

# Status Report

2015.09.23  
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# Action Item

- Paper review
  - Measurement of Inclusive W and Z Boson Production Cross Sections in pp Collisions at  $\sqrt{s}=8\text{ TeV}$
- ROOT
  - Histogram

# Paper Review

- Measure W, Z production cross sections
  - Proton-proton collision at  $\sqrt{s}=8 \text{ TeV}$
  - From electron and muon final state
  - Cross sections times branching fractions
  - $\sigma(pp \rightarrow WX) \times \mathcal{B}(W \rightarrow \ell \nu) \approx 12.21 \text{ (nb)}$
  - $\sigma(pp \rightarrow ZX) \times \mathcal{B}(Z \rightarrow \ell^+ \ell^-) \approx 1.15 \text{ (nb)}$

# CMS design

- Silicon pixel, Strip tracker
  - Record particle paths
- Crystal ECAL
  - Measures energies of electrons and photons
- HCAL
  - Measures energies of hadrons
- Solenoid
  - To bend paths of particles
- Muon detector

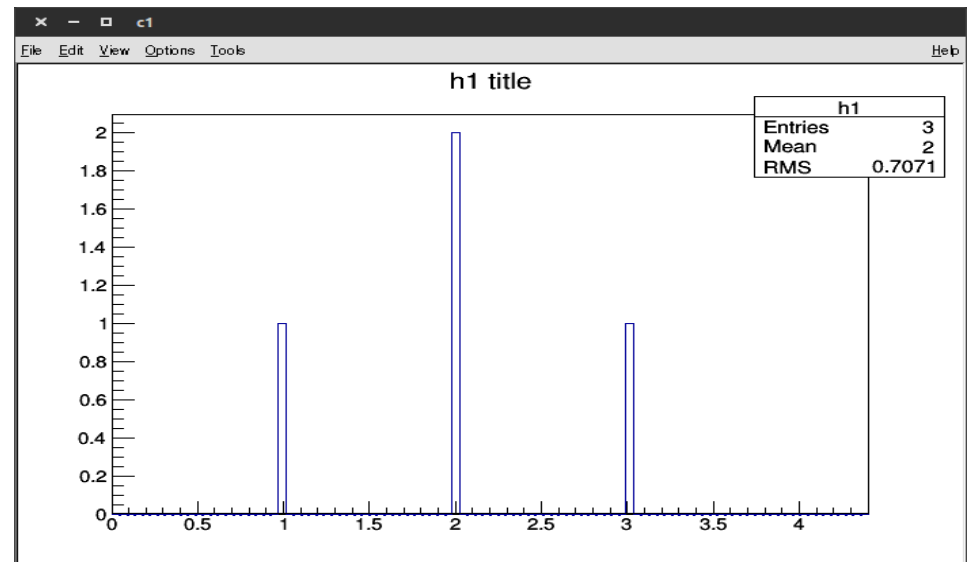
- W decays to charged lepton + neutrino
  - Missing transverse energy
- Z decays to two leptons
  - same flavor opposite charge
  - Reconstructed dilepton  $60 < \text{mass} < 120 \text{ GeV}$

# ROOT Histogram

- Histogram Classes
  - TH[dimension][type]
  - eg. TH**1F** : histogram with **1 float** per channel.
  - TH1 Constructor
  - TH1F(“name”, “title”, “# of bins, x\_min, x\_max);

# Histogram methods

- Fill
  - TH1 : Fill(x, weight)
  - eg. h1 → Fill (1);  
h1 → Fill (2, 2);  
h1 → Fill (3);



# Histogram methods

- FillRandom
  - FillRandom(“distribution func”, # of entries);
  - eg. h1 → FillRandom(“gaus”, 10100);

