



Updates on Z from last 7 day's data

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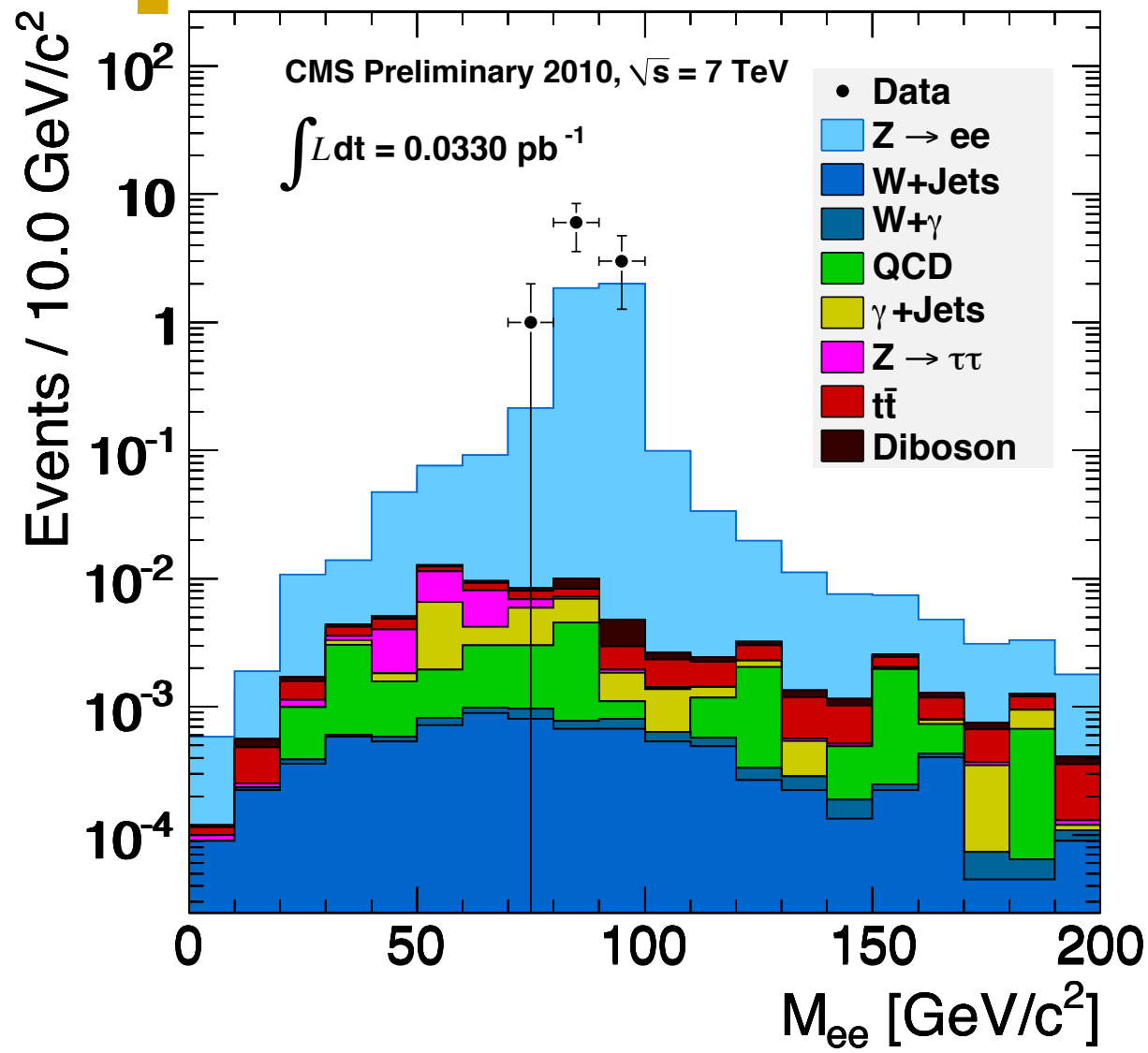
Fermilab

on behalf of Z Signal Extraction team:

D Bandurin, J Berger, C Broutin, Y Chung, A De Cosa, F Fabozzi, M De Gruttola, V Halyo, J Han, N Heracleous, O Hindrichs, I Kravchenko, C Lazaridis, L Lista, M Makouski, K Mishra, P Paganini, D Piccolo, D Piparo, R Rodrigues, Y Roh, A Schorlemmer, K Sung, J Werner, S Xie, A Zabi, M Zeise

VBTF meeting
(July 2, 2010)

Z → ee snapshot after latest data addition



We have now 10 Z → ee candidates in the high purity sample (*i.e.*, both legs passing electron WP95 selection). Out of these 7 candidates appeared in the recent runs. See the details about these candidates in the next slide.

Breaking News:
First Z(ee)+jet candidate found (details later) !

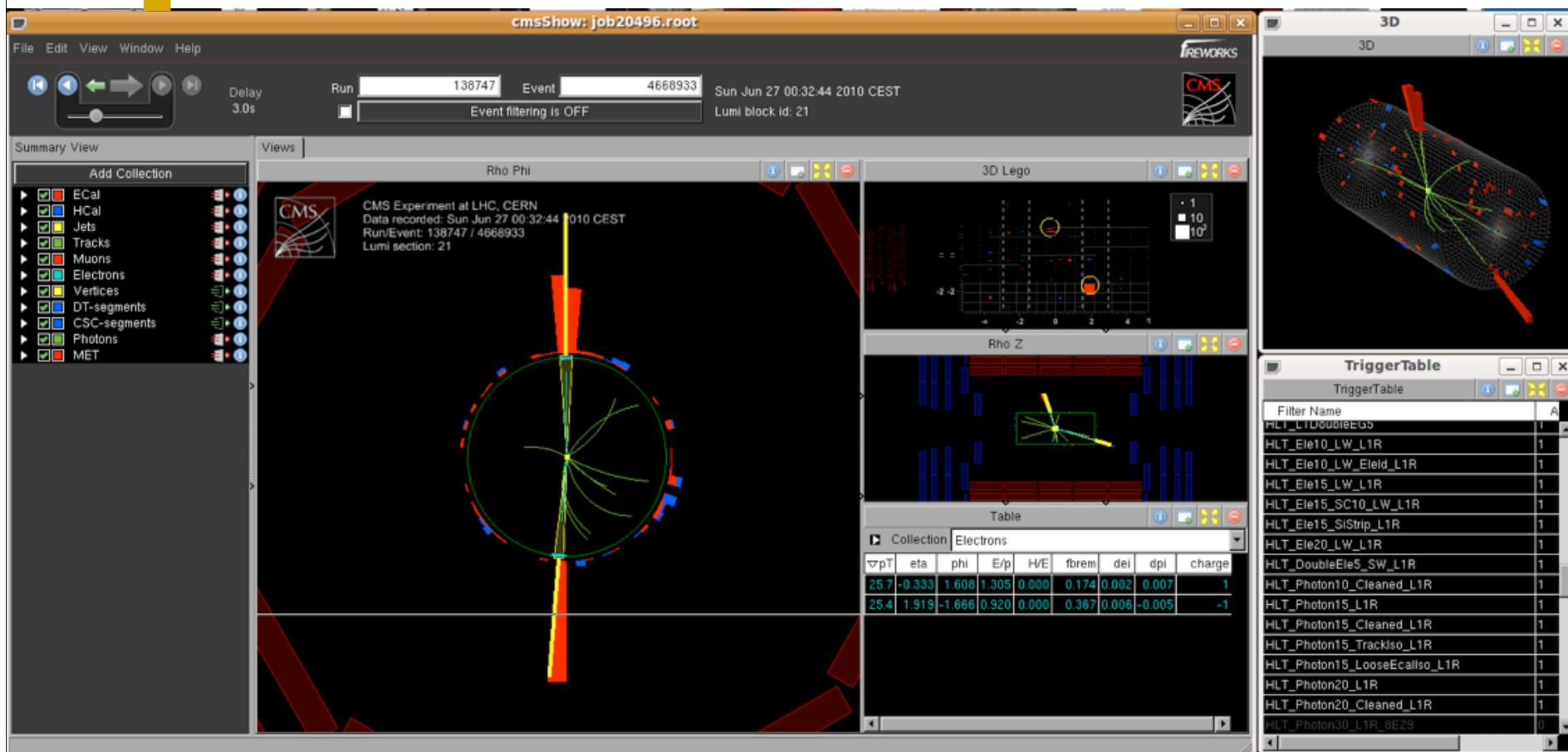
Details of the 7 new $Z \rightarrow ee$ candidates



run	event	dilepton mass	electron quantities								
			et	eta	phi	combined Iso	sigmaIeta	mishits	HoverE	deltaPhi	deltaEta
138747	4668933	87.02	25.7	-0.33	1.61	0	0.0089	0	0	0.0070	0.0023
			25.4	1.92	-1.67	0.0066	0.0269	0	0	0.0050	0.0056
EBEB 139020	440588753	93.79	36.3	0.16	0.98	0	0.0088	0	0	0.0481	0.0004
			36.2	-1.36	-2.40	0	0.0089	0	0	0.0086	0.0041
139096	218780276	84.48	37.1	1.02	-1.66	0	0.0090	1	0	0.0068	0.0005
			30.5	2.41	1.46	0.0071	0.0251	0	0	0.0066	0.0062
139098	23178656	87.45	45.8	-2.08	-2.50	0.0004	0.0243	0	0	0.0041	0.0059
			33.5	-1.12	0.53	0.0302	0.0088	0	0	0.0064	0.0012
139102	18305289	87.86	44.8	1.66	1.04	0.0288	0.0243	0	0	0.0274	0.0020
			43.0	1.42	-2.33	0.0164	0.0066	0	0	0.0061	0.0008
139100	245451772	89.18	29.3	1.66	2.06	0.0304	0.0275	0	0.01	0.0029	0.0094
			29.2	-0.31	-1.18	0.0073	0.0094	0	0	0.0009	0.0003
EBEB 139100	205982246	79.65	49.6	-0.96	-2.32	0.0228	0.0090	0	0	0.0070	0.0002
			32.4	-1.15	1.12	0	0.0085	0	0.01	0.0016	0.0001

- ◆ At long last, we have 2 EBEB $Z \rightarrow ee$ candidates (we expect 60% of our Z with both legs in barrel, currently we have got just 20% !)
- ◆ Of the 10 events we have got so far, 2 events have an electron in EE- and 6 events have an electron in EE+.
- ◆ All 10 events have at least one leg in the barrel.

Event Display: R 138747, E 4668933



Very balanced Z candidate: almost at rest. No hadronic activity.

Event Display: R 139020, E 440588753



cmsShow: /uscms1b_scratch/lpc1/old_scratch/lpctrig/jwerner/CMSSW_3_6_1_patch2/src/DATA/ZeeHunter/diElectronCandidates_Ru...

File Edit View Window Help

Delay 3.0s Run 139020 Event 440588753 Wed Jun 30 02:34:52 2010 CDT Lumi block id: 426

Event filtering is OFF

Summary View

Add Collection

- ECal
- HCal
- Jets
- Tracks
- Muons
- Electrons
- Vertices
- DT-segments
- CSC-segments
- Photons
- MET

Views

Rho Phi

3D Lego

Rho Z

TriggerTable

Filter Name	Accept	Av
HLT_Ele20_LW_L1R	1	100.
HLT_DoubleEle5_SW_L1R	1	65.
HLT_Photon10_Cleaned_L1R	0	14.
HLT_Photon15_L1R	1	100.
HLT_Photon15_Cleaned_L1R	1	100.
HLT_Photon15_TrackIso_L1R	1	100.
HLT_Photon15_LooseEcalIso_L1R	1	100.
HLT_Photon20_L1R	1	100.
HLT_Photon20_Cleaned_L1R	1	100.
HLT_Photon30_L1R_8E29	1	85.
HLT_DoublePhoton4_eeRes_L1R	1	100.
HLT_DoublePhoton4_Jpsi_L1R	0	0.0
HLT_DoublePhoton4_Upsilon_L1R	0	0.0
HLT_DoublePhoton5_Jpsi_L1R	0	0.0
HLT_DoublePhoton5_Upsilon_L1R	0	0.0
HLT_DoublePhoton5_L1R	1	100.

Table

Collection	Electrons							
Δp_T	eta	phi	E/p	H/E	fbrem	dei	dpi	charge
36.3	0.156	0.980	4.008	0.000	0.758	-0.000	-0.048	-1
36.2	-1.355	-2.403	1.284	0.000	0.715	-0.004	0.009	1

Balanced Z candidate. No hadronic activity. Both electrons in the barrel.

Event Display: R 139096, E 218780276



File Edit View Window Help

Delay 3.0s Run 139096 Event 218780276 Wed Jun 30 20:06:41 2010 CDT Lumi block id: 214

Event filtering is OFF

Summary View

Add Collection

- ECal
- HCal
- Jets
- Tracks
- Muons
- Electrons
- Vertices
- DT-segments
- CSC-segments
- Photons
- MET

Rho Phi

3D Lego

Rho Z

TriggerTable

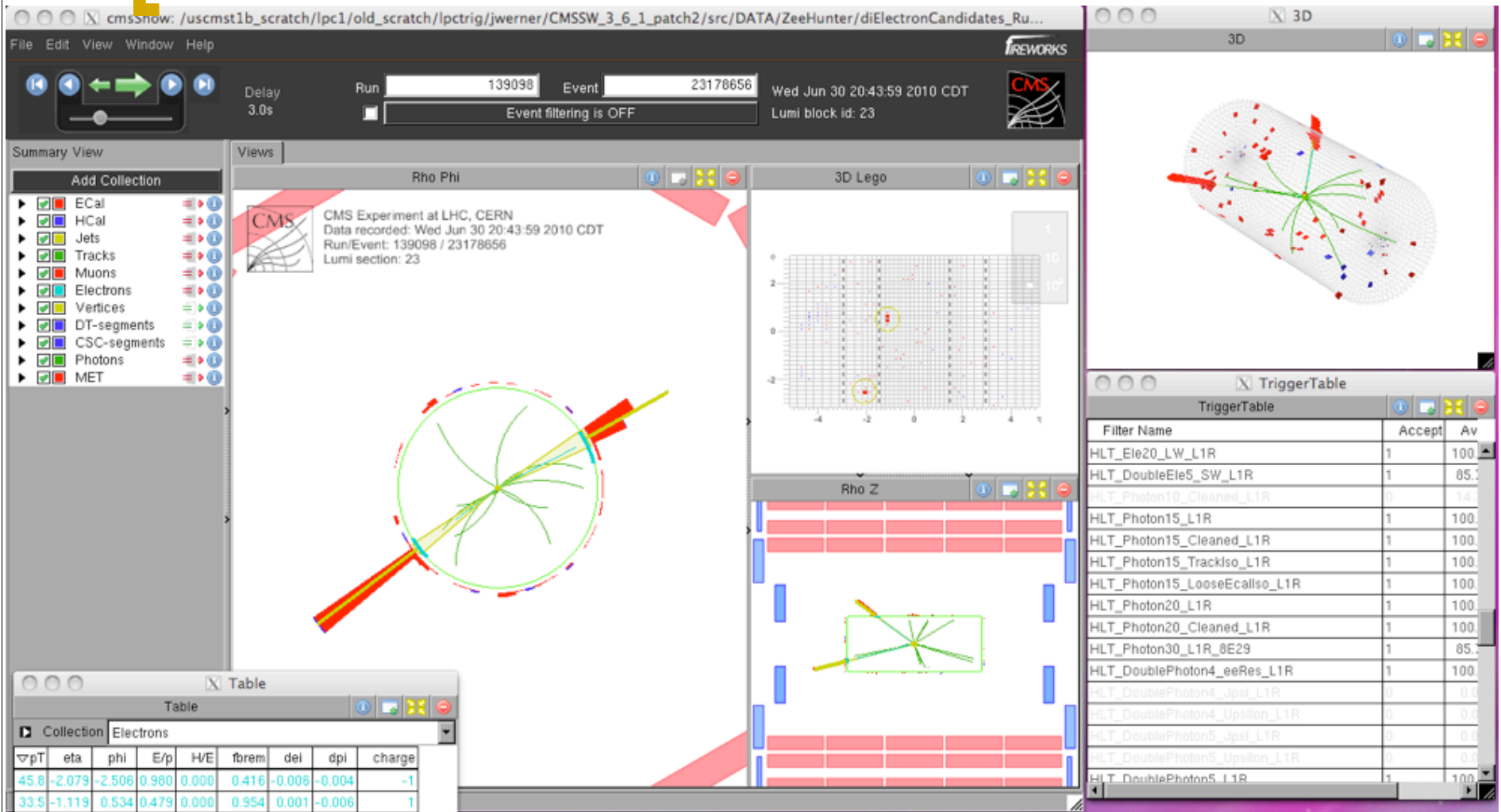
Filter Name	Accept	Av
HLT_Ele20_LW_L1R	1	100
HLT_DoubleEle5_SW_L1R	1	85
HLT_Photon10_Cleaned_L1R	0	14
HLT_Photon15_L1R	1	100
HLT_Photon15_Cleaned_L1R	1	100
HLT_Photon15_TrackIso_L1R	1	100
HLT_Photon15_LooseEcalIso_L1R	1	100
HLT_Photon20_L1R	1	100
HLT_Photon20_Cleaned_L1R	1	100
HLT_Photon30_L1R_8E29	1	85
HLT_DoublePhoton4_eeRes_L1R	1	100
HLT_DoublePhoton4_Jpsi_L1R	0	0
HLT_DoublePhoton4_Upsilon_L1R	0	0
HLT_DoublePhoton5_Jpsi_L1R	0	0
HLT_DoublePhoton5_Upsilon_L1R	0	0
HLT_DoublePhoton5_L1R	1	100

Table

Collection	Electrons							
\sqrt{pT}	eta	phi	E/p	H/E	f Brem	d _{ei}	d _{pi}	charge
37.1	1.015	-1.656	0.911	0.000	0.963	-0.000	0.007	-1
30.5	2.415	1.460	5.335	0.000	0.540	-0.006	0.007	-1

No hadronic activity.

Event Display: R 139098, E 23178656



No hadronic activity.

Event Display: R 139100, E 205982246



cmsShow: /uscms1b_scratch/lpc1/old_scratch/lpctrig/jwerner/CMSSW_3_6_1_patch2/src/DATA/ZeeHunter/diElectronCandidates_Ru...
File Edit View Window Help

Delay 3.0s Run 139100 Event 205982246 Wed Jun 30 23:18:37 2010 CDT
Event filtering is OFF Lumi block id: 213

Summary View

- ECal
- HCal
- Jets
- Tracks
- Muons
- Electrons
- Vertices
- DT-segments
- CSC-segments
- Photons
- MET

Rho Phi

CMS Experiment at LHC, CERN
Data recorded: Wed Jun 30 23:18:37 2010 CDT
Run/Event: 139100 / 205982246
Lumi section: 213

3D Lego

Rho Z

3D

TriggerTable

Filter Name	Accept	Av
HLT_Ele20_LW_L1R	1	100
HLT_DoubleEle5_SW_L1R	1	85
HLT_Photon10_Cleaned_L1R	0	14
HLT_Photon15_L1R	1	100
HLT_Photon15_Cleaned_L1R	1	100
HLT_Photon15_TrackIso_L1R	1	100
HLT_Photon15_LooseEcalIso_L1R	1	100
HLT_Photon20_L1R	1	100
HLT_Photon20_Cleaned_L1R	1	100
HLT_Photon30_L1R_8E29	1	85
HLT_DoublePhoton4_eeRes_L1R	1	100
HLT_DoublePhoton4_Jpsi_L1R	0	0
HLT_DoublePhoton4_Upsilon_L1R	0	0
HLT_DoublePhoton5_Jpsi_L1R	0	0
HLT_DoublePhoton5_Upsilon_L1R	0	0
HLT_DoublePhoton5_L1R	1	100

Table

Collection	Electrons							
η	eta	phi	E/p	H/E	fbrem	delt	dphi	charge
49.6	-0.959	-2.318	1.098	0.000	0.208	0.000	0.007	-1
32.4	-1.155	1.124	0.782	0.012	0.604	-0.000	-0.002	1

Small missing E_T in the event. No jets. Both electrons in barrel.

Event Display: R 139100, E 245451772



The screenshot displays the CMS event display interface. At the top, the event information is shown: Run 139100, Event 245451772, recorded on Wed Jun 30 23:33:22 2010 CDT, with Lumi block id: 251. The interface is divided into several panels:

- Summary View:** A list of collections with checkboxes, including ECal, HCal, Jets, Tracks, Muons, Electrons, Vertices, DT-segments, CSC-segments, Photons, and MET.
- Rho Phi:** A 2D plot showing the distribution of particles in the Rho-Phi plane. Two yellow circles highlight specific regions.
- 3D Lego:** A 3D visualization of the event, showing the detector structure and particle tracks.
- Rho Z:** A 2D plot showing the distribution of particles in the Rho-Z plane. Two yellow circles highlight specific regions.
- Table:** A table showing the properties of the selected 'Electrons' collection.
- TriggerTable:** A table showing the status of various triggers.

Collection	Electrons
∇p_T	29.3
eta	1.657
phi	2.064
E/p	0.682
H/E	0.010
fbrem	0.191
dei	-0.009
dpi	-0.003
charge	1
∇p_T	29.2
eta	-0.314
phi	-1.182
E/p	0.965
H/E	0.000
fbrem	0.039
dei	0.000
dpi	0.001
charge	-1

Filter Name	Accept	Av
HLT_Ele20_LW_L1R	1	100
HLT_DoubleEle5_SW_L1R	1	85.0
HLT_Photon10_Cleaned_L1R	0	14
HLT_Photon15_L1R	1	100
HLT_Photon15_Cleaned_L1R	1	100
HLT_Photon15_TrackIso_L1R	1	100
HLT_Photon15_LooseEcallso_L1R	1	100
HLT_Photon20_L1R	1	100
HLT_Photon20_Cleaned_L1R	1	100
HLT_Photon30_L1R_BE29	0	85.0
HLT_DoublePhoton4_eeRes_L1R	1	100
HLT_DoublePhoton4_Jpsi_L1R	0	0.0
HLT_DoublePhoton4_Upsilon_L1R	0	0.0
HLT_DoublePhoton5_Jpsi_L1R	0	0.0
HLT_DoublePhoton5_Upsilon_L1R	0	0.0
HLT_DoublePhoton5_L1R	1	100

Balanced Z candidate. No hadronic activity.

Event Display: R 139102, E 18305289



The screenshot displays the CMS event display interface. The top bar shows the file path, menu options (File, Edit, View, Window, Help), and the IREWORKS logo. The main interface is divided into several panels:

- Summary View:** A list of detector components with checkboxes, including ECal, HCal, Jets, Tracks, Muons, Electrons, Vertices, DT-segments, CSC-segments, Photons, and MET.
- Rho Phi:** A 2D plot of the event in the Rho-Phi plane, showing tracks and calorimeter hits. A text box indicates: "CMS Experiment at LHC, CERN. Data recorded: Thu Jul 1 00:09:30 2010 CDT. Run/Event: 139102 / 18305289. Lumi section: 18."
- 3D Lego:** A 2D plot of the event in the Rho-Z plane, showing tracks and calorimeter hits.
- 3D:** A 3D visualization of the event, showing tracks and calorimeter hits in a cylindrical coordinate system.
- Table:** A table showing the properties of the selected "Electrons" collection. The table has columns for pT, eta, phi, E/p, H/E, f0rem, del, dpi, and charge.
- TriggerTable:** A table showing the status of various triggers. The table has columns for Filter Name, Accept, and Av.

Collection	Electrons							
pT	eta	phi	E/p	H/E	f0rem	del	dpi	charge
44.8	1.663	1.041	3.432	0.000	0.628	-0.002	-0.027	-1
43.0	1.418	-2.327	0.975	0.000	0.860	-0.001	0.008	1

Filter Name	Accept	Av
HLT_L1DoubleEG5	1	100
HLT_Ele10_LW_L1R	1	100
HLT_Ele10_LW_EleId_L1R	1	100
HLT_Ele15_LW_L1R	1	100
HLT_Ele15_SC10_LW_L1R	1	100
HLT_Ele15_SiStrip_L1R	1	100
HLT_Ele20_LW_L1R	1	100
HLT_DoubleEle5_SW_L1R	1	87.9
HLT_Photon10_Cleaned_L1R	0	12
HLT_Photon15_L1R	1	100
HLT_Photon15_Cleaned_L1R	1	100
HLT_Photon15_TrackIso_L1R	1	100
HLT_Photon15_LooseEcalIso_L1R	1	100
HLT_Photon20_L1R	1	100
HLT_Photon20_Cleaned_L1R	1	100
HLT_Photon30_L1R_8E29	1	87

Our very first Z(ee)+1 jet event.

First Z($\rightarrow ee$)+jet candidate

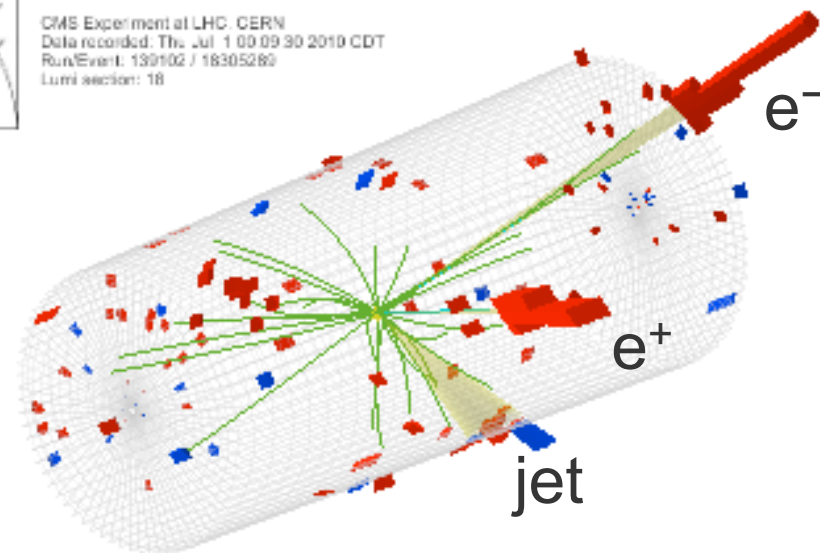
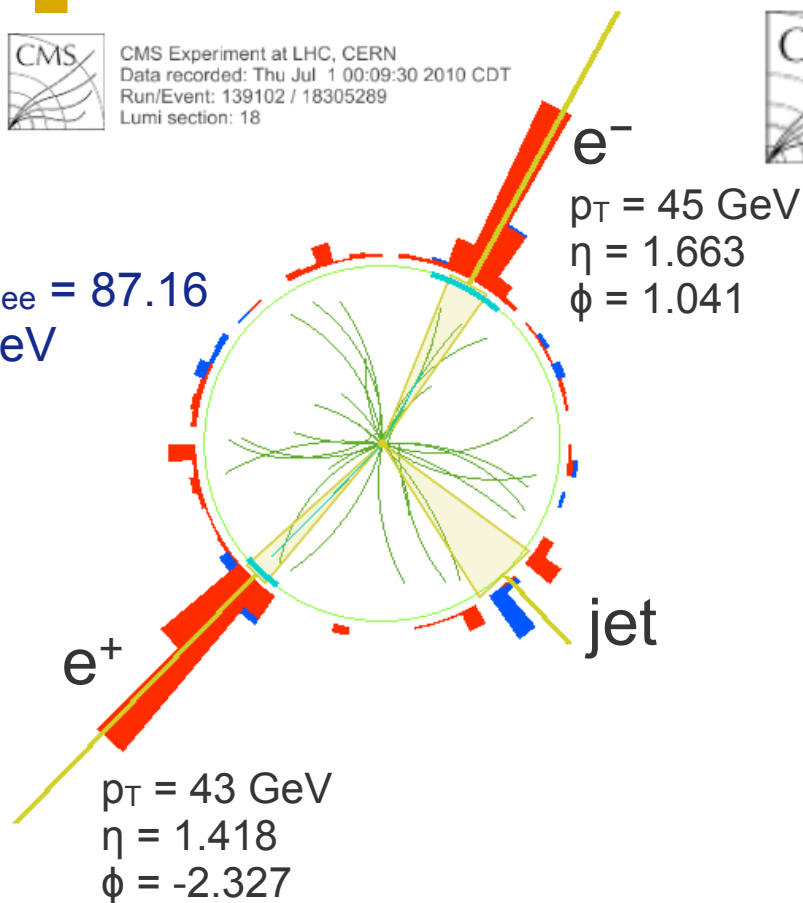


CMS Experiment at LHC, CERN
Data recorded: Thu Jul 1 00:09:30 2010 CDT
Run/Event: 139102 / 18305289
Lumi section: 18



CMS Experiment at LHC, CERN
Data recorded: Thu Jul 1 00:09:30 2010 CDT
Run/Event: 139102 / 18305289
Lumi section: 18

$m_{ee} = 87.16$
GeV



CaloJet

PF jet (unc.)

$p_T = 23$ GeV (un-Cor:10.6)

17.3 GeV

$\eta = 0.418$

0.377

$\phi = -0.819$

-0.816

emf = 0.402

$\sigma_\eta = 0.211$

$\sigma_\phi = 0.143$

[$Z \rightarrow \mu\mu$ snapshot after latest data addition



See Michele's talk in this forum.