Short status report of HZZ EFT study

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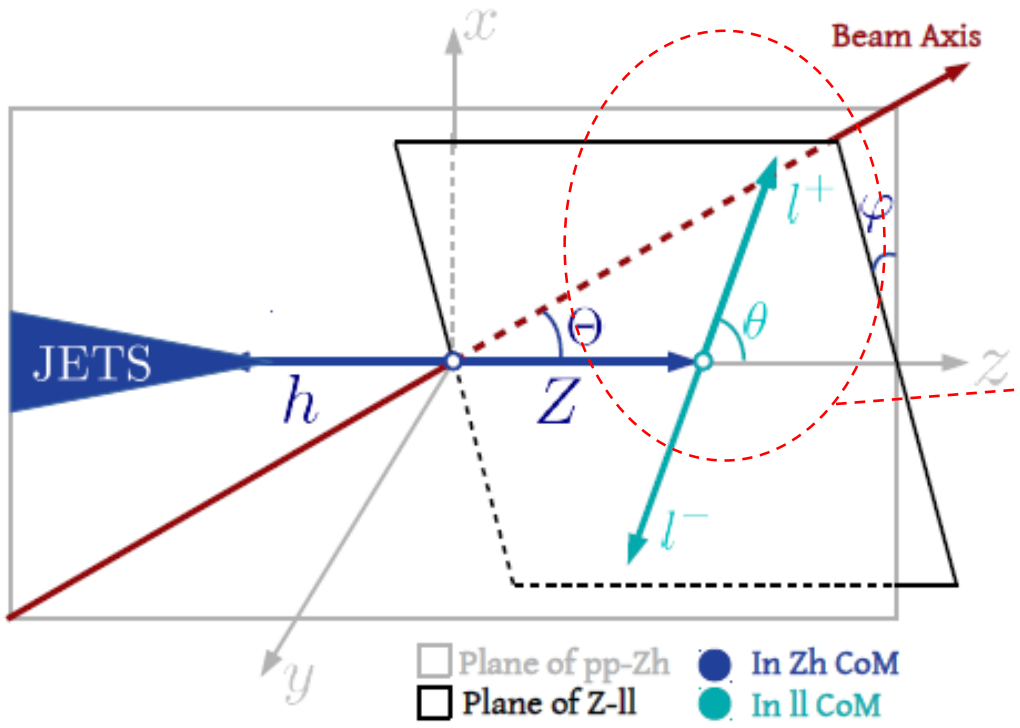
Acceptance Mask

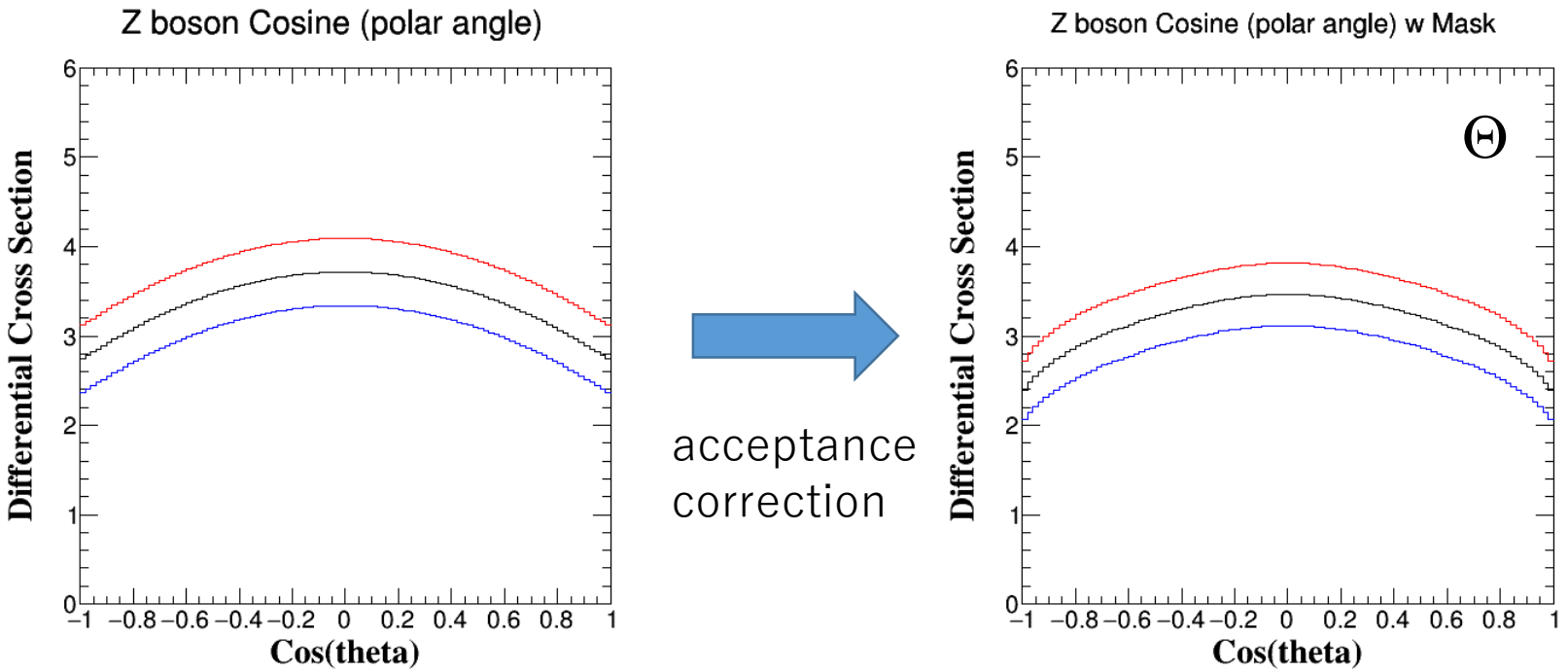


1. Using momentum of Z boson, boost the lepton direction
   (P_Z ~ 51.58 GeV/c , for ee->ZH)

2. From Θ, new θ, and ϕ, calculating the polar angle of lepton pairs, and mask the events(=ratio in the model)
   if, cos(theta) < 0.996

Comparison: Z boson polar angle

$$\Delta\mathcal{L}_6^{hZ\bar{f}f} \supset \delta\hat{g}_{ZZ}^{h}\,\frac{2m_Z^2}{v}h\frac{Z^\mu Z_\mu}{2} + \sum_f g_{Zf}^{h}\,\frac{h}{v}Z_\mu\bar{f}\gamma^\mu f + \kappa_{ZZ}\,\frac{h}{2v}Z^{\mu\nu}Z_{\mu\nu} + \tilde{\kappa}_{ZZ}\,\frac{h}{2v}Z^{\mu\nu}\tilde{Z}_{\mu\nu}.$$



: SM

$\left(\delta\hat{g}_{ZZ}, g_{Zf}^{h}, \kappa_{ZZ}, \tilde{\kappa}_{ZZ}\right) = (0,0,0,0)$

: BSM

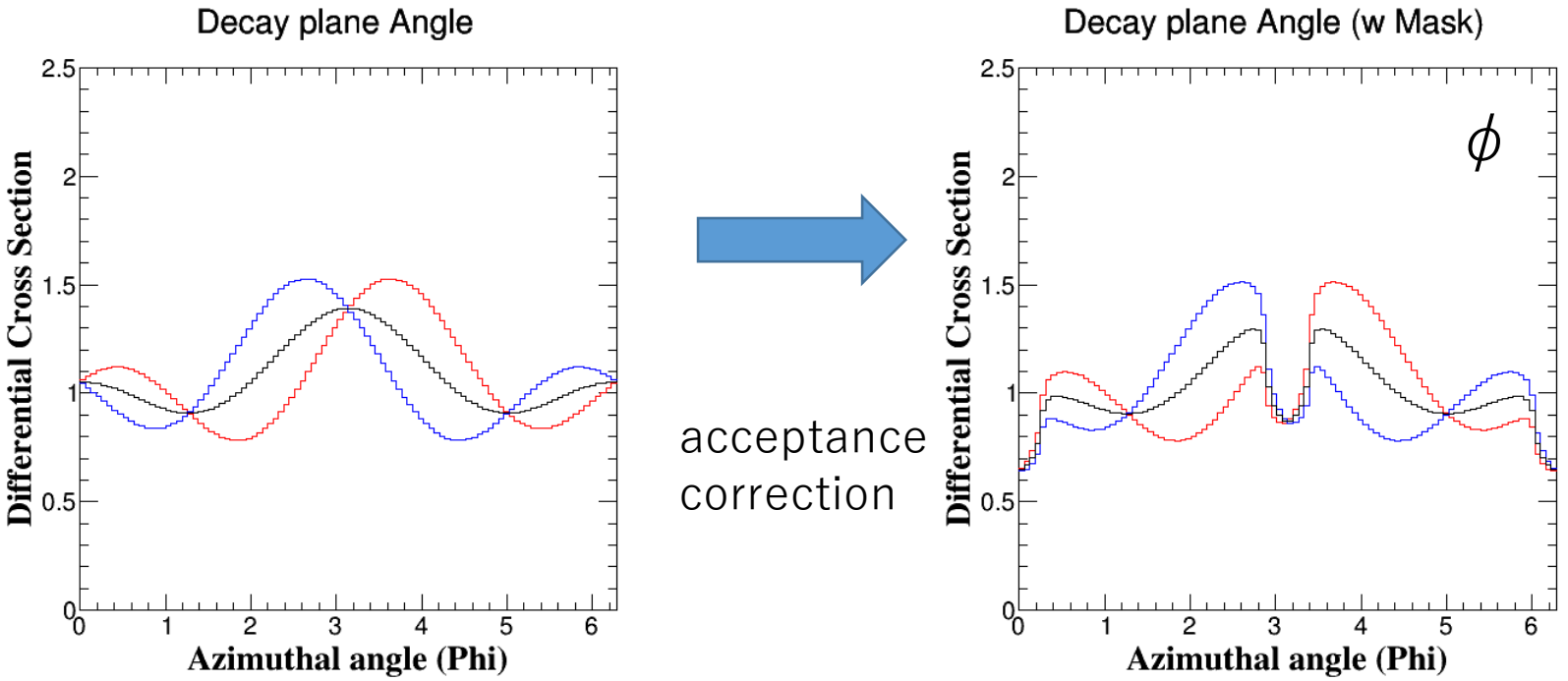
$\left(\delta\hat{g}_{ZZ}, g_{Zf}^{h}, \kappa_{ZZ}, \tilde{\kappa}_{ZZ}\right) = (0,0,+0.02,0)$

: BSM

$\left(\delta\hat{g}_{ZZ}, g_{Zf}^{h}, \kappa_{ZZ}, \tilde{\kappa}_{ZZ}\right) = (0,0,-0.02,0)$

Comparison: diff. of plane angle

$$\Delta\mathcal{L}_6^{hZ\bar{f}f} \supset \delta\hat{g}_{ZZ}^{h}\,\frac{2m_Z^2}{v}h\frac{Z^\mu Z_\mu}{2} + \sum_f g_{Zf}^{h}\,\frac{h}{v}Z_\mu \bar{f}\gamma^\mu f + \kappa_{ZZ}\,\frac{h}{2v}Z^{\mu\nu}Z_{\mu\nu} + \tilde{\kappa}_{ZZ}\,\frac{h}{2v}Z^{\mu\nu}\tilde{Z}_{\mu\nu}.$$



: SM

$\left(\delta\hat{g}_{ZZ}, g_{Zf}^{h}, \kappa_{ZZ}, \tilde{\kappa}_{ZZ}\right) = (0,0,0,0)$

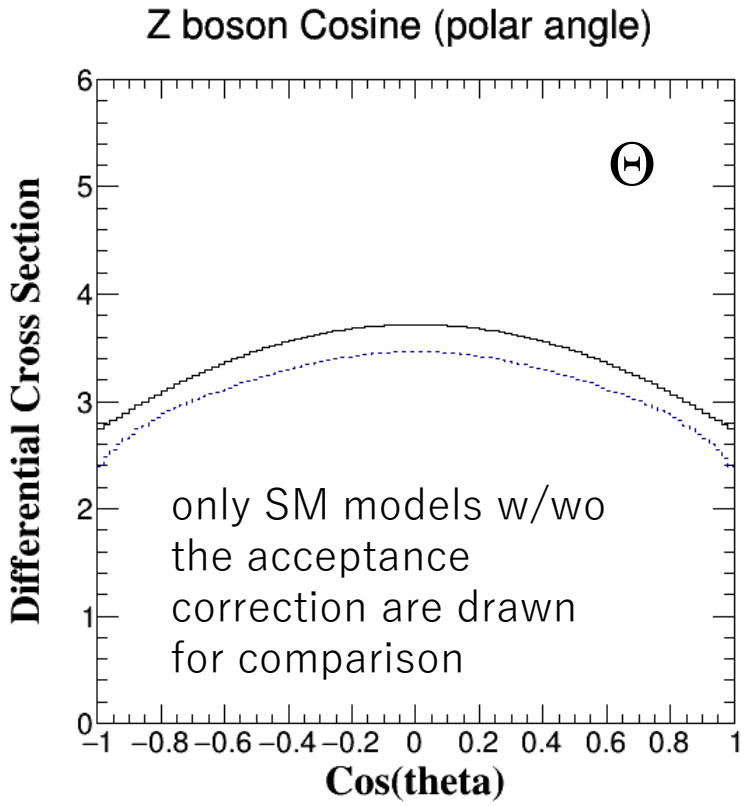
: BSM

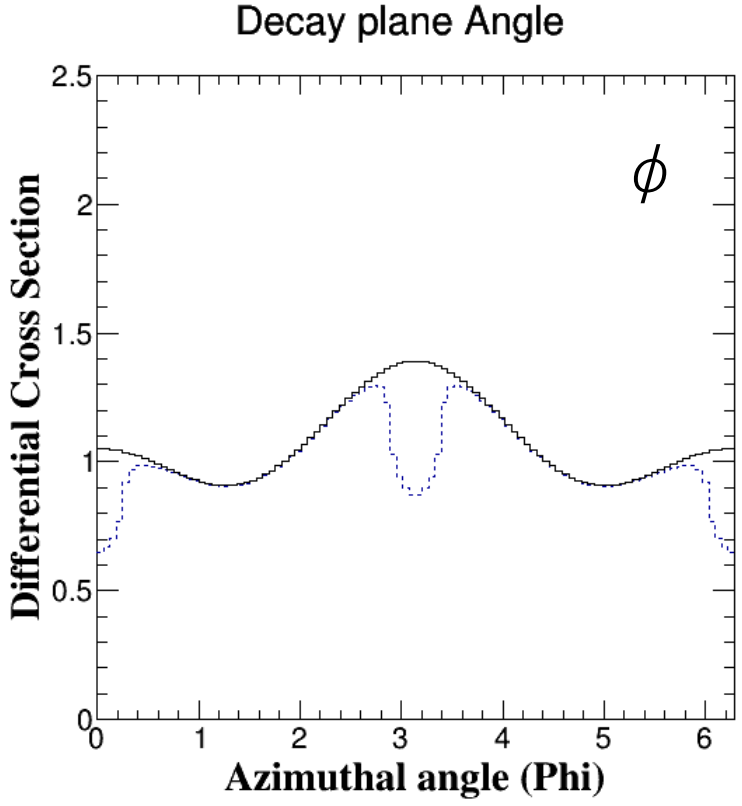
$\left(\delta\hat{g}_{ZZ}, g_{Zf}^{h}, \kappa_{ZZ}, \tilde{\kappa}_{ZZ}\right) = (0,0,0,+0.2)$

: BSM

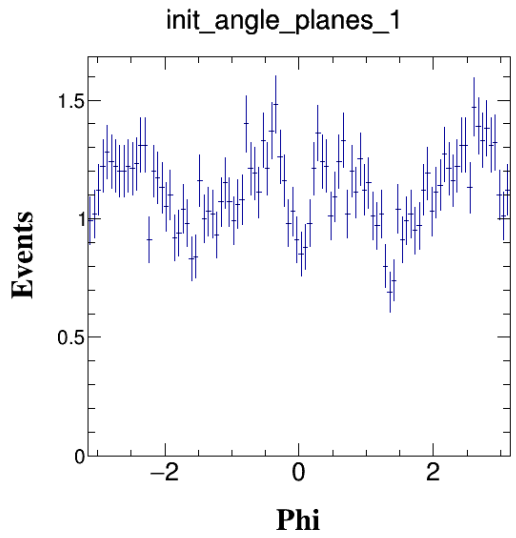
$\left(\delta\hat{g}_{ZZ}, g_{Zf}^{h}, \kappa_{ZZ}, \tilde{\kappa}_{ZZ}\right) = (0,0,0,-0.2)$

Comparison: w/wo the acceptance correction





Ref : CEPC MC data



azimuthal angle

Next

・ Try to fit (compare) the two distribution ,
analysis result from CEPC data & the model .
(in my eye, the statistics would be a matter ,,,)