



HIGGS SELF-COUPLING ANALYSIS WITH $H \rightarrow WW^*$

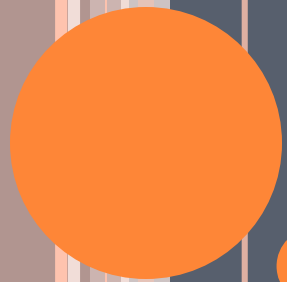
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STATUS

- Lepton ID study
 - Single lepton is OK
 - $\sim 20\%$ improve with shower profile & dE/dx
 - Problem: $Z \rightarrow ll$ finding
 - First lepton ID is OK
 - Second lepton finding efficiency is so bad \rightarrow check the cause
- Particle ID is being formed
 - Firstly, using likelihood
 - Check the particle tagging efficiency



LEPTON ID

LEPTON ID FOR $Z \rightarrow LL$ DECAY

- Problem: e^+e^- finding is so bad...

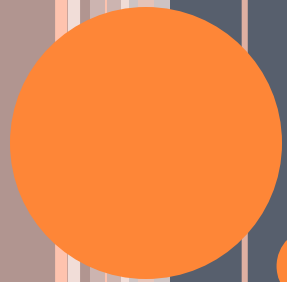
Finding eff.(%)	First lepton	Second lepton
e^+e^-	98.5	78.8?

- Muon type doesn't cause such a strange behavior
- So far, checking the likelihood selection...

- $Z \rightarrow$ dilepton finding – preliminary result

- Using $t\bar{t}$ samples

method	Lep+jets	allhad	dilepton
Cut base(%)	0.79	0.071	17.3
Likelihood(%)	0.384	0.039	19.5



PARTICLE ID



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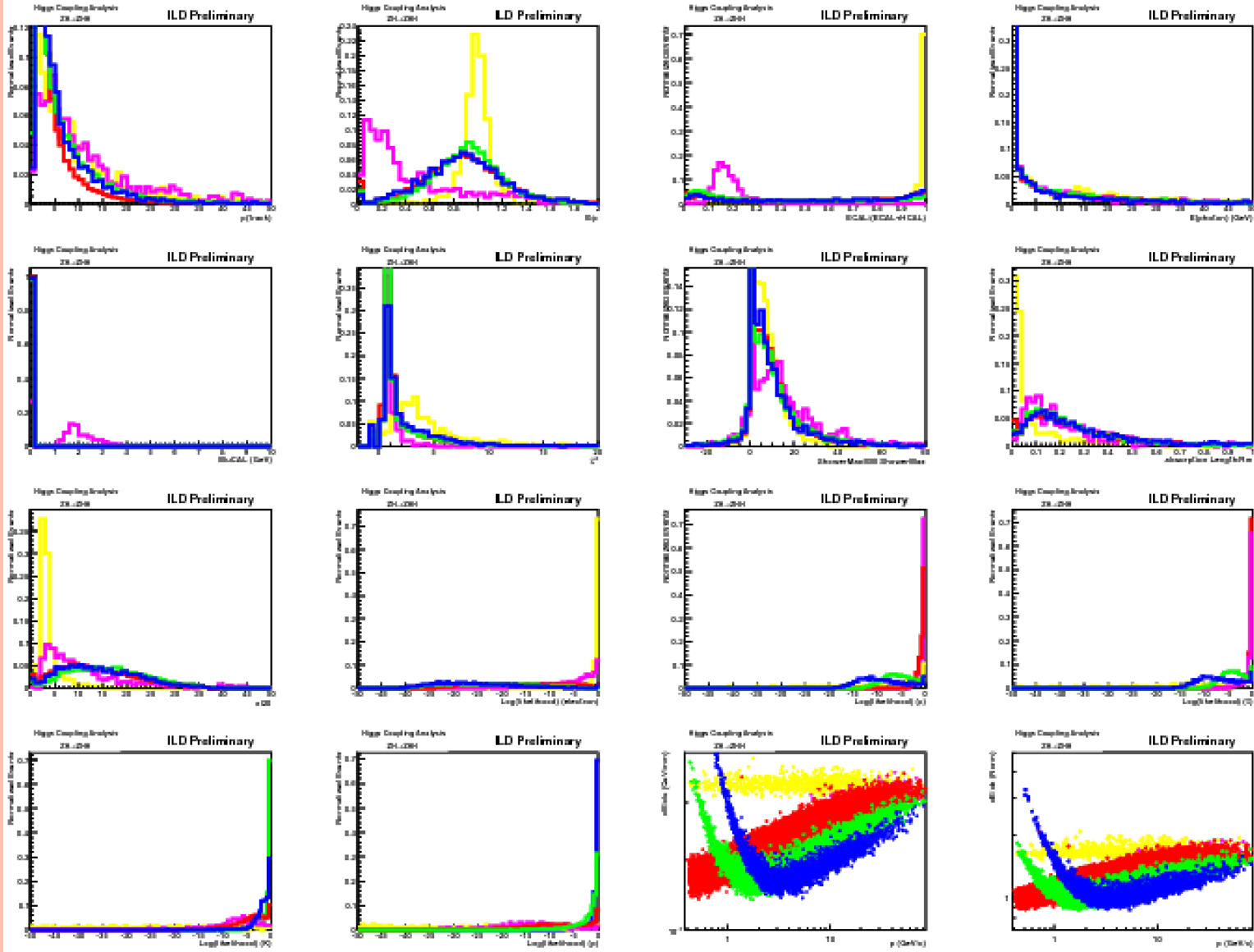
PARTICLE ID STRATEGY

- Based on the likelihood
 - Tracks will be assigned to the particle class with maximum likelihood
- Electron and muon will be identified easily
 - Electron or not
 - Muon or not
 - Hadrons can be classified after electron and muon selection

VARIABLES CHECKED FOR PARTICLE ID

- Almost same as lepton ID, w/o cone energy, $|d_0|$, $|z_0|$

Electron
 Muon
 Pion
 Kaon
 Proton

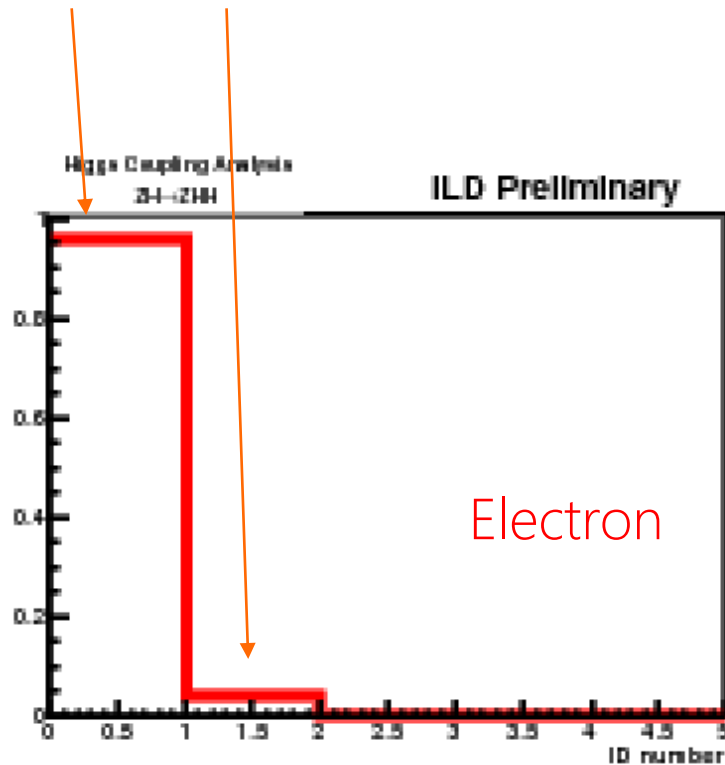


LIKELIHOOD RESULT FOR EACH PARTICLE TYPE

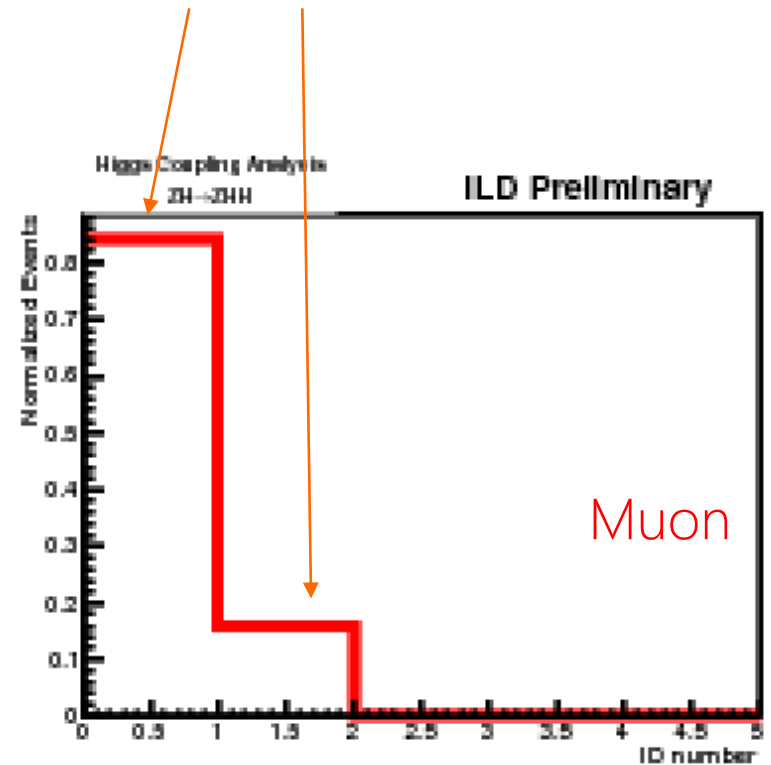
- Electron & muon

- Check the particle electron or not
- Check the particle muon or not

electron no



muon no



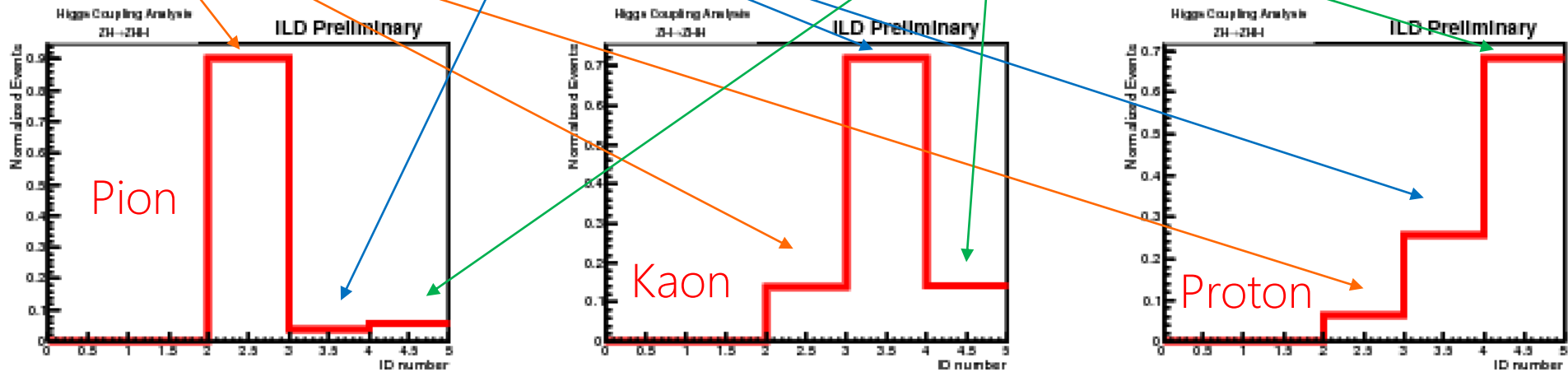
LIKELIHOOD RESULT FOR EACH PARTICLE TYPE

- hadrons
 - Identify each particle type

Pion

Kaon

Proton



TODO

- Solve the efficiency problem
- Apply lepton ID (& jet pairing) to Self-coupling analysis
 - Lep+jets & dilepton+jets first
- Particle ID
 - Optimize and strategy for good particle ID
- Integrating Ecal/Hcal - good estimation in Hcal
 - Very difficult!!
 - Fit function gives up fitting...