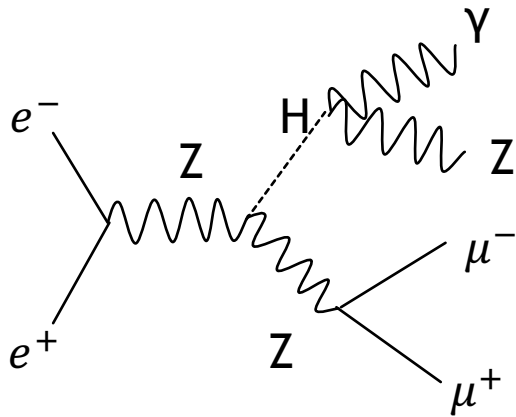




Analysis of $H \rightarrow Z\gamma$ decay channel at the ILC center of mass energy 250GeV

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Confirm cross section



► At 250GeV in SM

$$\sigma_{LR} = 17.14 \times 0.154\% fb$$

$$\sigma_{RL} = 10.98 \times 0.154\% fb$$

► Set up

$$L = 2000 fb^{-1} \text{ (ILC 250GeV scenario)}$$

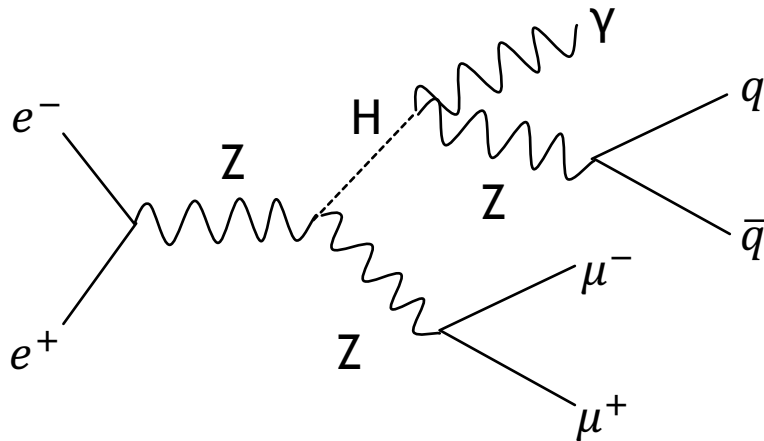
$$(P_{e^-}, P_{e^+}) = (-0.8, +0.3)$$

32.04 events generated

Pre-selection method

► Target: $e^-e^+ \rightarrow ZH, Z \rightarrow \mu^-\mu^+, H \rightarrow Z\gamma \rightarrow q\bar{q}$

1. Isolate lepton pair selection
2. Isolate photon selection
3. 2 Jets selection



Result of pre-selection

	No Cut	Pre-selecion
Signal	32.04629	24.494998
2f_z_bhabhag	50366740	7430149
2f_z_l	25987700	612571
4f_size_sl	756562	162953
4f_size_l	2106889	124199
4f_zz_sl	1713857	77461
Other bkg	233227790	43559

Method of making variables

Reconstructing higgs

- ① $\gamma + Z$
- ② 250GeV - Z

Choosing recoiled Z

- ① Higgs mass
- ② Z's momentum
- ③ Z's momentum in H rest fame

- ▶ Try to make variables with 6 methods.
- ▶ Frist, analize with $\gamma + Z$ and Higgs mass method

Cut condition

1. Lepton pair's particle ID = 13(muon)
2. $80\text{GeV} < M_{Z1} < 100\text{GeV}$, $60\text{GeV} < M_{Z2} < 120\text{GeV}$
3. $M_\gamma < 0.15\text{GeV}$, $190\text{GeV} < M_{\gamma\text{recoil}} < 235\text{GeV}$
4. $120\text{GeV} < M_{Z\text{recoil}} < 140\text{ GeV}$, $45\text{GeV} < P_{Z1} < 70\text{GeV}$
5. $N_{\text{PFOS}} > 21$
6. $|\cos\theta_\gamma| < 0.85$
7. $5000 < P_\gamma(280 + 126\cos\theta_{Z\gamma}) < 10000$
8. $|\cos\theta_{\text{missing}}| < 0.98$
9. **energyratio > 0.9**

Result of cutting

► $H = \gamma + Z$ & H mass selection

①

