Study of Single-W process

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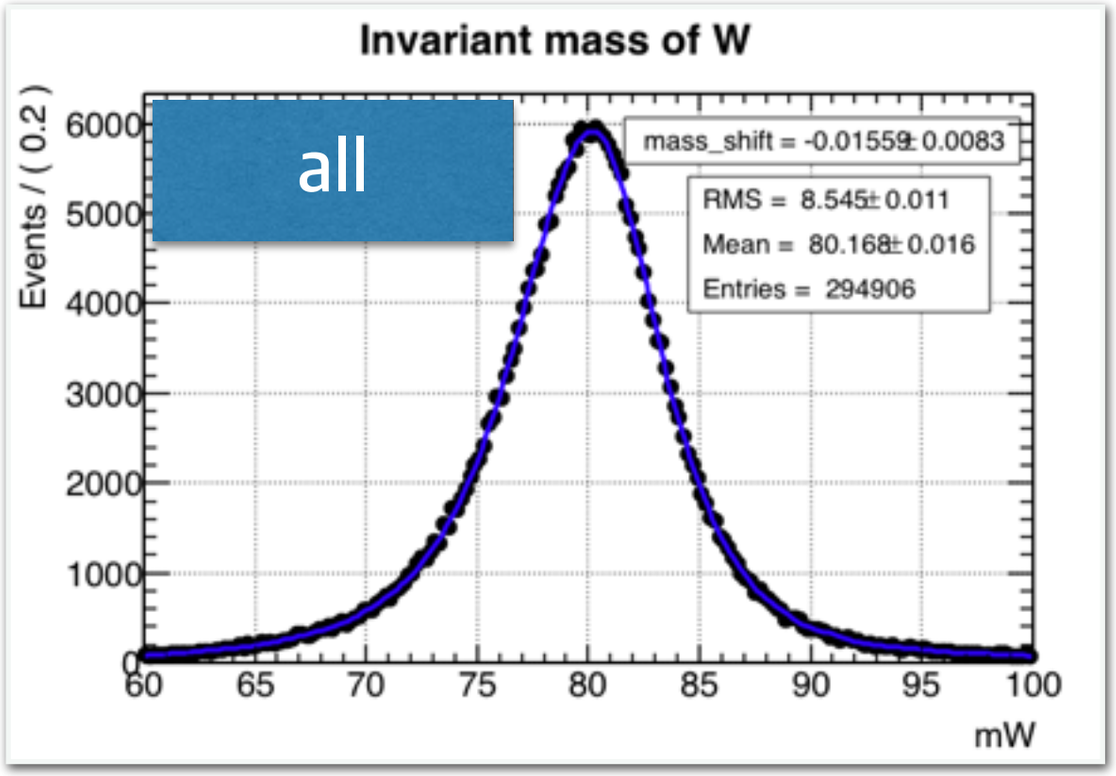
—> Current status of my study

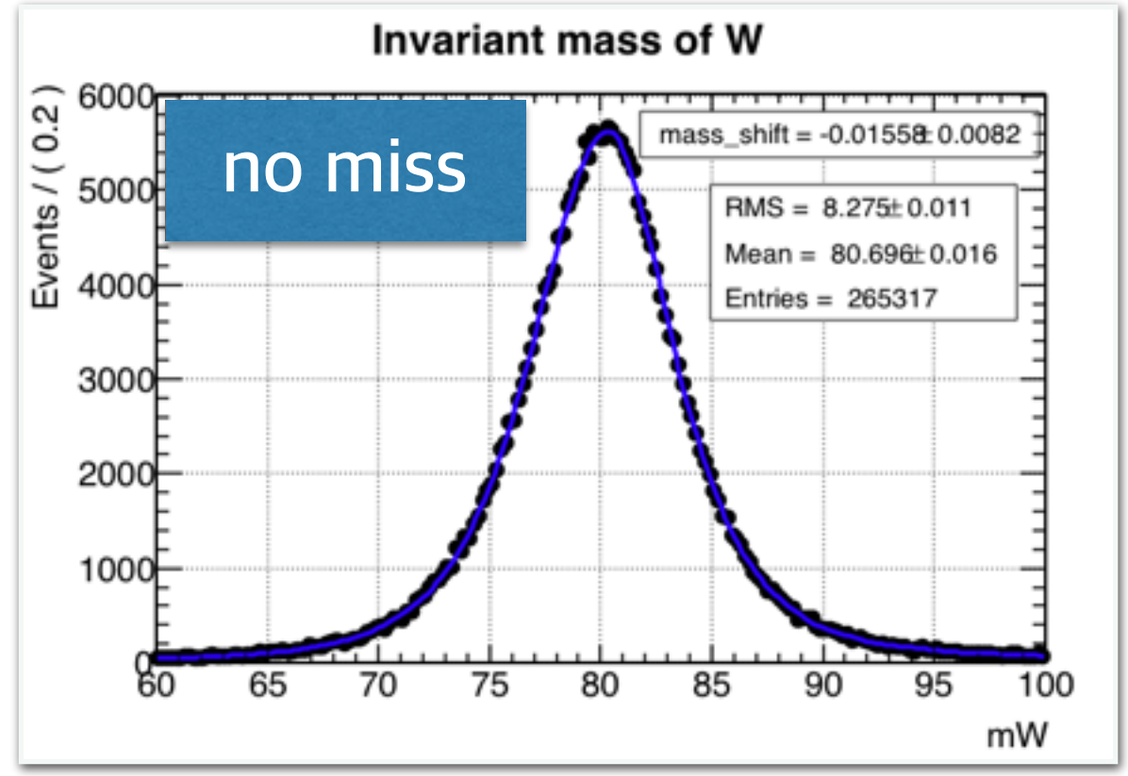
Status

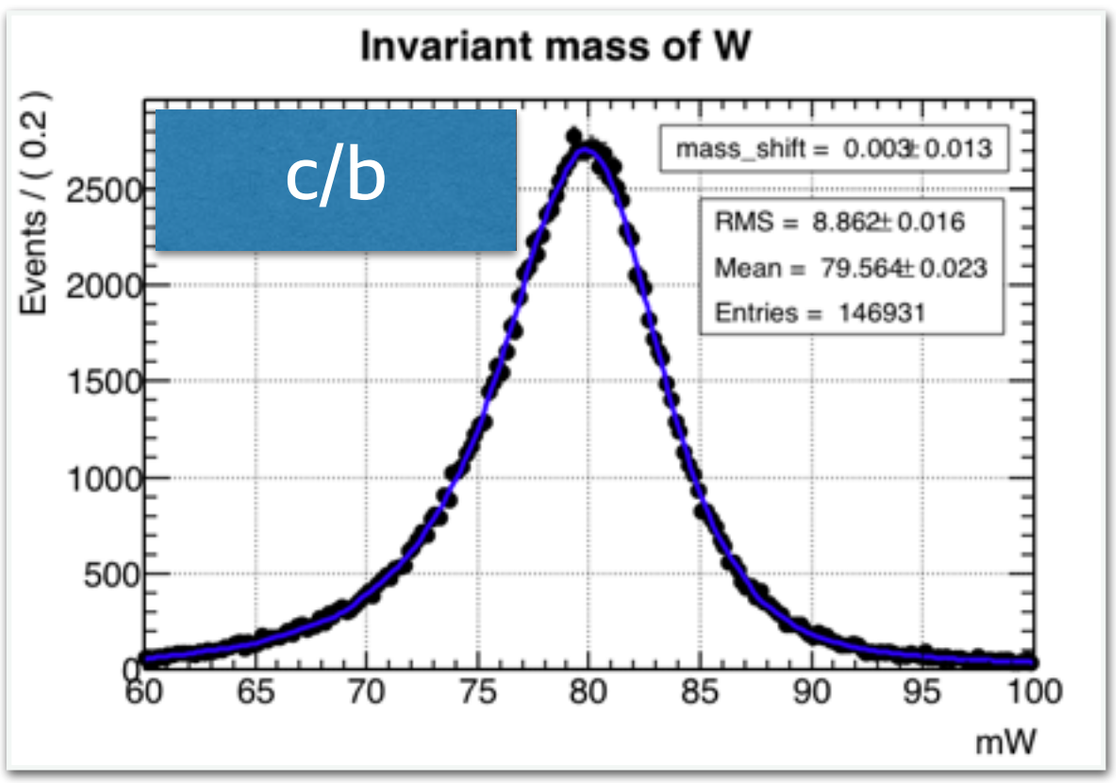
- I tried to do template fitting
  - to obtain the solid number of statistical error
- procedure
  - first divide the sample to two samples, one as data(int.L = 50fb^{-1}) and another as template
  - categorize samples by quark jet flavor or existence of missing neutrinos
  - then fit each samples with template data, and obtain the fitting errors as the statistical errors for each

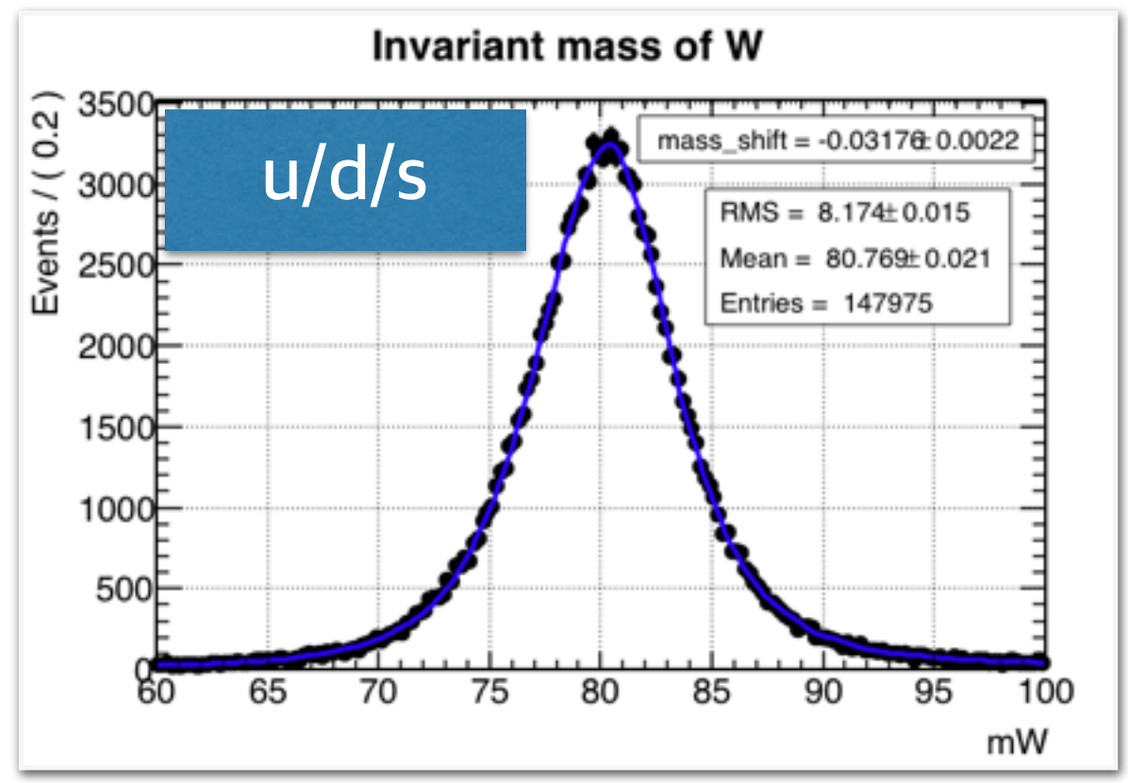
Template fit plots

L = 50 fb^{-1}









Statistical errors

- At $\sqrt{s}$ = 250 GeV
- int.L = 50 fb^{-1} for data, int.L ~ 84 fb^{-1} for template

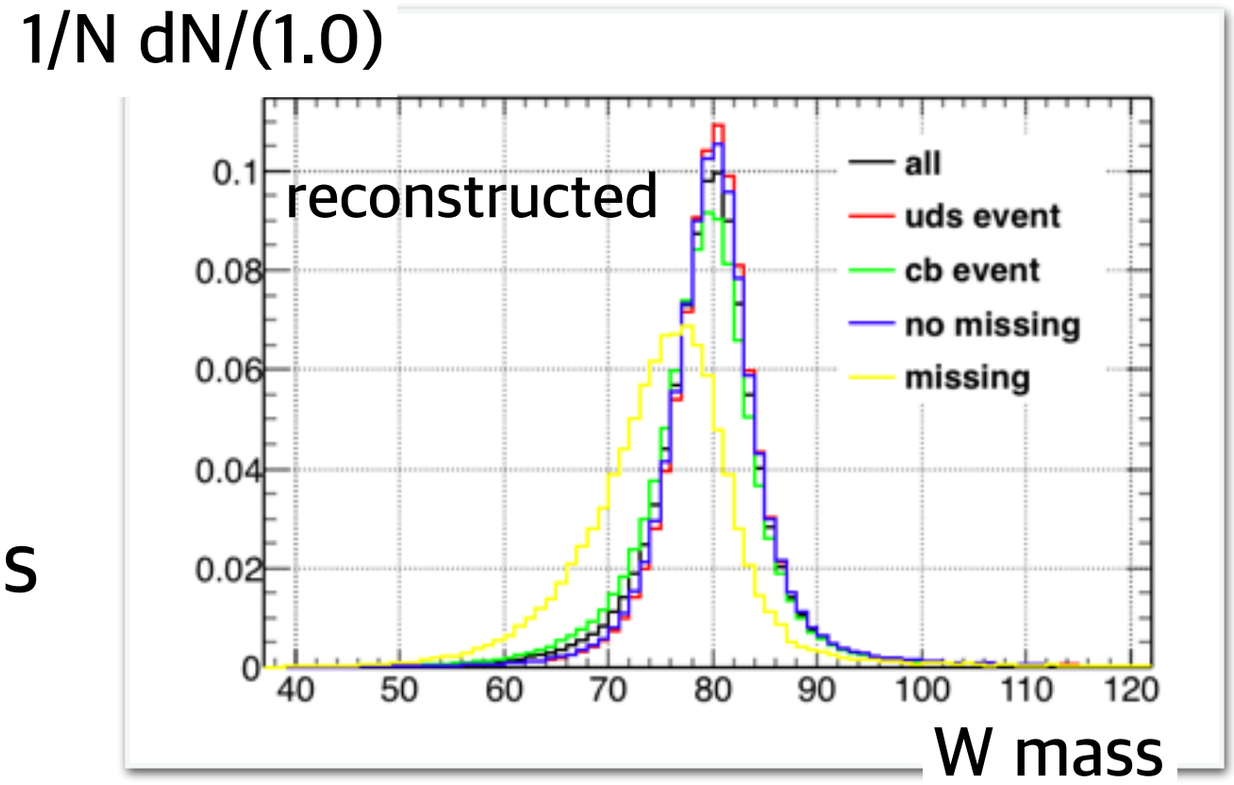
category	# of events	stat. err. [MeV]	
all	294906	8.3	
E_{miss} == 0	265317	8.2	
E_{miss} > 0	29589	37.0	
c/b events	146931	13.0	
uds events	147975	2.2	the best

Summary & Next

- Template fitting method
  - statistical errors have been shown for each categorized event samples
  - W—>qq'(uds jet) event sample gives the best statistical error, 2.2MeV@E_{CM}=250&L=50fb^{-1}
- For the next,
  - check several systematic errors,
    - different W mass value
    - different jet energy scale fractuation
    - and different hadronization models

Back up

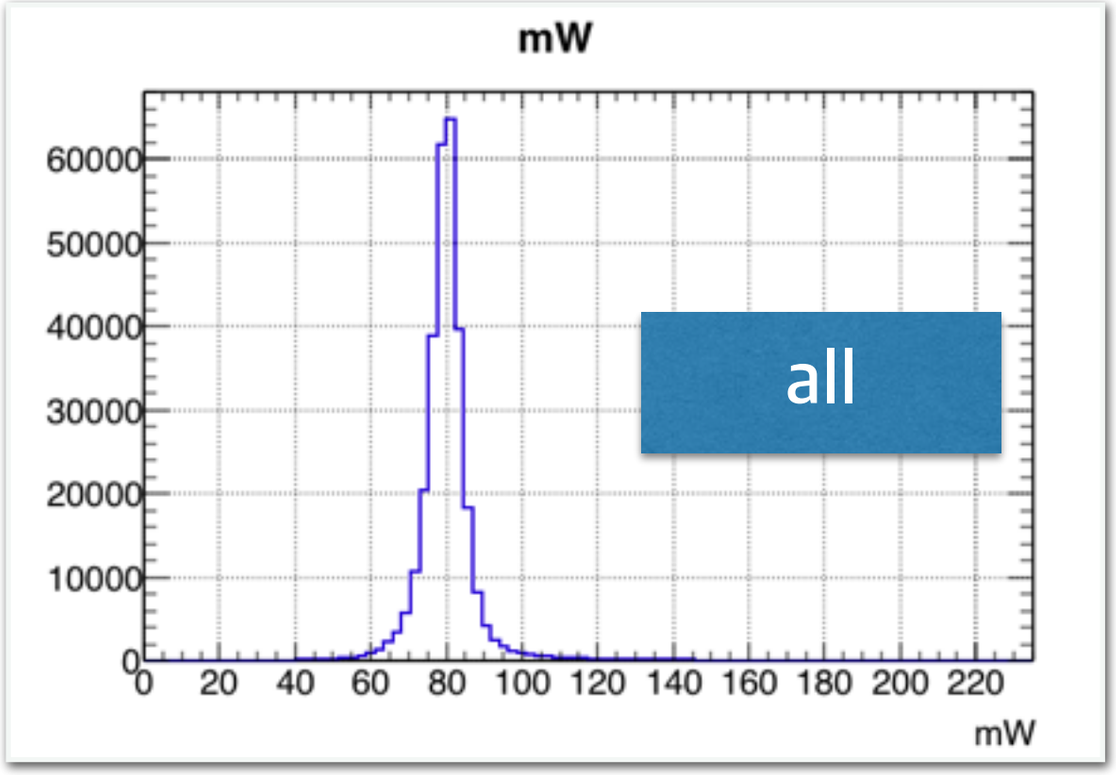
Event categorization

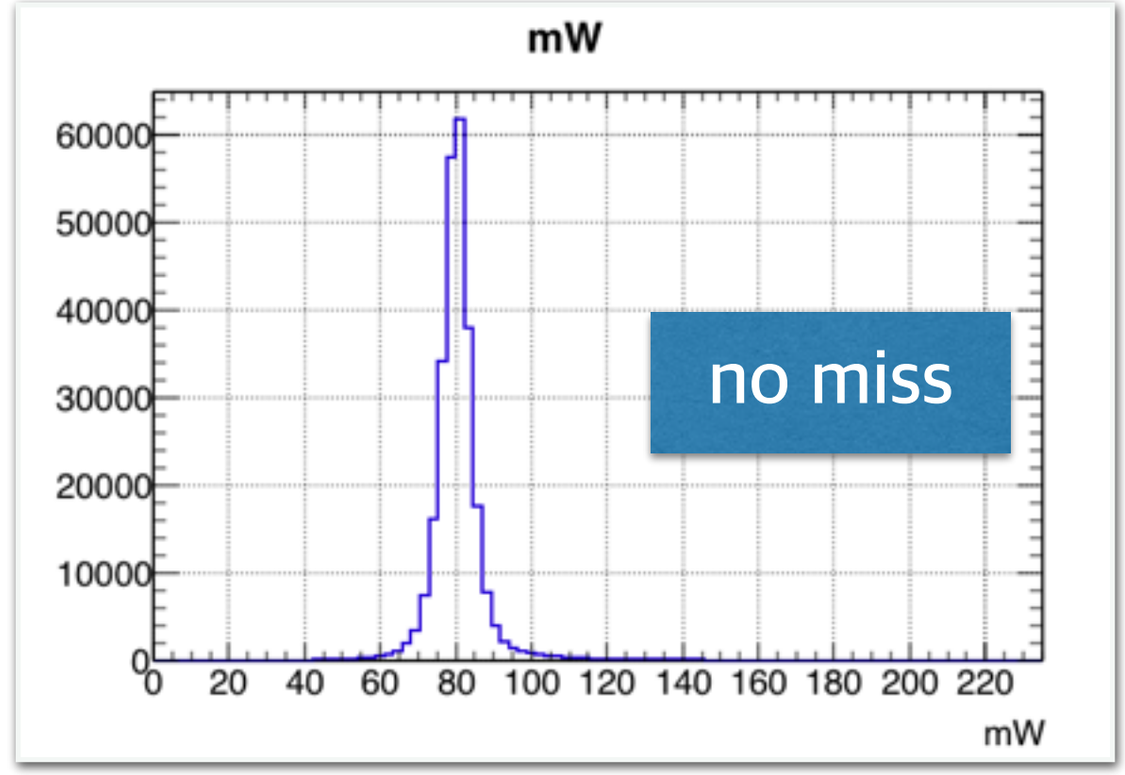


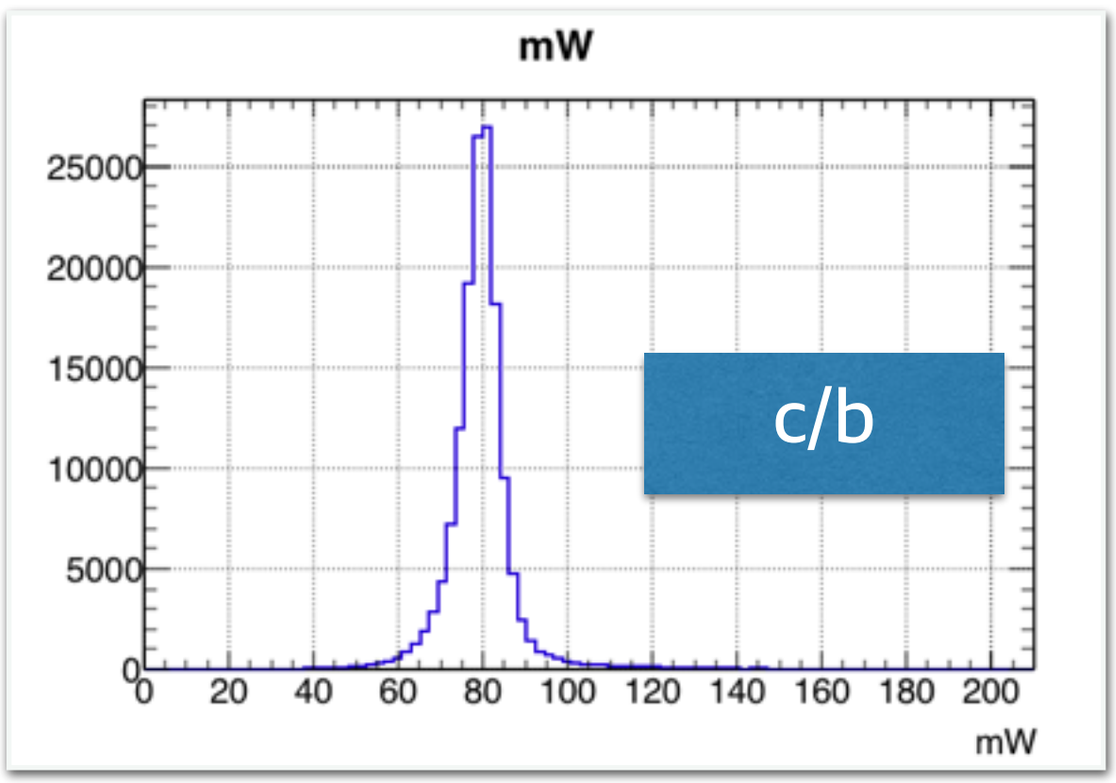
- by quark jet flavors
  - uds jet events
    - W —> uD, Ud, uS, Us
  - c/b jet events
    - W —> cS, sC, cD, dC, bU, uB, bC, Cb
- by existence of missing neutrinos
  - $E_{miss} == 0$
  - $E_{miss} > 0$

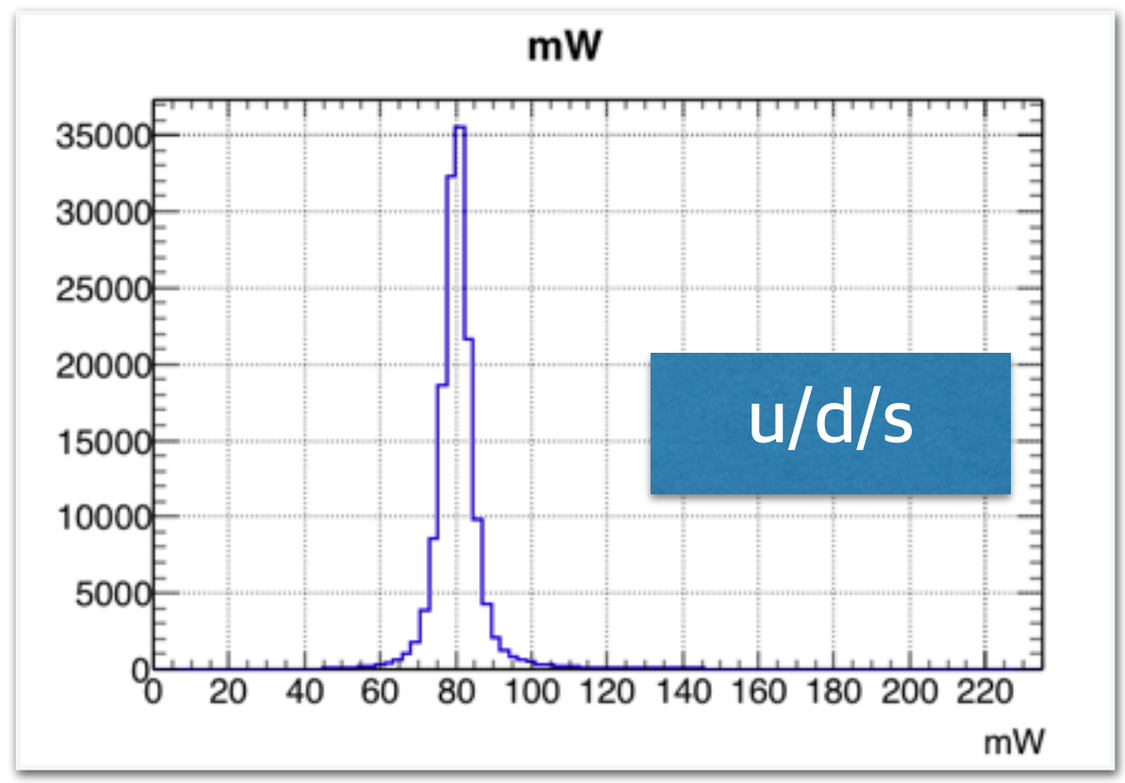
Template data

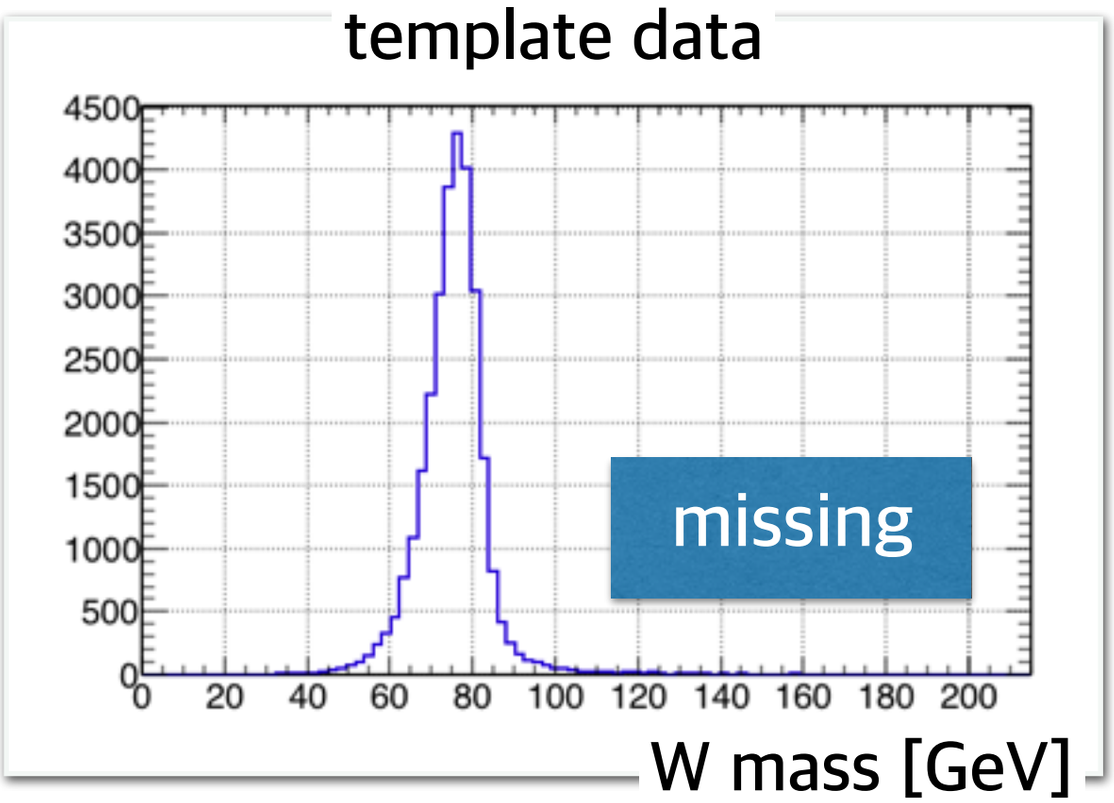
mW = 80.419 (DBD)

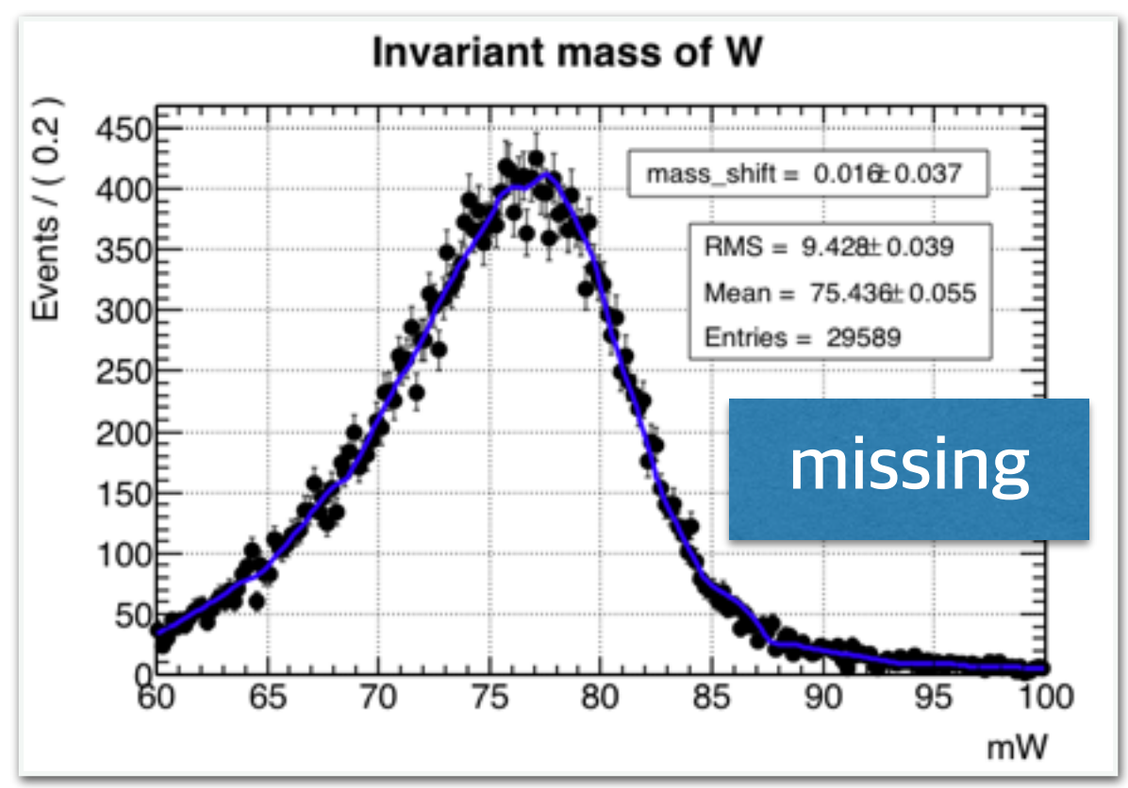


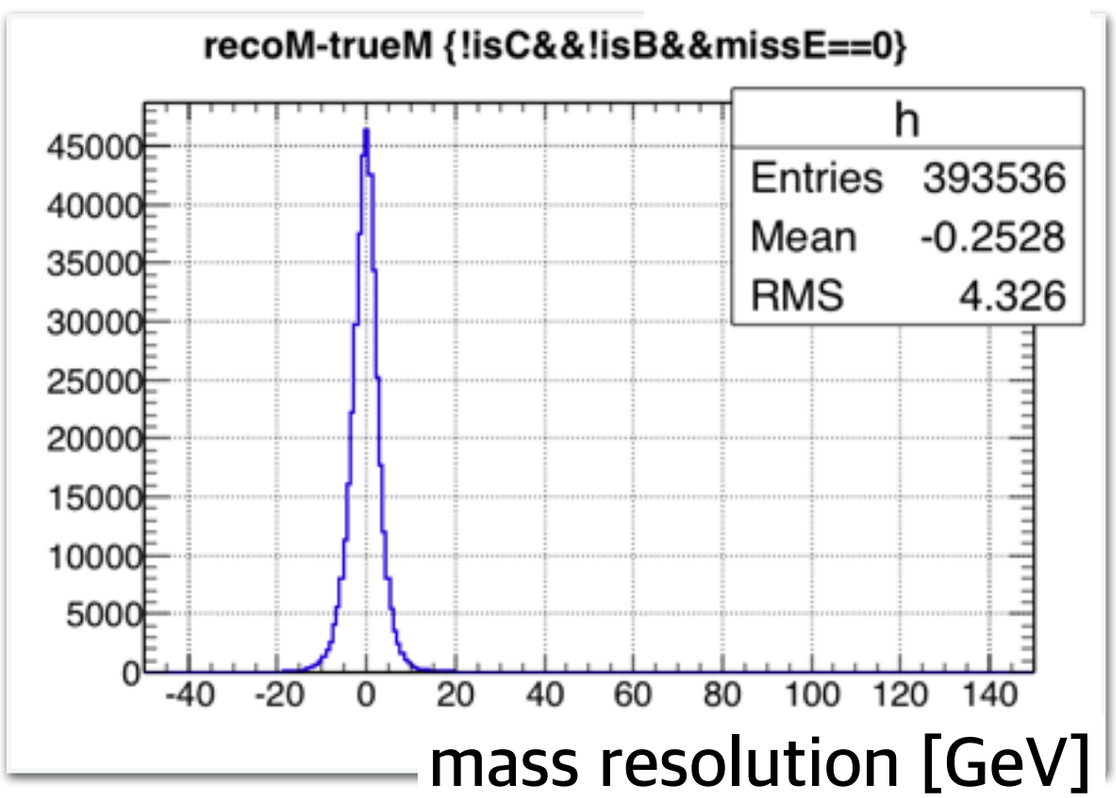


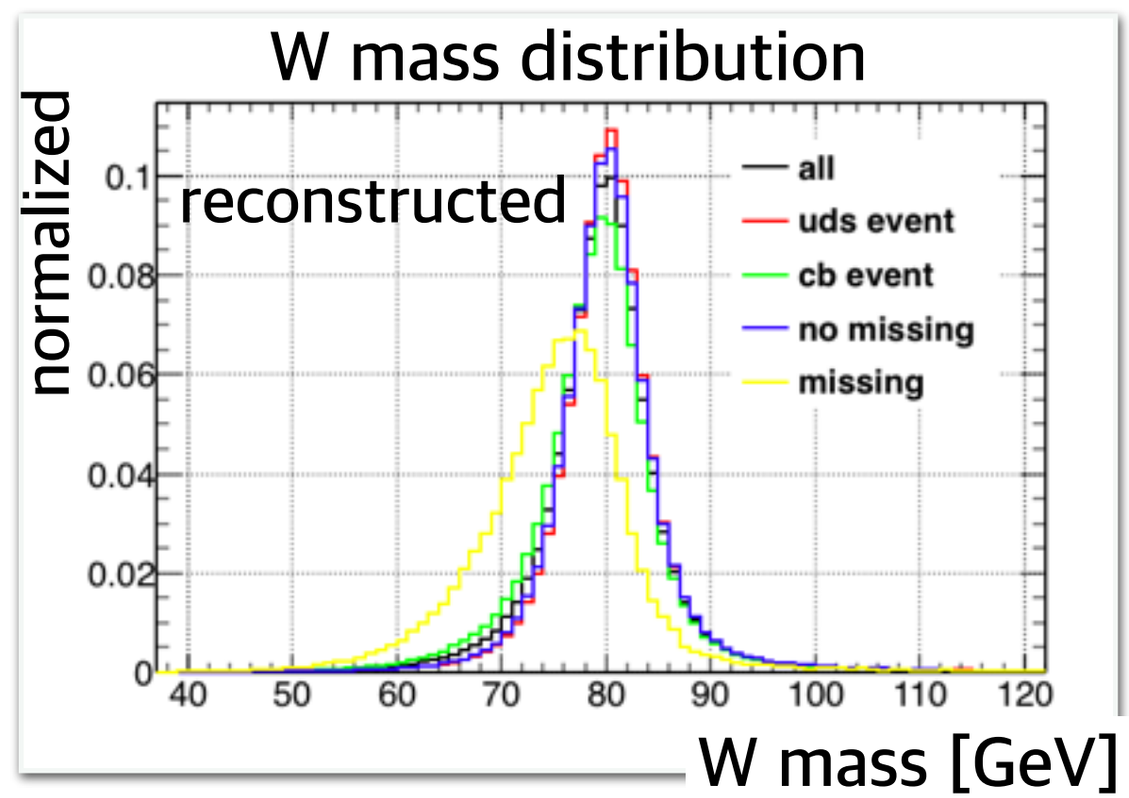





template data
missing
W mass [GeV]


Invariant mass of W
Events / (0.2)
mass_shift = 0.016± 0.037
RMS = 9.428± 0.039
Mean = 75.436± 0.055
Entries = 29589
missing
mW


recoM-trueM {!isC&&!isB&&missE==0}
h
Entries 393536
Mean -0.2528
RMS 4.326
mass resolution [GeV]


W mass distribution
normalized
reconstructed
all
uds event
cb event
no missing
missing
W mass [GeV]