new EMid/ICR Study

Status report

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- Reproduce Taka's result for Loose in p20.
- Testing new EMid.
- ICR EMid study.
- Status.

Reproduce Taka's result for Loose in p20

Data:

Run 2b Preshutdown

CSG_CAF_2EMhighpt_PASS2_p21.10.00

MC samples:

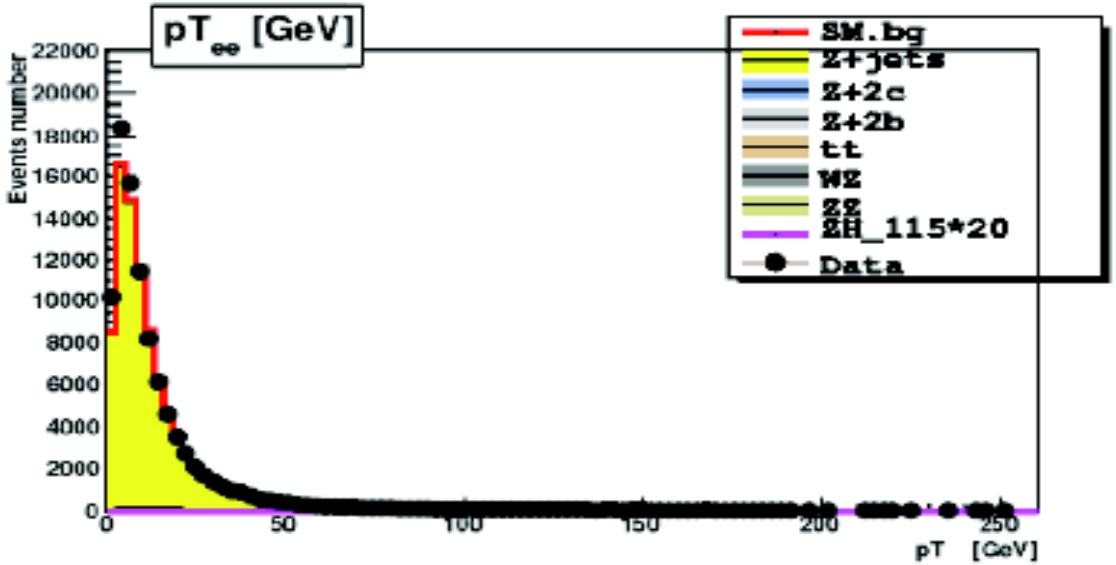
in sam

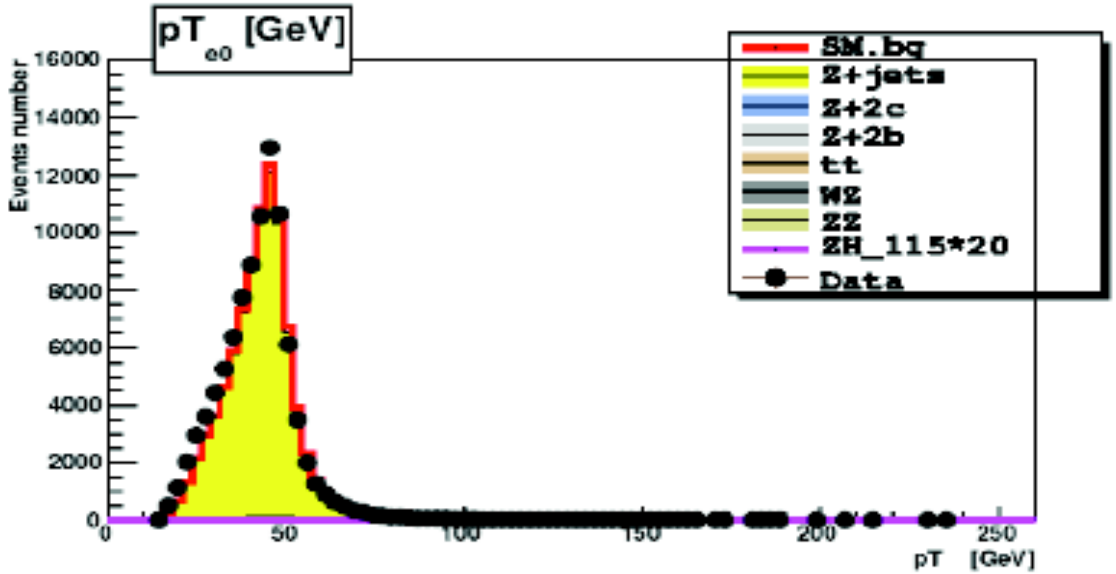
CSG_CAF_MCv2-xxxxx_p21.08.00

Cuts:

hold Emid

Loose Trk V2





Testing new EMid

The goal is to test the different new Emid cuts, and to see wich one is better for p20 data set analyse, compare to Loose hold EMid:

- Keep signal high

- Keep background low

QCD estimate, comparison between Loose p17 and Loose p20

V11 Loose (p20 EMID)
V2 Loose_trk (p17 EMID)

	DATA		MC		
	Z-peak	Exponential under peak (DY + QCD)	Z-peak	Exponential under peak (DY)	QCD background
CC-CC	45696 43410	11358 6193	45696 43410	4635 4796	6723 1397
EC-CC	9460 7966	5281 1002	9521 7655	878 820	4403 181
EC-EC	49 220	209 34	126 179	80 32	129 2
Total	55205 51627	16848 7228	55343 51244	5593 5649	11255 1579

- We gained 7% Z's and the QCD background increased by a factor of 7.

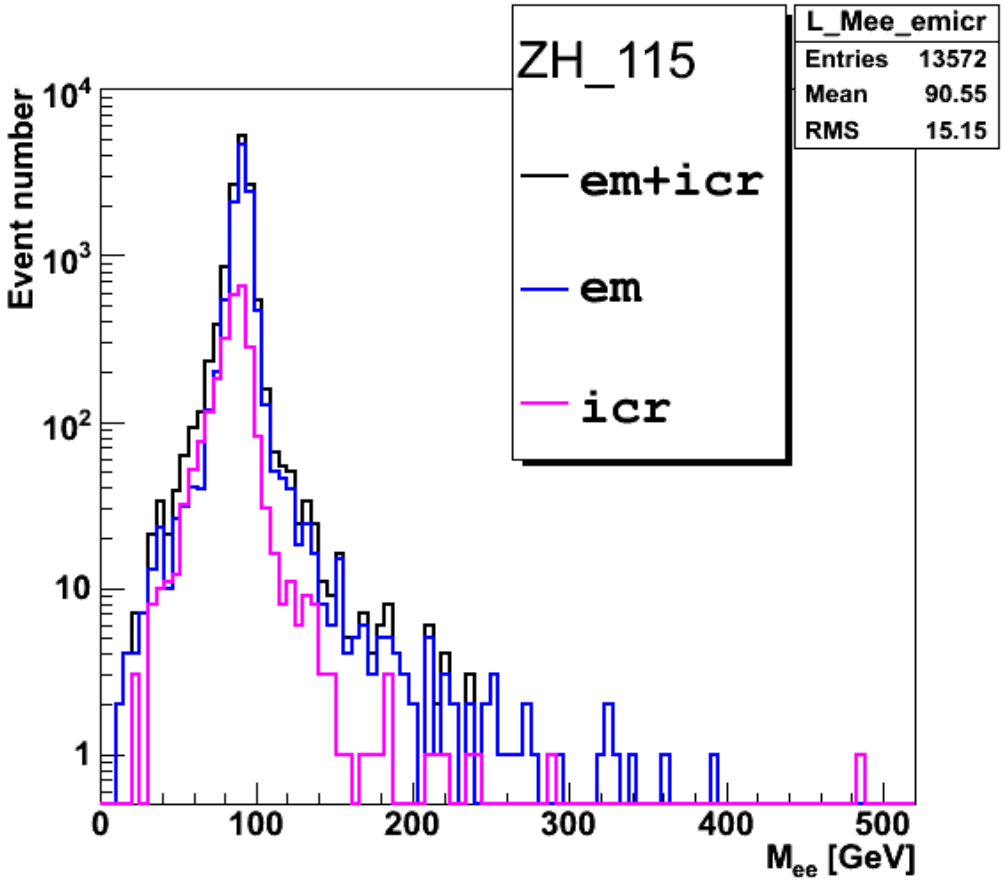
- The next step is to try "Mloose1" and "MLoose2" instead of "Loose" to see if it's any better.

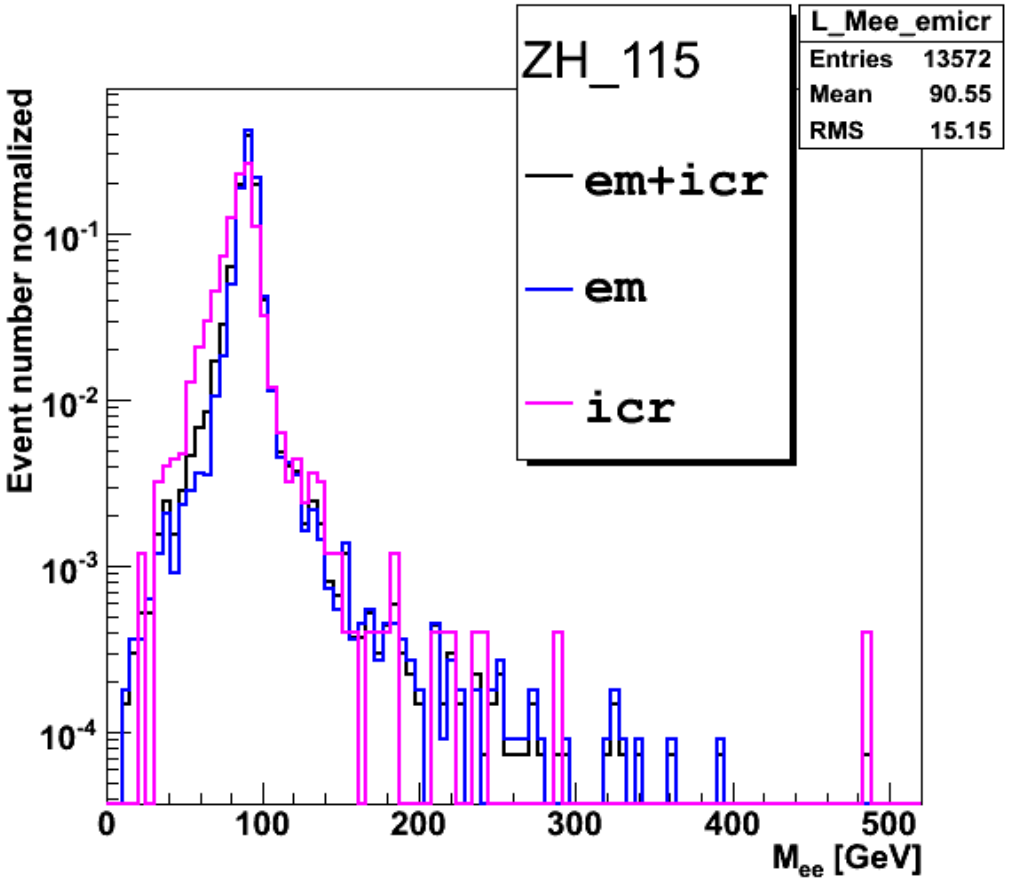
ICR EMid study

Goal: Add ele. In ICR region to see by how much it can improuve the signal efficiency.

- M_{ee} signal ZH_{115} study
- M_{ee} data study
- Status

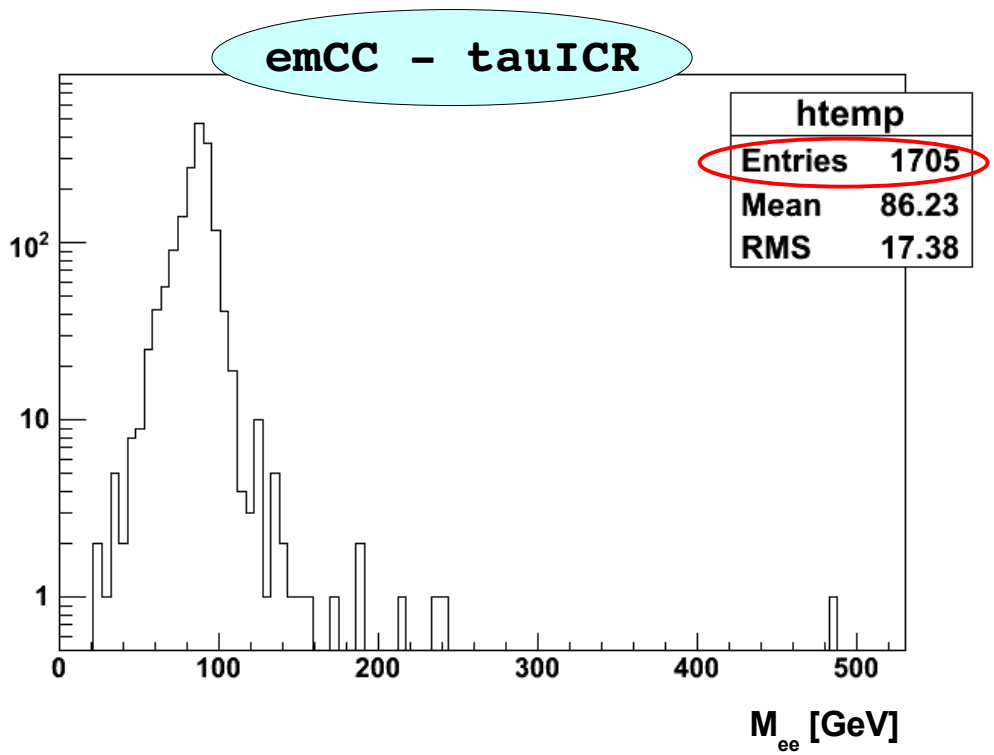
M_{ee} for em/tau/em+tau elec.; example for Loose cuts

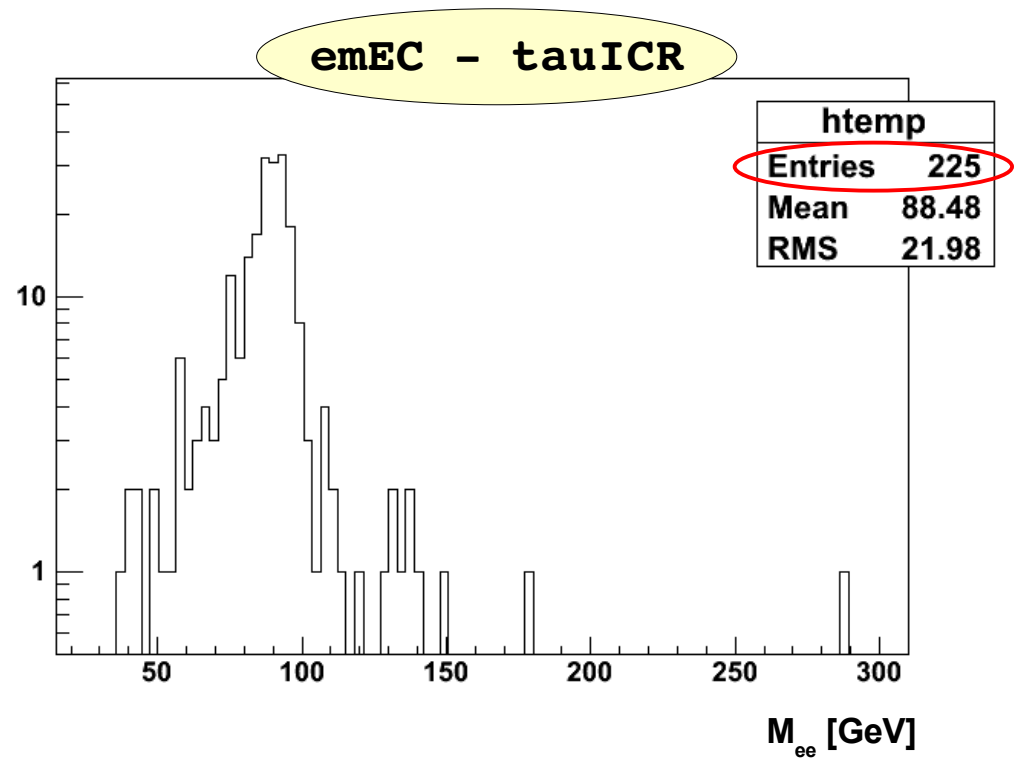




- tau elec. Represent about 19% of the total event.

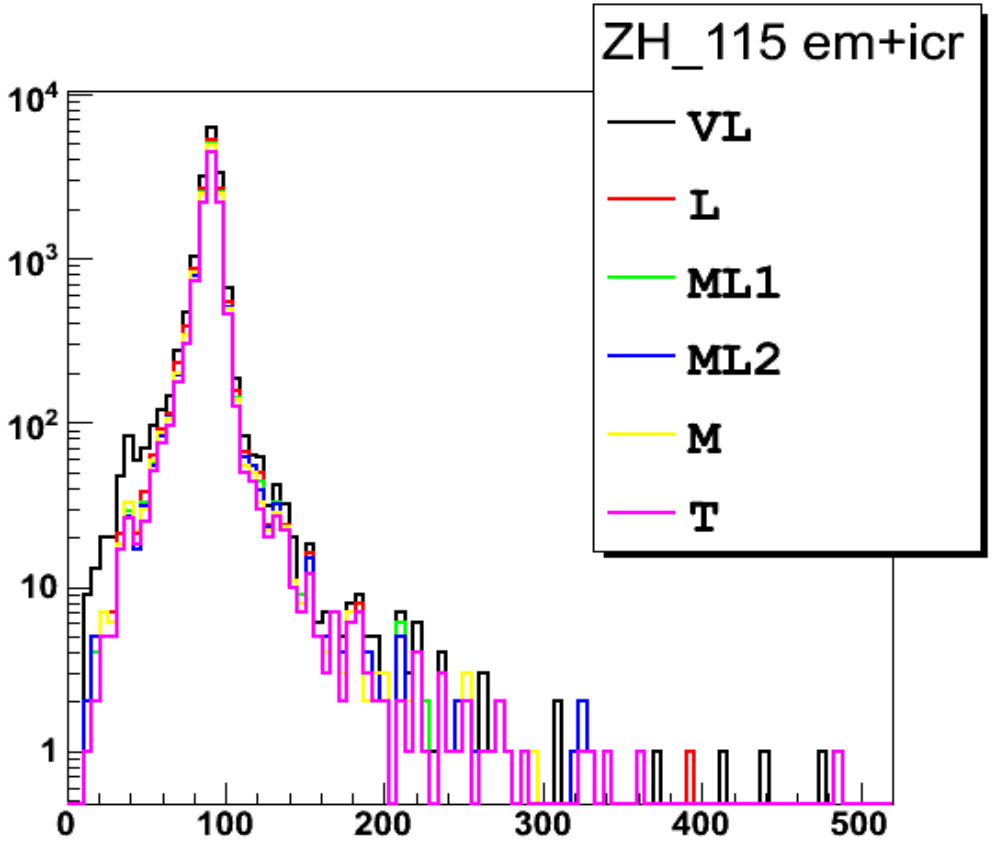
M_{ee} (η) for ZH_{115} GeV

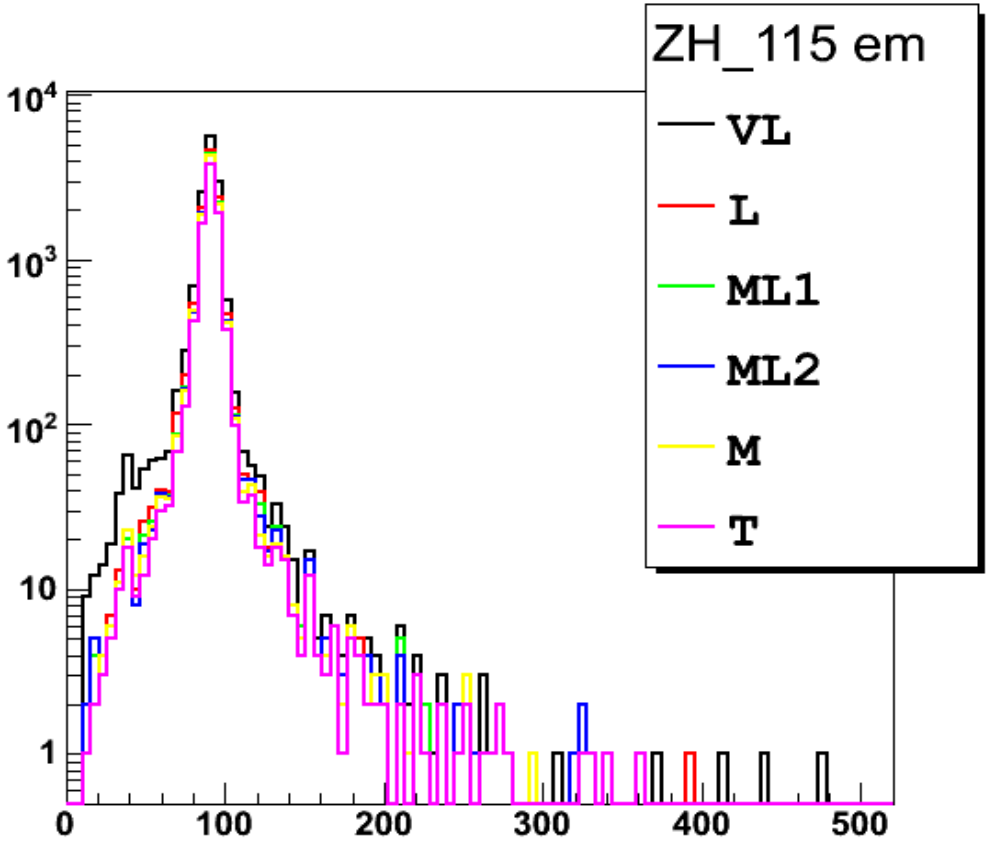




- 8 times more events in CC-ICR then in EC-ICR

ε study with M_{ee} (new id cuts), w/o ICR





- The shape are basically the same betweem w/o ICR for diff. cuts.
- At first look tau elec. increase select event's number without adding too much noise.

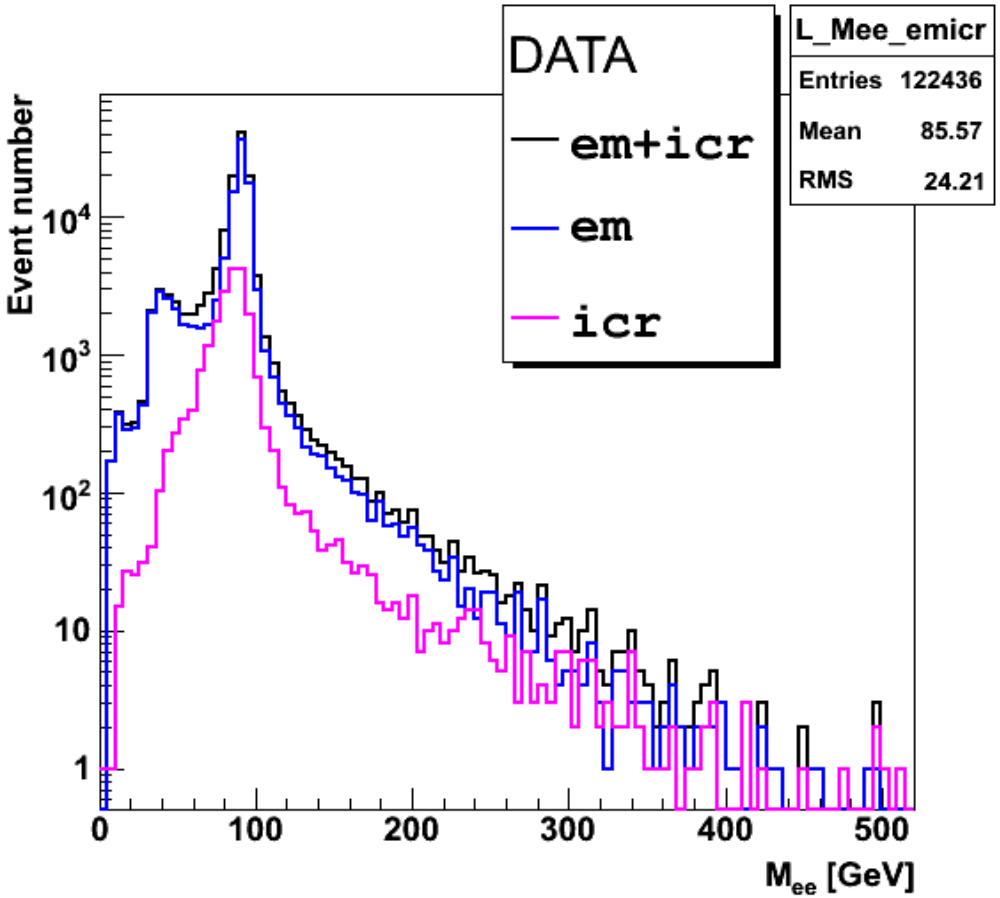
Efficiency comparison for new ID cuts

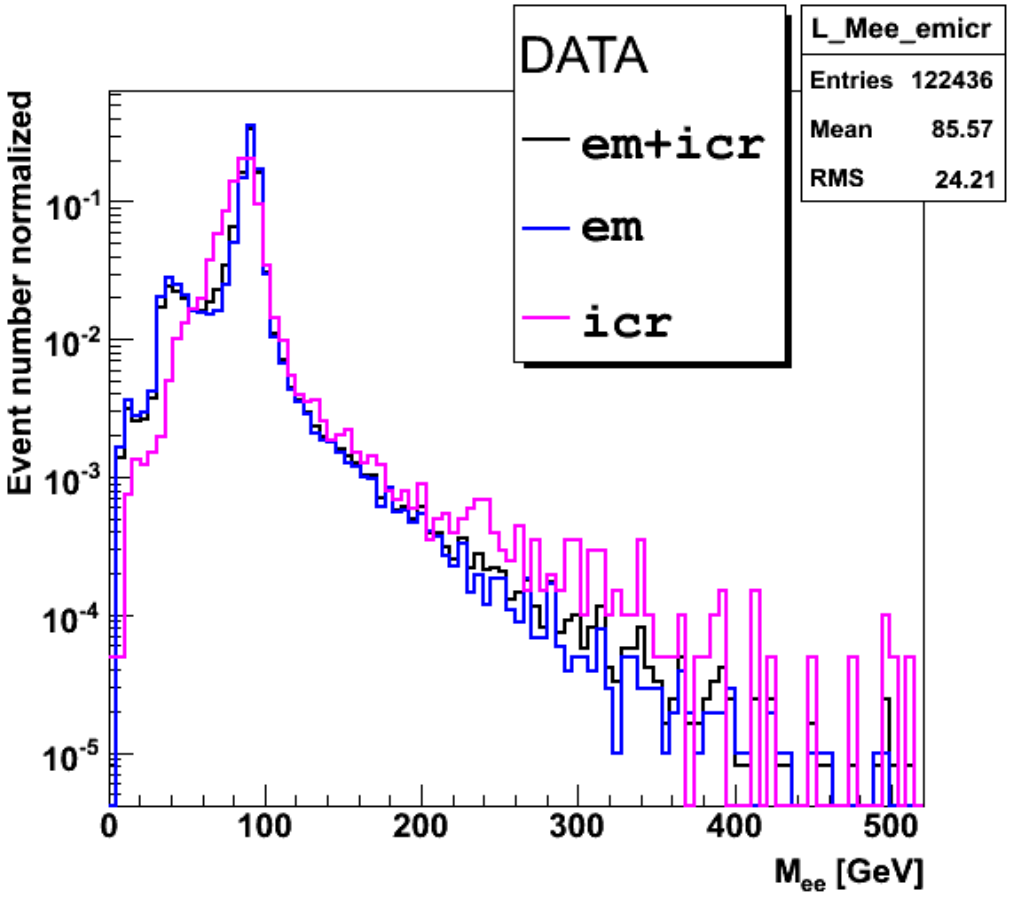
ε \ cuts	VLoose	Loose 1	MLoose 1	MLoose 2	Medium	Tight
em elec.	0.1410	0.1121	0.1045	0.1024	0.1010	0.0895
tau elec.	0.0271	0.0256	0.0247	0.0246	0.0253	0.0241
em + tau elec.	0.1681	0.1377	0.1292	0.1270	0.1263	0.1136

- When adding tau elec. we gain about 2% on $\varepsilon(ZH_{115})$, for each cuts; in agreement with the expected value.

Effect of tau. ele. on data

M_{ee} for em/tau/em+tau elec.; example for Loose cuts





- tau elec. Represent about 17% of the total event.

Comments / Status

MC:

- Adding tau elec. increase the ZH_115 signal efficiency by 2%, for all new-id cuts; in agreement with expected value.

DATA:

- Adding tau elec. increase the select event's number by 17%.

Backup slides

V11 EMID cuts apply on ZH(115 Gev)

Vloose:
Isolation_CC: 0.10
Isolation_EC: 0.10
EMFraction_CC: 0.95
EMFraction_EC: 0.95
HMx7_CC: 35
HMx7_EC: 35
IsoHC4_CC: 3.5
IsoHC4_EC: 3.5
pT: 15

Loose: VLoose+
IsoHC4_CC: 3.0
IsoHC4_EC: 2.0
TrkMatchChi2_CC: 0.001
EMHits_e_f_CC: 0.4
NNout7_CC: 0.2
NNout3_EC: 0.4

Mloose1:
Isolation_CC: 0.07
Isolation_EC: 0.10
EMFraction_CC: 0.97
EMFraction_EC: 0.95
HMx7_CC: 25
HMx7_EC: 35
IsoHC4_CC: 2.5
IsoHC4_EC: 2.0
TrkMatchChi2_CC: 0.001
EMHits_e_f_CC: 0.4
NNout7_CC: 0.2
Sigphi_EC: 20.
pT: 15

Mloose2: MLoose1+
EMHits_e_f_CC: 0.5
NNout7_CC: 0.6

Medium:
Isolation_CC: 0.07
Isolation_EC: 0.10
EMFraction_CC: 0.97
EMFraction_EC: 0.95
HMx7_CC: 25
HMx7_EC: 35
IsoHC4_CC: 2.5
IsoHC4_EC: 2.0
NNout7_CC: 0.6
Sigphi_EC: 20.
LHood_CC: 0.2
TrkMatchChi2_EC: 0.0
pT: 15

Tight: Medium+
LHood_CC: 0.8

Run 2 job to select evts in CC-EC then in ICR and merge them afterwards

Events selection in CC-EC

Elec. CC-EC

em_quality: Loose V11; em_nmin: 2; em_pt: 15; $|\eta_{CC}|<1.1$; $1.5<|\eta_{EC}|<2.5$

Events selection in ICR (loosest cut possible, base on NN cuts)

Elec. CC-EC

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em_nmin: 1

Elec. ICR (in wz_cafreco v00-08-00)

loose_tau.NNcalc:	true
loose_tau.p17NN:	true
loose_tau.NN_type1_p17:	p17NNtype1_noICD.dat
loose_tau.NN1_ICD_p17:	p17NNtype1_ICD.dat
loose_tau.NN_type2_p17:	p17NNtype2_with_e.dat
loose_tau.NNelec:	p17NNelec_etad3.dat
loose_tau.NN_type3_p17:	p17NNtype3.dat
icrele_quality:	Medium
icrele_nICRElectron:	1