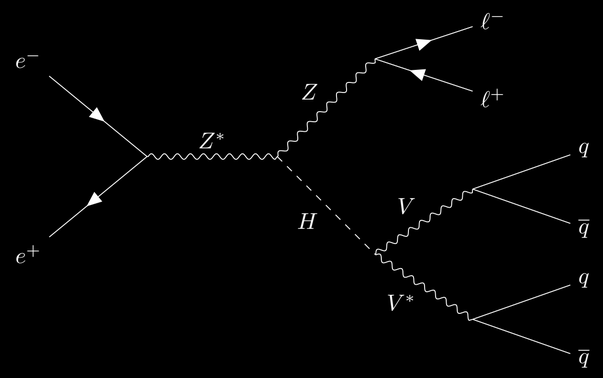
Considered Processes

Signal

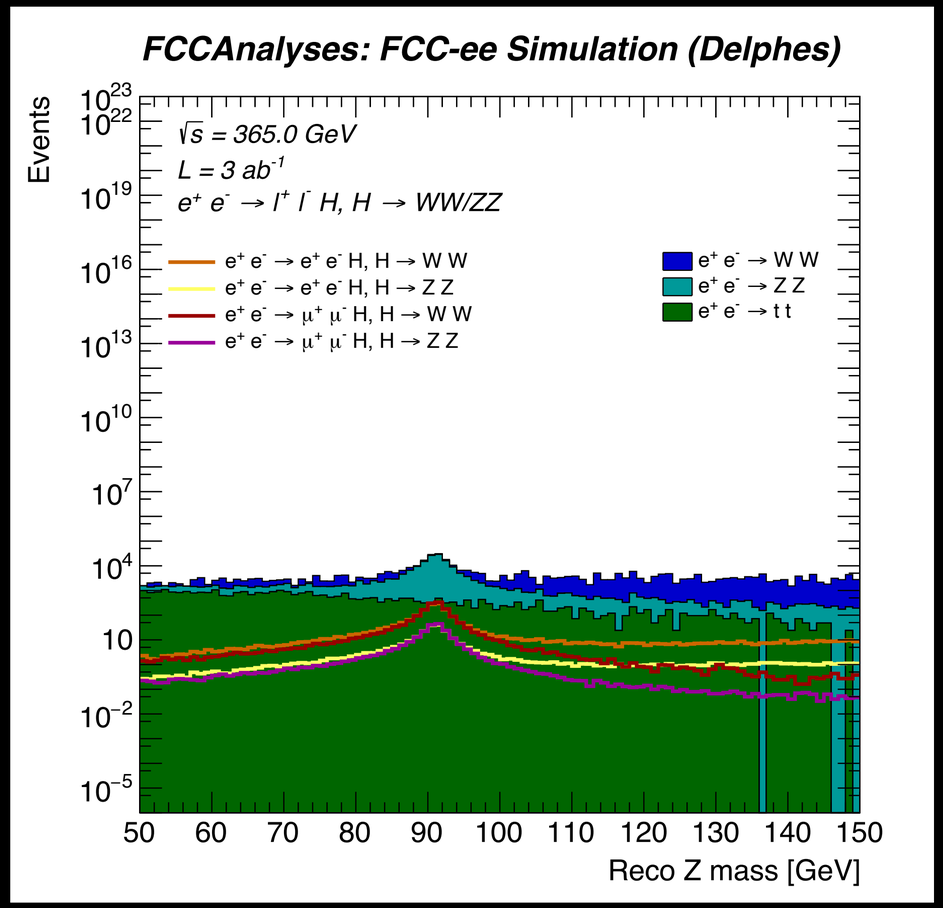
- $e^+e^- \to Z^* \to ZH$
  - $Z \to \ell^+\ell^-$
  - $H \to WW^*/ZZ^*$
    - $W \to qq'$
    - $Z \to q\bar{q}$

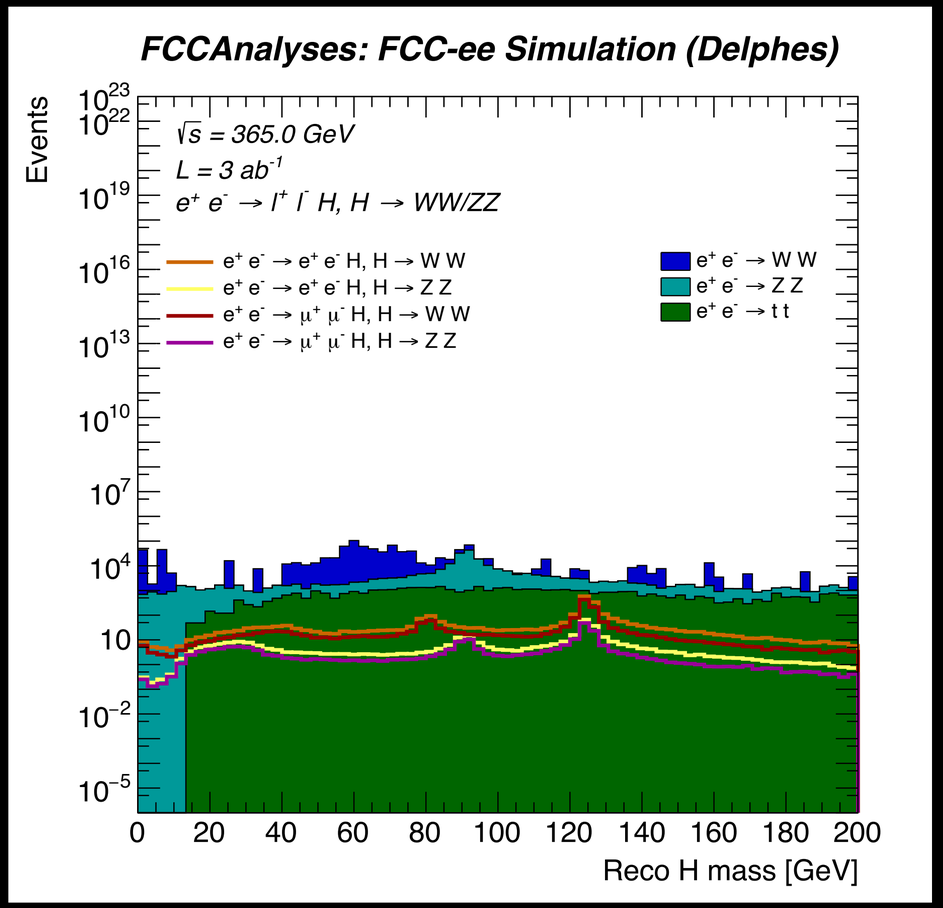
Background

- $e^+e^- \to WW$
- $e^+e^- \to ZZ$
- $e^+e^- \to tt$



- Filtering events and reconstructing Z from:
  - exactly 2 leptons (e or μ) with opposite charge
  - each with p > 20 GeV to remove softer leptons that may not reconstruct well and also increases overall efficiency
- These leptons are removed from the reconstructed particle class in order to cluster the jets
- H is reconstructed from 4 jets


FCCAnalyses: FCC-ee Simulation (Delphes)
Events
√s = 365.0 GeV
L = 3 ab-1
e+ e- → l+ l- H, H → WW/ZZ
e+ e- → e+ e- H, H → W W
e+ e- → e+ e- H, H → Z Z
e+ e- → μ+ μ- H, H → W W
e+ e- → μ+ μ- H, H → Z Z
e+ e- → W W
e+ e- → Z Z
e+ e- → t t
Reco Z mass [GeV]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e+ e- → μ+ μ- H, H → W W
e+ e- → μ+ μ- H, H → Z Z
e+ e- → W W
e+ e- → Z Z
e+ e- → t t
Reco H mass [GeV]

Possible next steps

- Extra bumps in the Higgs mass plot may be from a mis-pairing where a single W or Z is reconstructed as the Higgs
- Possible way to address this:
  - With the 4 jets, form the three possible 2-jet pairings
  - Pick the pairings where each 2-jet mass is closest to M_W or M_Z
  - Sum those pairs to define a Higgs candidate