

**LHT status report on
 $e^+e^- \rightarrow e_H^+e_H^-$ @1TeV**

2010.12.24 optimization meeting
Tohoku Univ. Eriko Kato

Today's topic

- Mass extraction of e_H

$e_H e_H \rightarrow e Z_H e Z_H$ analysis

■ analysis on $e Z_H e Z_H$

— Cross section: 3.91 fb (pol. 0)

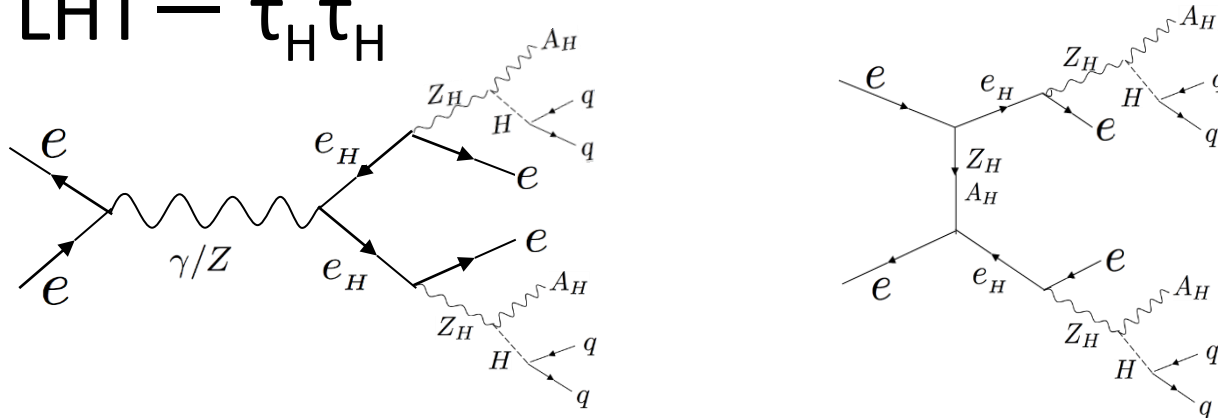
— $2e + 2$ Higgs final state \rightarrow characteristic

■ Background

top — tt, ttZ, ttH

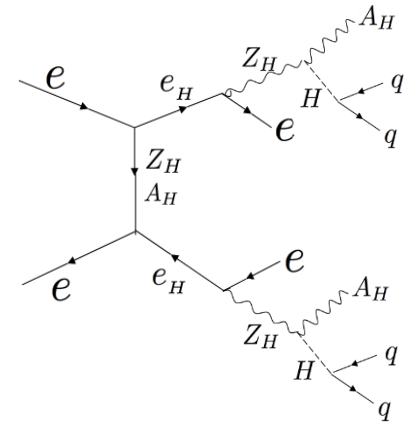
WZ — $enWZ, eeWW, eeZZ, WWZ, ZZZ, WWZZ$

LHT — $\tau_H \tau_H$

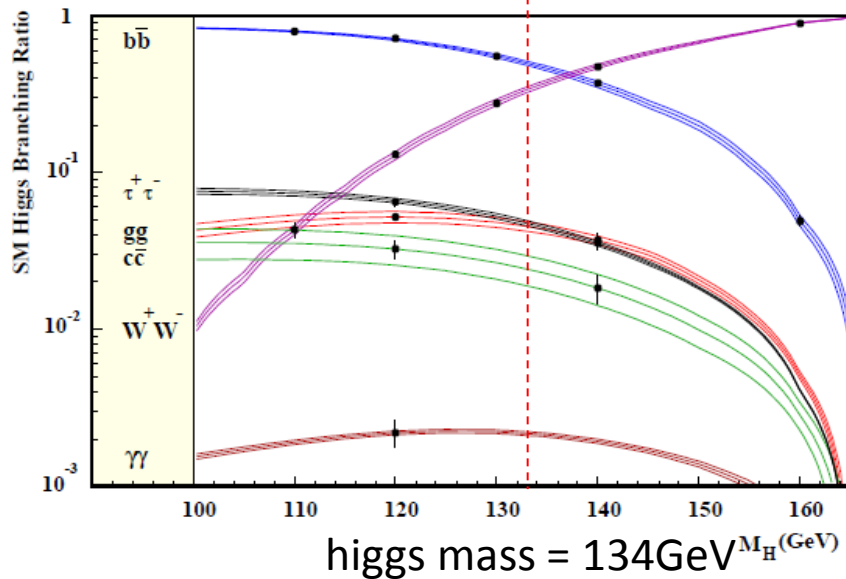


Signal Electron selection

- $e_H e_H \rightarrow e Z_H e Z_H$ analysis: 2e + 4jet
 - save full hadronic & lose partial leptonic (electron emitting) events
- ⇒ optimize isolated electron selection



Higgs branching ratio



Pythia information

$$\text{Br}(h \rightarrow bb) = 42.35\%$$

$$\text{Br}(h \rightarrow WW) = 39.57\%$$

$$\text{Br}(h \rightarrow ZZ) = 5.50\%$$

$$\text{Br}(h \rightarrow \tau\tau) = 5.21\%$$

$$\text{Br}(h \rightarrow gg) = 4.49\%$$

$$\text{Br}(h \rightarrow cc) = 2.31\%$$

Leptonic decaying candidate

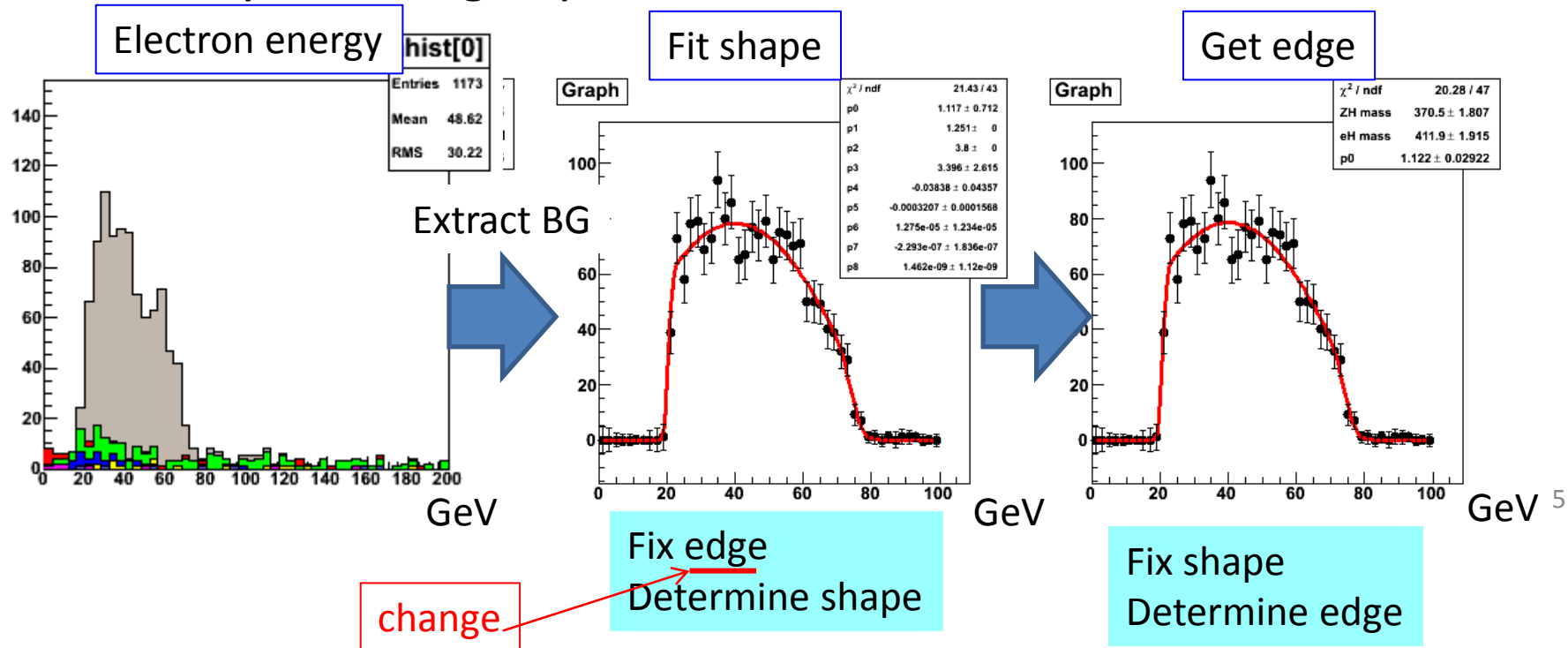
Mass extraction

■ Background contribution small in signal region

⇒ extract background and preform mass fit.

— eH mass = 410 ± 9.0 GeV $\rightarrow 411.9 \pm 1.9$ GeV

Renewed GENumCon.h constants so the masses are consistent with theory. \rightarrow fitting improved.



Summary & plan

- Improved fitting for mass extraction.
- Study with polarization.
- Derive parameter κ from e_H mass.
- Consider finding e_H mass by reconstructing e_H .