W mass direct measurement via Single-W process

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—> Updates and current status of my study

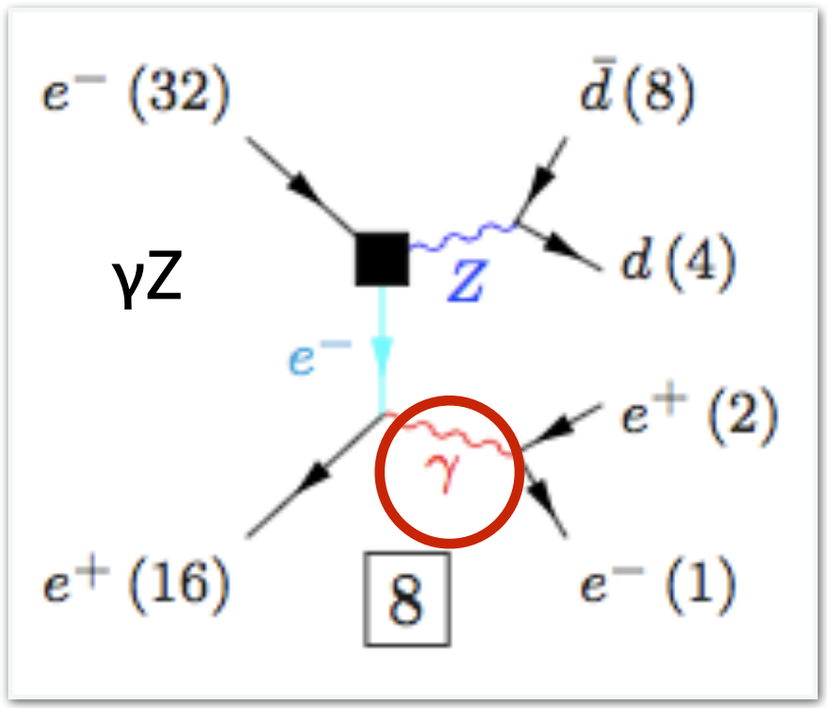
Currently working on

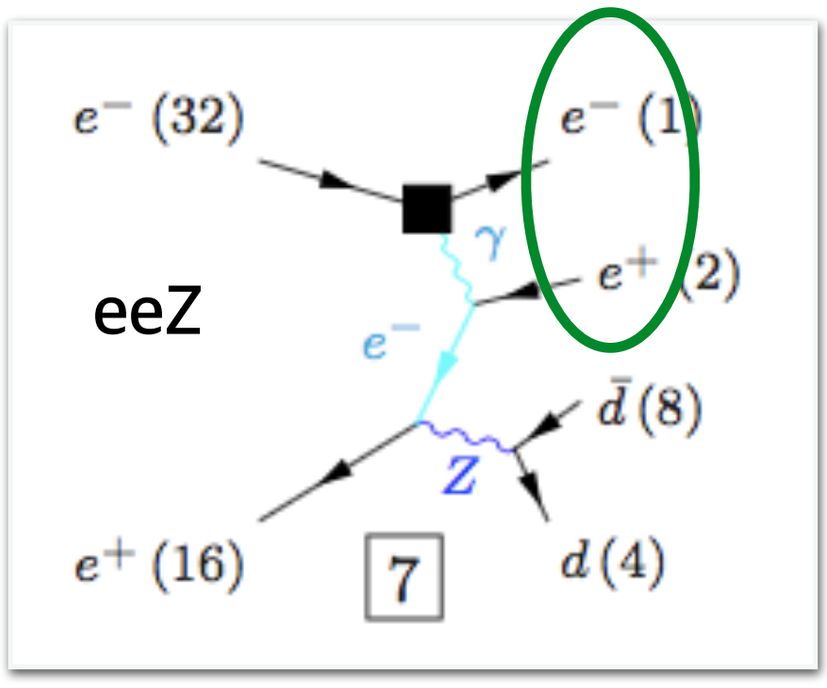
- W mass systematic error from jet energy scale uncertainty
  - JES uncertainty may be very sensitive to the error of hadronic Z mass
    - how many available hadronic Zs ?
    - how much the error on m_Z ?

—> Check Z control samples to estimate N of available Zs

Z production processes

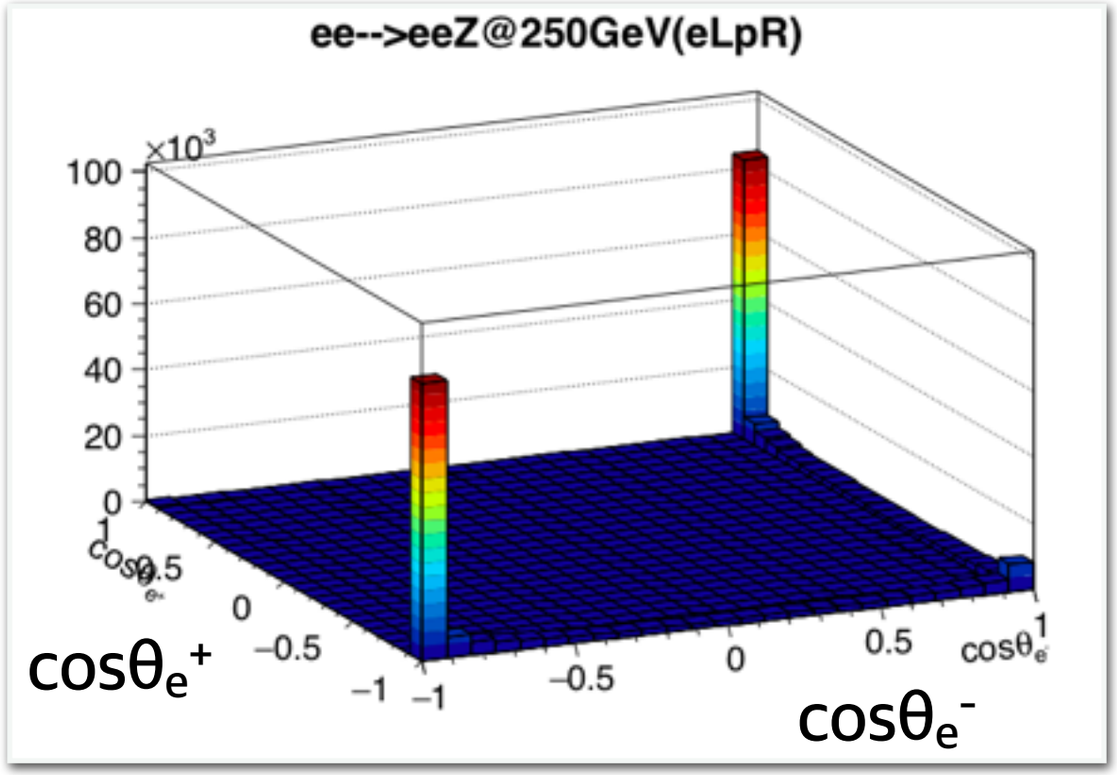
- ee —> γZ (radiative return)
- ee —> eeZ (t-channel)
- ee —> ννZ (WW-fusion)
- ee —> ZZ (t-channel)

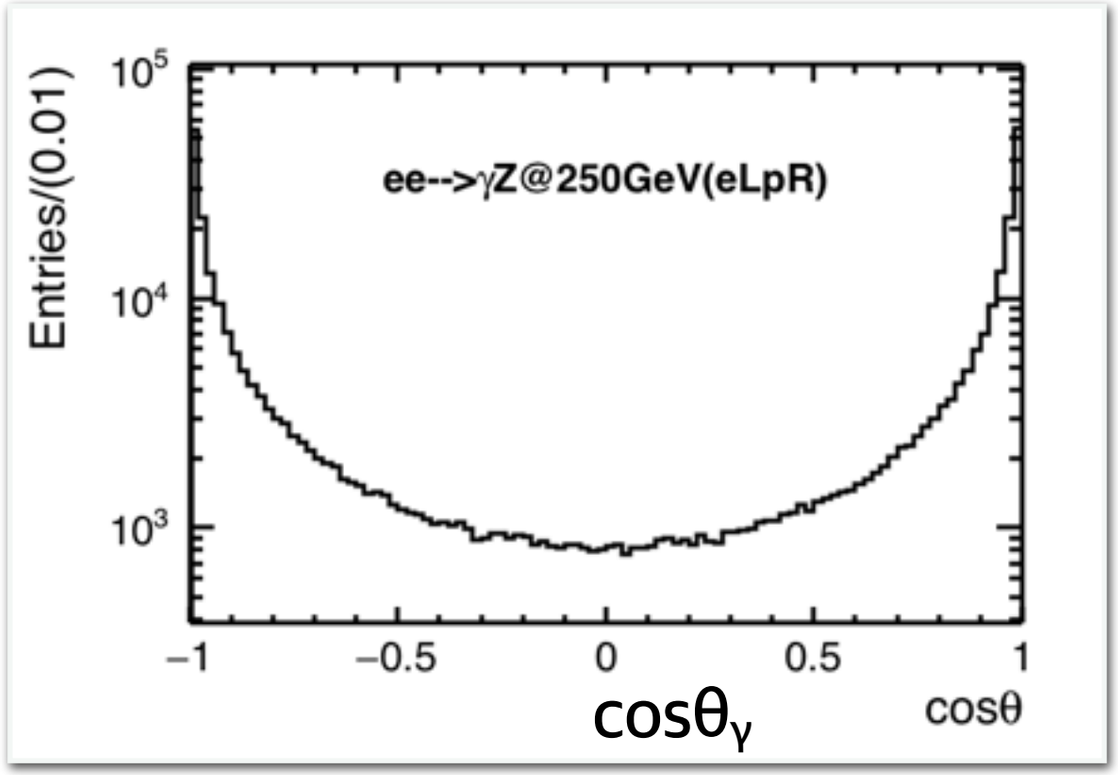




if some key particles could not be detected, those events are not accepted

ee —> eeZ & γZ





	xsec @ 250GeV P(e-,e+)=(-1,1)	criteria	detector acceptance
ee —> eeZ	5061 fb^{-1}	$\lvert\cos\theta_{e^-}\rvert < 0.99$ $\lvert\cos\theta_{e^+}\rvert < 0.99$	4.16%
ee —> γZ	33498 fb^{-1}	$\lvert\cos\theta_{\gamma}\rvert < 0.99$	82.31%

Summary and next

- Summary
  - some Z production processes have high cross sections
  - but some key particles actually go to beam pipe so that they cannot be detected
  - hence this detector acceptance affects the effective luminosities of those Z control samples
    - e.g. in the case of ee—>eeZ, acceptance is only ~4%
      - if $|\cos\theta_{e^-}|<0.99$ && $|\cos\theta_{e^+}|<0.99$
    - considering the selection efficiency of isolated electron and positron, it will be worth by a factor of ~0.7*0.7
    - and the decay fraction ~0.7(hadronic)