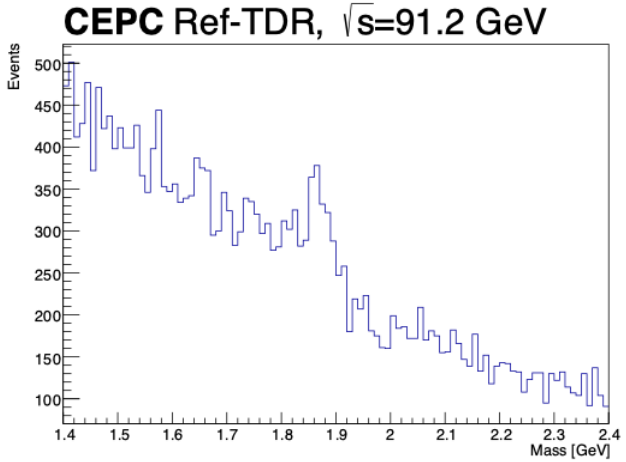


Step 2: combining π^0 with two other tracks

- Two tracks:
  - Select one K(pi) track and one pi track from PFOs using PID information
  - Combine them with π^0 candidates
- Constrain PFO objects with
  - Momentum of charged K and π tracks > 0.5 GeV
  - Angle between charged K and π tracks < 20 degree
  - Angle between K and diphoton momentum direction < 20 degree
  - No vertex used
  - No Truth information used



Kpipi0



pipipi0

Step 3: fits and Dalitz plot

- Clear D0 peak
  - Purity ~ 40%, eff ~20%
- Clear K* and rho resonance structures in Dalitz plot

- Nuisance asymmetries not considered, systematics not considered