An update of top to stop analysis

Outline

- **How to estimate W->en cross section?**
- **Why the w to en cross section I used is so big?**
- **Next**

W->enu cross section estimate

- **Choose an channel related data sample:**

trigger em1_eistrkcc_ms: events of mEt>25, Et>25(CC) Et>20(EC) pass electron quality cut: ***<u>|eta|<1.1:</u> L5<1.0;Fiso<0.15; <u>1.5<|eta|<2.5</u>: L4<1.5,Fiso<0.15;***

choose 4 good jets:*0.1<emf<0.9;chf<0.4;|eta|<3.5;Distance with two electrons >0.5,* Et>20GeV and isolated from two <u>electrons;</u>

two EM clusters has transverse mass in 20<Mt<120 ==># of events: N(data)

- **Choose w->en Monte Carlo sample:**

apply all the above cuts except electron quality cuts ==># of events N(mc)

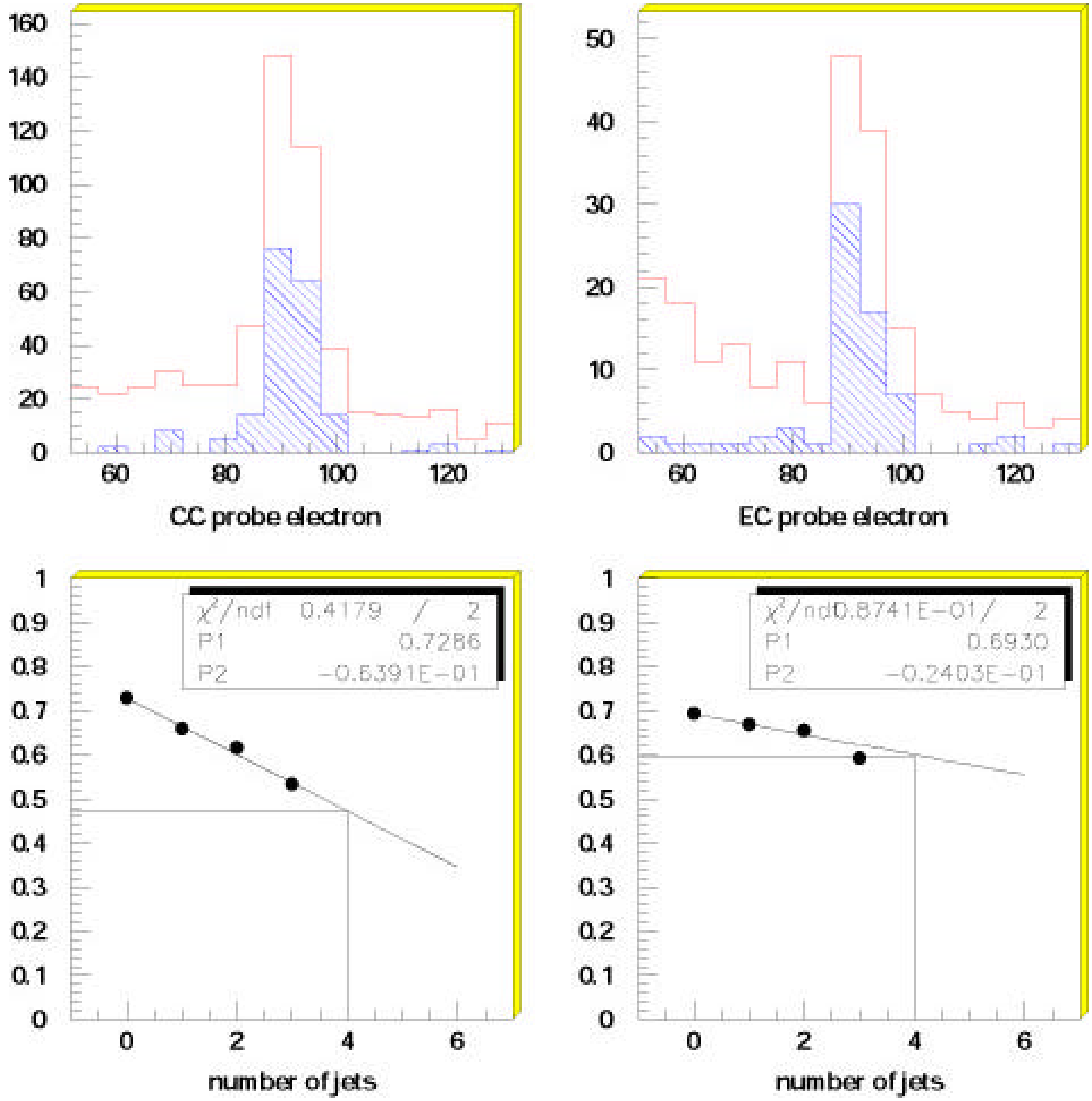
- **Choose Z->ee data sample (trigger em2_eis2_hi):**

pick first two leading electrons: the tagging electron satisfies quality cuts and Et>20(CC) or Et>15(EC), probe electron satisfies |eta|<1.1 and Et>25

W->eν cross section estimate

- **Choose 4 jets with good quality cuts and Et>25GeV**
  calculate invariance mass of the two electrons before and after apply electron ID cuts to probe electron: ***L5<1.0;Fiso<0.15***
  the ratio gives the efficiency of electron quality cut
  W->en cross section can be derived by
  N(data)=(luminosity of data)(w->en cross section)
  (efficiency of electron quality cut)N(mc)/
  N(total # of MC sample)
- **luminosity of data sample: 94pb^-1, efficiency of electron ID cut ~ 0.55**
  N(data)=116, N(mc)=989, N(total)=35501, cross section~80pb
- **Using branching ratio, we can get cross sections for w->mn, w->tn and t hadronically or leptonically decays.**
- **I use w->en cross section= 96 pb, a CDF results~3.1, 30 times smaller !!!**
- **Compare data (histogram) and MC sample (point),there are certain excesses, they are background of w to en: QCD, w->tn, Z->ee, top and promotion.**

[illegible] w+jets backgrounds should be reduced by a factor 30
How about Z->tt and Z->nn cross section? Reoptimize my cuts.


CC probe electron
EC probe electron
number of jets
number of jets
χ^2/ndf 0.4179 / 2
P1 0.7286
P2 -0.6391E-01
χ^2/ndf 0.8741E-01 / 2
P1 0.6930
P2 -0.2403E-01

Process	σ (pb)	$\pm\delta\sigma$ (pb)	MC events generated
$t\bar{t} \to X$	5.9	1.54	22720
$W \to e\nu + \geq 2$ jets	510	35	16929
$W \to \mu\nu + \geq 2$ jets	510	45	16929
$W \to \tau\nu + \geq 2$ jets, $\tau \to \ell\nu\nu$	168	15.5	5955
$W \to \tau\nu + \geq 1$ jets	1700	190	458102
$W \to e\nu + \geq 3$ jets	208	45	14840
$W \to \mu\nu + \geq 3$ jets	208	45	14840
$W \to \tau\nu + \geq 3$ jets, $\tau \to \ell\nu\nu$	73	15.5	10418
$W \to \tau\nu + \geq 2$ jets, $\tau \to$ hadrons	330	28	10854
$W \to e\nu + \geq 4$ jets	96	28	15727
$W \to \mu\nu + \geq 4$ jets	96	34	15727
$W \to \tau\nu + \geq 4$ jets, $\tau \to \ell\nu\nu$	34	12.2	5533
$W \to \tau\nu + \geq 3$ jets, $\tau \to$ hadrons	135	27	10793
pair $W \to \ell\nu, W \to qq'$	5.54	1.66	47410
pair $W \to \ell\nu, Z \to X$	0.32	0.10	47940
$Z \to ee + \geq 2$ jets	22	3.5	7737
$Z \to \mu\mu + \geq 2$ jets	22	3.5	7710
$Z \to \tau\tau + \geq 2$ jets	101	19	83328
$Z \to \nu\nu + \geq 2$ jets	132	21	15676
$Z \to ee + \geq 3$ jets, $Z\ p_T > 50$	5.6	1.8	19435
$Z \to \mu\mu + \geq 3$ jets	104	36	24285
$Z \to \tau\tau + \geq 3$ jets, $25 < Z\ p_T < 50$	17.8	5.8	11909
$Z \to \tau\tau + \geq 3$ jets, $50 < Z\ p_T < 100$	5.0	1.6	2943
$Z \to \tau\tau + \geq 3$ jets, $100 < Z\ p_T < 200$	0.58	0.19	957
$Z \to \tau\tau + \geq 3$ jets, $200 < Z\ p_T < 400$	0.019	0.006	911
$Z \to \nu\nu + \geq 3$ jets, $25 < Z\ p_T < 50$	107	35	39929
$Z \to \nu\nu + \geq 3$ jets, $50 < Z\ p_T < 100$	30	9.8	9958
$Z \to \nu\nu + \geq 3$ jets, $100 < Z\ p_T < 200$	3.5	1.1	994
$Z \to \nu\nu + \geq 3$ jets, $200 < Z\ p_T < 400$	0.11	0.037	962
$Z \to \tau\tau + \geq 4$ jets, $25 < Z\ p_T < 50$	17.8	5.8	52711
$Z \to \tau\tau + \geq 4$ jets, $50 < Z\ p_T < 100$	5.0	1.6	15380
$Z \to \tau\tau + \geq 4$ jets, $100 < Z\ p_T < 200$	0.58	0.19	1817
$Z \to \tau\tau + \geq 4$ jets, $200 < Z\ p_T < 400$	0.019	0.006	1167
$Z \to \nu\nu + \geq 4$ jets, $25 < Z\ p_T < 50$	107	35	1943650
$Z \to \nu\nu + \geq 4$ jets, $50 < Z\ p_T < 100$	30	9.8	449127
$Z \to \nu\nu + \geq 4$ jets, $100 < Z\ p_T < 200$	3.5	1.1	31655
$Z \to \nu\nu + \geq 4$ jets, $200 < Z\ p_T < 400$	0.11	0.038	13116

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creases both the extra interaction correction and the promotion correction contribute a larger fraction of the total

TABLE XX. $W+\geq n$ jet cross sections. The total uncertainty is broken down into the combined statistical uncertainty (which includes the statistical uncertainty on the number of events and the statistical uncertainty on the efficiency and background calculations), the common systematic uncertainty (4.8% from the input inclusive W cross section), and the systematic uncertainty (which is dominated by jet counting systematics; see Sec. VII B). For this table we list the maximum of the plus and minus systematic.

n	Cross Sections Results (pb)				σ_n
Jets	$BR\cdot\sigma$	Stat.	Com.	Syst.	$\overline{\sigma_{n-1}}$
≥ 1	471.2 ± 57.1	6.3	23.1	51.8	0.189 ± 0.021
≥ 2	100.9 ± 19.0	3.2	4.9	18.1	0.214 ± 0.015
≥ 3	18.4 ± 5.3	1.4	0.9	5.1	0.182 ± 0.020
≥ 4	3.1 ± 1.4	0.7	0.2	1.2	0.166 ± 0.042