

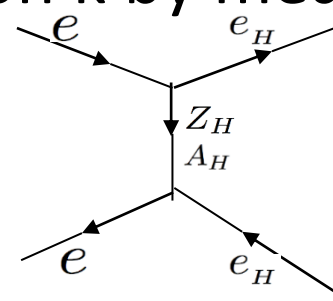
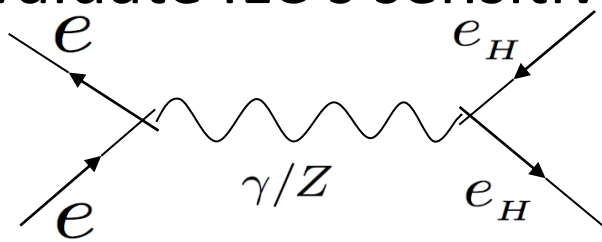
Little Higgs with T-parity@ ILC

12.3 optimization meeting
Tohoku Univ Eriko Kato

Analysis mode

Aim of this study:

Evaluate ILC's sensitivity on κ by measuring the mass of e_H .

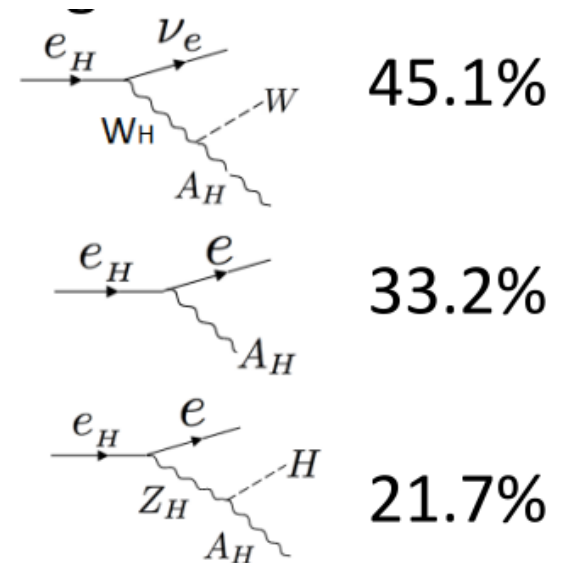


$$m_{e_H} = \sqrt{2} \kappa f = 410 \text{ GeV}$$

Analysis mode

There are 3 ways e_H can decay.

-> we will now focus on $e_H e_H \rightarrow e_{ZH} e_{ZH}$

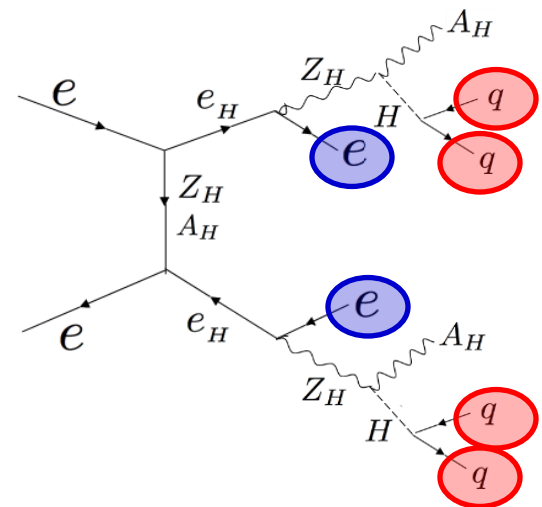
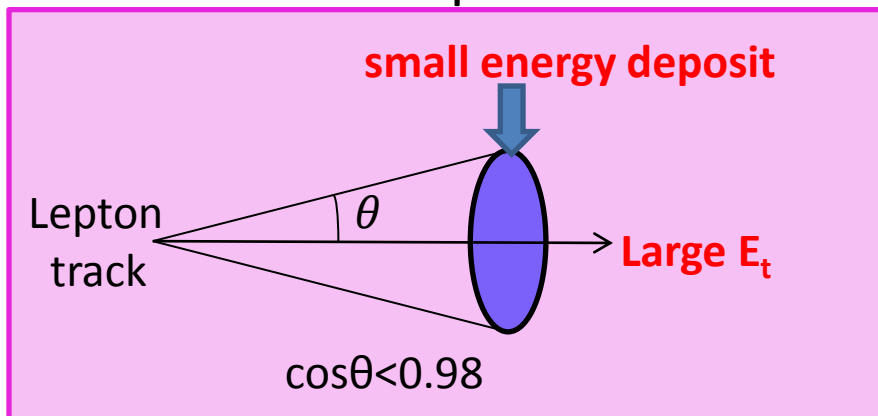


Event reconstruction

1. Select 2 Isolated lepton with maximum energy
2. Reconstruct and force the rest of the tracks as 4 jets.
3. Select reconstructed jet pair that minimizes χ^2 .

$$\chi_H^2 = \left(\frac{M_{H1} - M_H}{\sigma_{M_H}} \right)^2 + \left(\frac{M_{H2} - M_H}{\sigma_{M_H}} \right)^2 \quad M_H = 134.0(\text{GeV})$$

Isolated Lepton ID



Isolated lepton energy

Aim

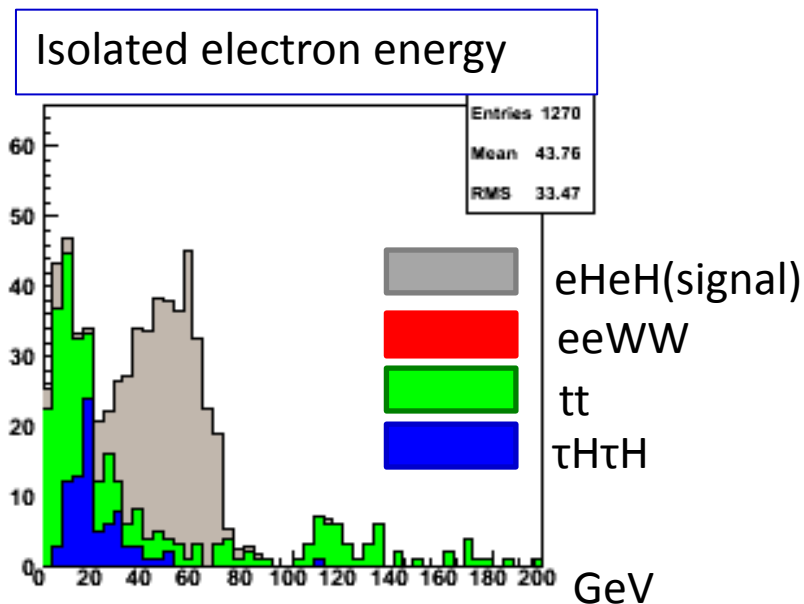
■ We want to extract mass of e_H & Z_H by fitting electron energy.

direction

■ Back ground is disrupting rising edge.

→ will be further studied.

■ efficiency of selecting electron from e_H needs to be improved.

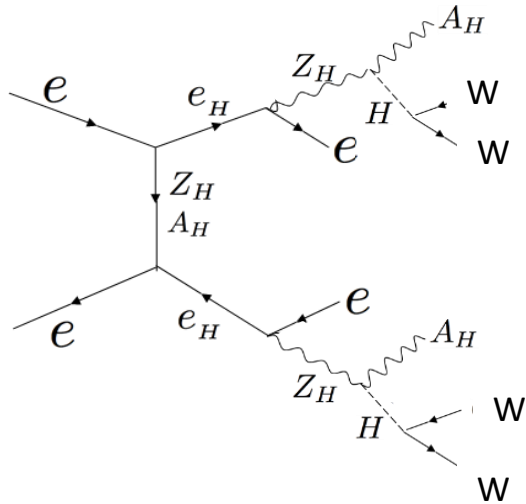


Selection criteria
$114 < H \text{ mass} < 154 \text{ (GeV)}$
Acoplanarity (degree)
Miss Pt > 80 (GeV)
#b-tag jet > 2

Signal significance 20.9

Signal Electron efficiency

■ Improve selection efficiency of electron from e_H .



Final state	# of event
2e+4jet	980
3e+3jet	350
4e+2jet	70
5e+1jet	9



We want to also analyze $H \rightarrow WW$ (leptonic) as signal

Method:

1. Count # of Isolated electrons.
2. Force the rest as 3 jets. } If isolated electron ≥ 3
3. Do jet-jet pair and jet-lepton pairing so Inv.mass is close to Hmass. The electron that minimizes χ^2 is the electron from W.

Summary

- focused on $e_H e_H \rightarrow e Z_H e Z_H$ and try measure κ
- Further background study will be continued.
- Study to improve selection efficiency of electron coming from e_H will done.