



# Invariant Mass of 3 leptons

Othmane Rifki, Alexander Paramonov, Chen Zhou  
10/07/14

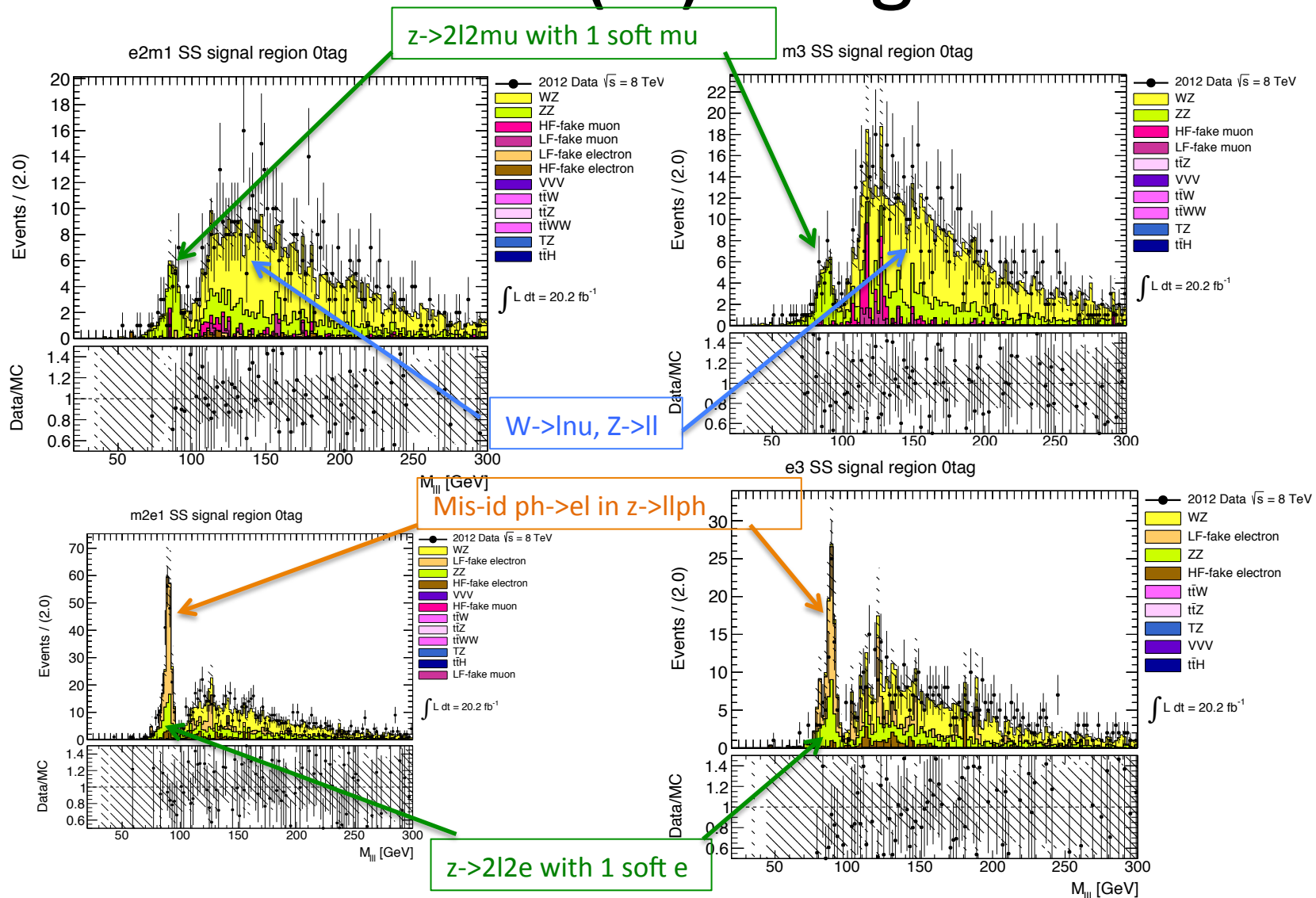


*The University of Oklahoma*

# Tools

- Format: (received from Chen)
  - Top MiniNtuple
- Software:
  - AIDA-analysis and AIDA-physics checked out on 09/19/14
- Samples:  
ttbarV, WZ, ZZ, WW, W/Z+jets, VVV, ttH, tttWW, tZ, data (egamma, muons, single lepton trigger)
- Same object definitions and event selection as Chen's analysis except for **lepton pt cut >15GeV**

# M(3l) 0 tag



# Strategy

- Calculate the ratio of the events contained in  $80\text{GeV} < m(3l) < 95\text{GeV}$  mass window to the total number of events for  $ttW$ ,  $ttZ$ , and the background:  $ZZ$  (which contains  $z \rightarrow 4l$ ), heavy flavor and light flavor fakes
- Veto events with  $80\text{GeV} < m(3l) < 95\text{GeV}$
- Show some distributions before and after the cut, the rest of the plots are attached

Full Range  
80GeV<M(3l)<95GeV

lepton e2m1

Ratio

pretag			
Signal yield for ttbarW:	3.91	0.14	0.0357
Signal yield for ttbarZ:	8.43	0.106	0.0126
Total background yield is	147	28	0.191
0tag			
Signal yield for ttbarW:	0.826	0.0268	0.0325
Signal yield for ttbarZ:	1.62	0.0217	0.0134
Total background yield is	143	27.6	0.194
1tag			
Signal yield for ttbarW:	3.08	0.113	0.0366
Signal yield for ttbarZ:	6.81	0.0845	0.0124
Total background yield is	4.44	0.398	0.0898
2tag			
Signal yield for ttbarW:	1.2	0.046	0.0382
Signal yield for ttbarZ:	2.61	0.0341	0.0131
Total background yield is	0.27	0.0798	0.296
lepton m2e1			
pretag			
Signal yield for ttbarW:	4.86	0.187	0.0386
Signal yield for ttbarZ:	8.99	0.0993	0.011
Total background yield is	481	211	0.438
0tag			
Signal yield for ttbarW:	1.08	0.0378	0.035
Signal yield for ttbarZ:	1.93	0.0297	0.0154
Total background yield is	473	209	0.441
1tag			
Signal yield for ttbarW:	3.78	0.15	0.0396
Signal yield for ttbarZ:	7.07	0.0696	0.00985
Total background yield is	8.6	2.24	0.26
2tag			
Signal yield for ttbarW:	1.37	0.0367	0.0267
Signal yield for ttbarZ:	2.81	0.0369	0.0132
Total background yield is	0.89	0	0

Full Range  
80GeV<M(3l)<95GeV

lepton m3

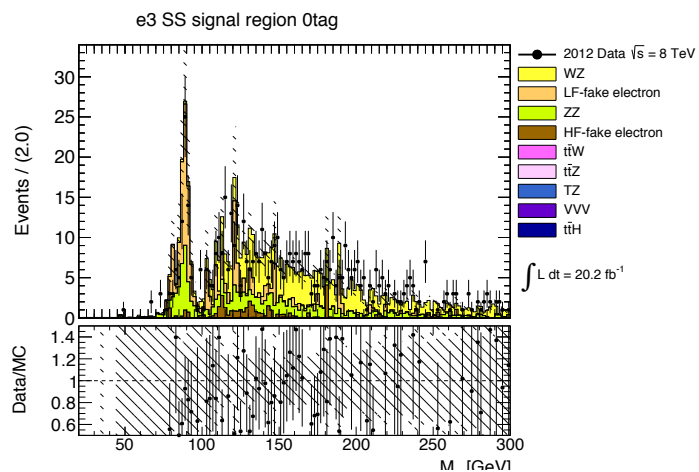
Ratio

pretag			
Signal yield for ttbarW:	2	0.0627	0.0313
Signal yield for ttbarZ:	9.48	0.0743	0.00784
Total background yield is	224	32.4	0.145
0tag			
Signal yield for ttbarW:	0.427	0.0152	0.0356
Signal yield for ttbarZ:	1.83	0.02	0.0109
Total background yield is	218	31.6	0.145
1tag			
Signal yield for ttbarW:	1.57	0.0475	0.0302
Signal yield for ttbarZ:	7.65	0.0543	0.00709
Total background yield is	5.88	0.83	0.141
2tag			
Signal yield for ttbarW:	0.613	0.0116	0.0189
Signal yield for ttbarZ:	3	0.0204	0.0068
Total background yield is	0.101	0	0
lepton e3			
pretag			
Signal yield for ttbarW:	1.1	0.0415	0.0376
Signal yield for ttbarZ:	6.1	0.0841	0.0138
Total background yield is	279	94.2	0.338
0tag			
Signal yield for ttbarW:	0.225	0.00548	0.0243
Signal yield for ttbarZ:	1.16	0.0108	0.00929
Total background yield is	274	93.4	0.34
1tag			
Signal yield for ttbarW:	0.877	0.036	0.0411
Signal yield for ttbarZ:	4.94	0.0733	0.0148
Total background yield is	4.42	0.811	0.184
2tag			
Signal yield for ttbarW:	0.306	0.0154	0.0506
Signal yield for ttbarZ:	1.99	0.0274	0.0138
Total background yield is	0.294	0.294	1

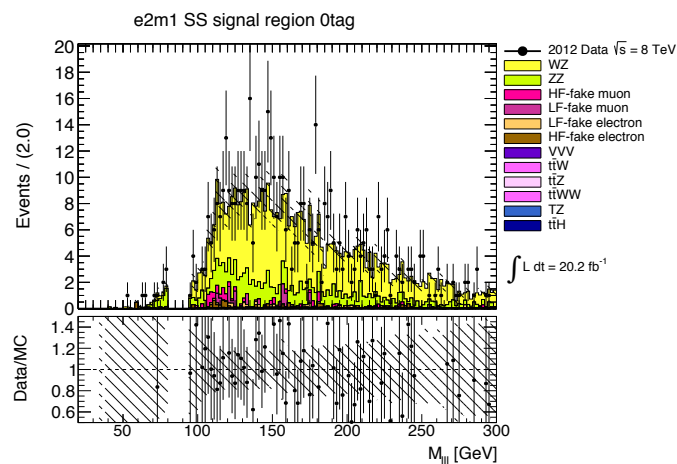
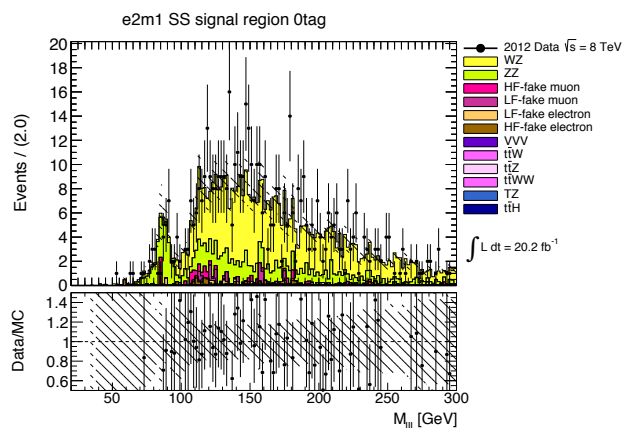
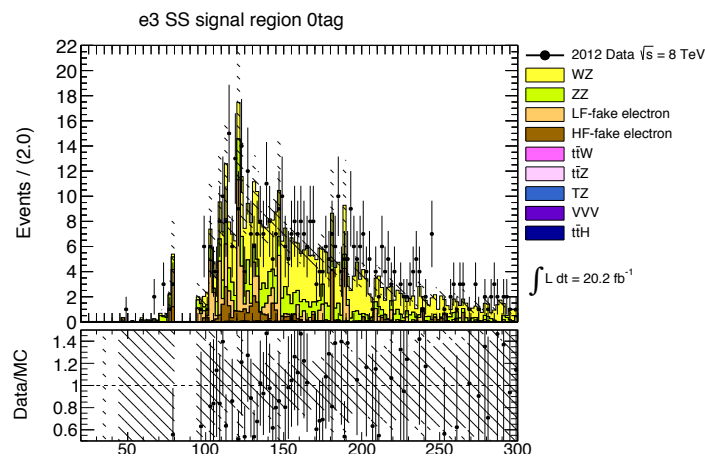
Background yield ratio is mostly larger than the signal yield ratio

# M(3l)

Before



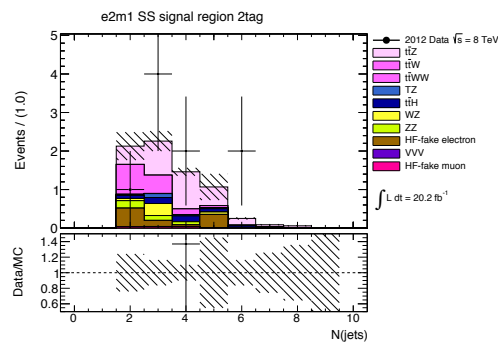
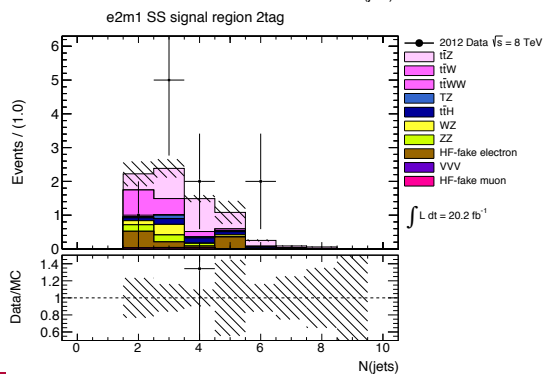
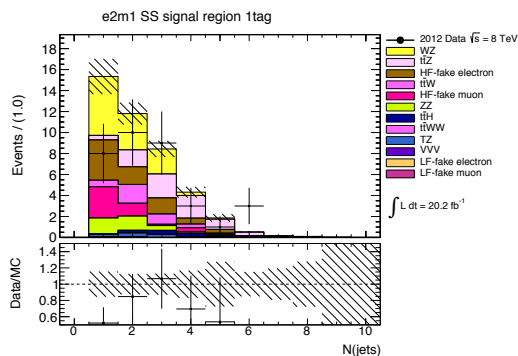
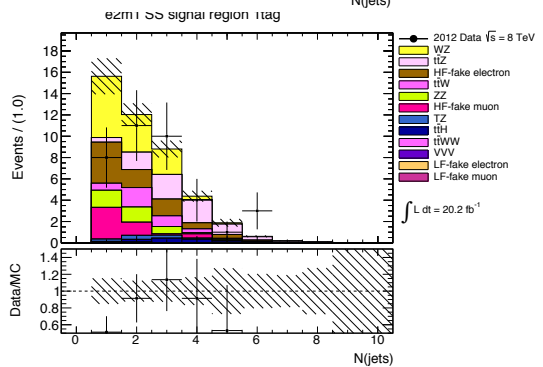
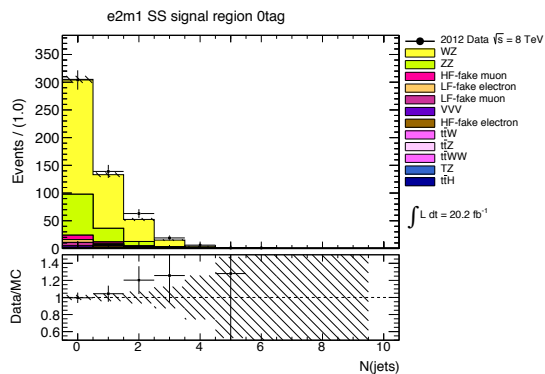
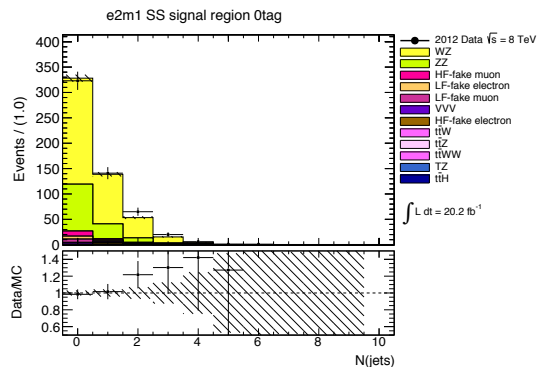
After



# NJETS

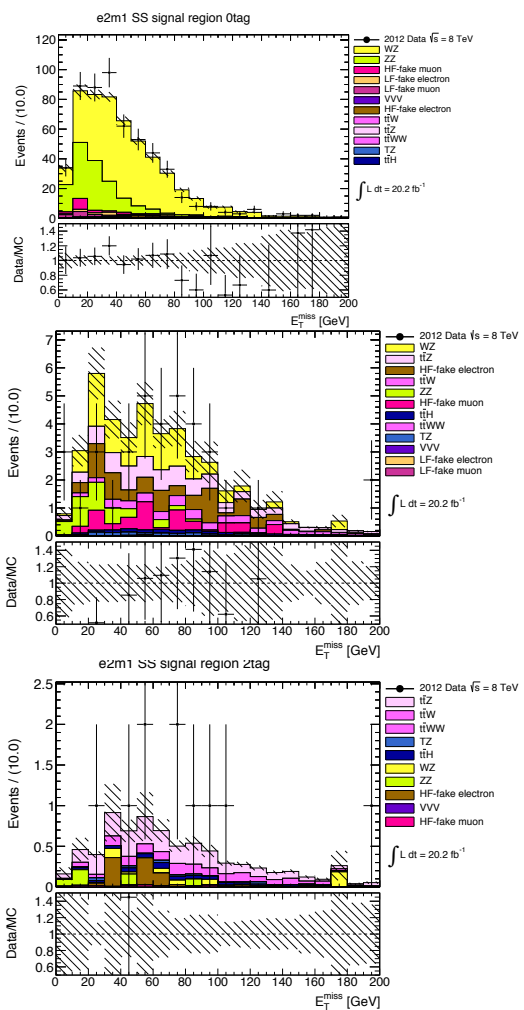
Before

After



# MET

Before



After

