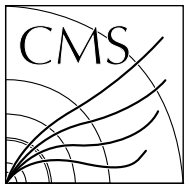
Available on CMS information server

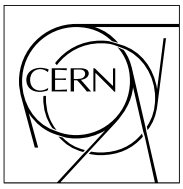
CMS DP -2015/039



The Compact Muon Solenoid Experiment

CMS Performance Note

Mailing address: CMS CERN, CH-1211 GENEVA 23, Switzerland



30 August 2015 (v2, 31 August 2015)

Event Display of a Candidate Electron-Positron Pair with an Invariant Mass of 2.9 TeV

CMS Collaboration

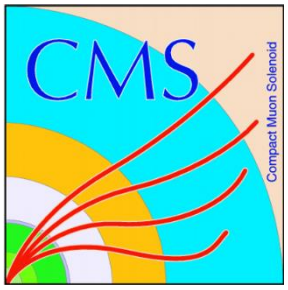
Abstract

This performance note shows the event display together with some kinematic quantities for a candidate electron-positron pair with an invariant mass of 2.9 TeV. The background expected from the SM above m(ee) = 1 TeV, 2 TeV and 2.5 TeV for an integrated luminosity of 65 pb-1 is also stated.

Event Display of a Candidate Electron-Positron Pair with an Invariant Mass of 2.9 TeV

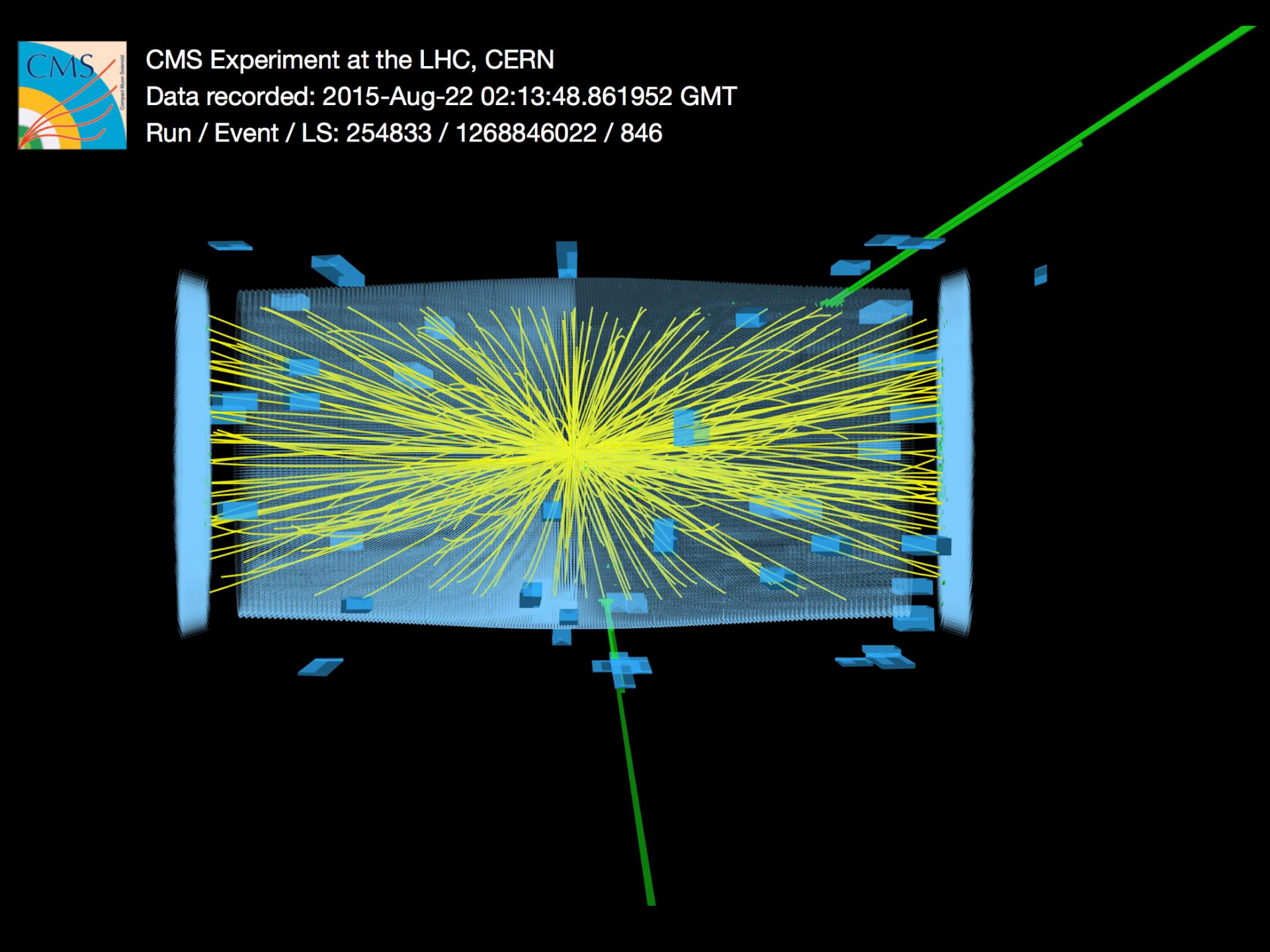
CMS collaboration

contacts: cms-pag-convenors-exo@cern.ch



Abstract

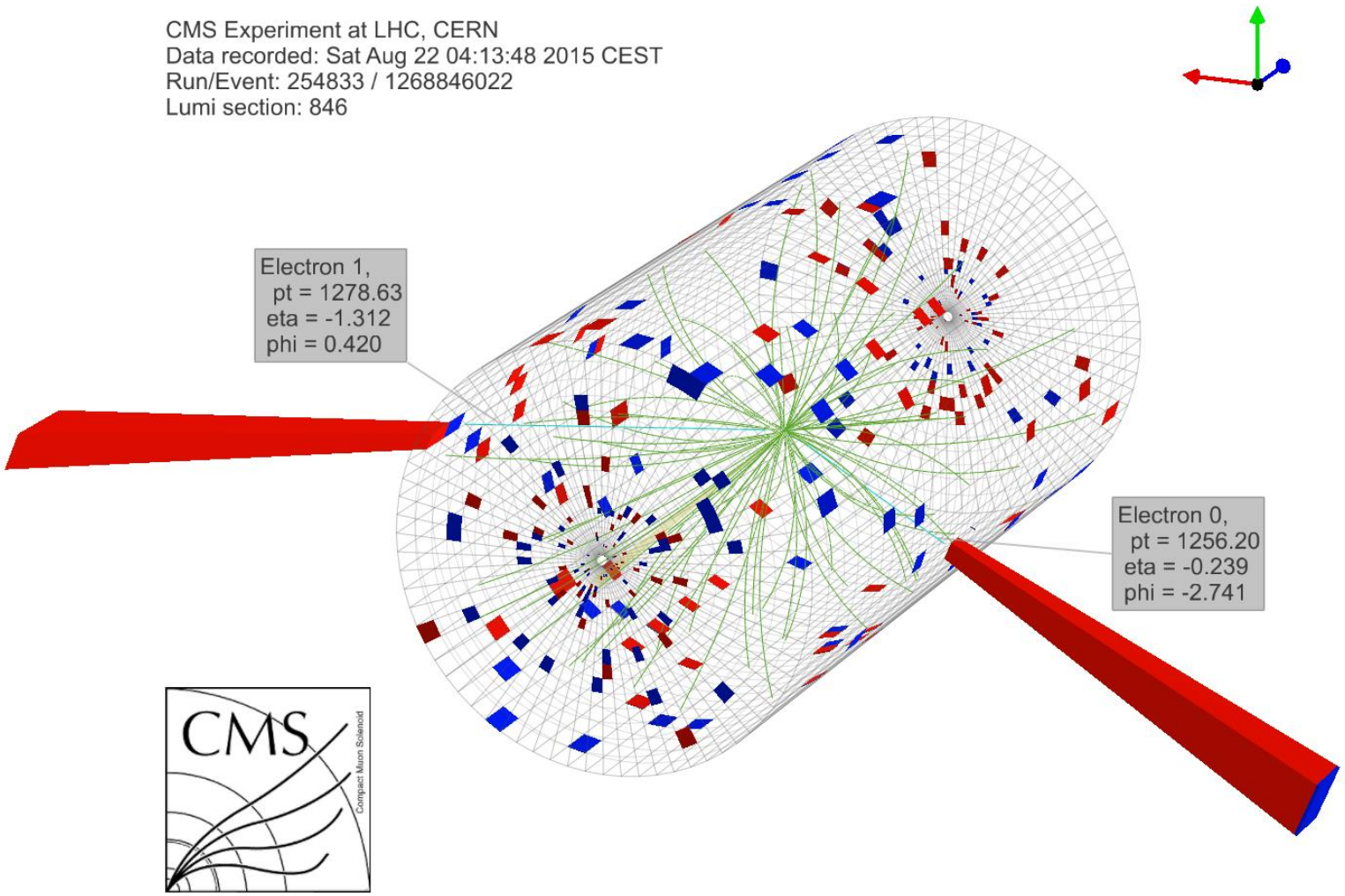
This performance note shows the event display together with some kinematic quantities for a candidate electron-positron pair with an invariant mass of 2.9 TeV. The background expected from the SM above m(ee) = 1 TeV, 2 TeV and 2.5 TeV for an integrated luminosity of 65 pb^{-1} is also stated.

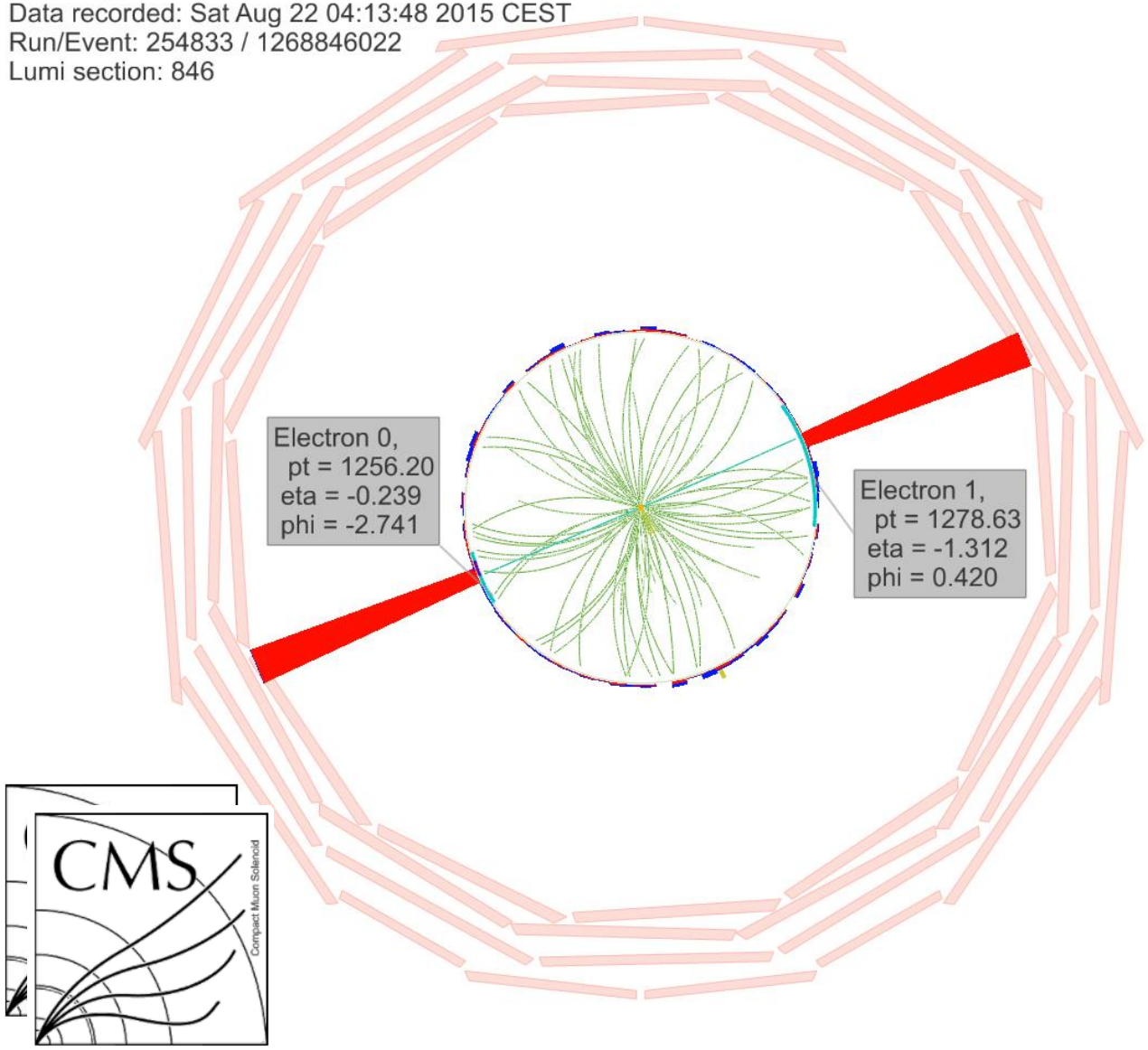

CMS Experiment at the LHC, CERN
Data recorded: 2015-Aug-22 02:13:48.861952 GMT
Run / Event / LS: 254833 / 1268846022 / 846

Event Kinematic Details

	electron 0	electron 1
E_T	1260 GeV	1280 GeV
η	-0.24	-1.31
ϕ	-2.74 rad	0.42 rad
charge	-1	+1
mass	2.91 TeV	
$\cos\theta^*_{CS}$	-0.49	
y	-0.78	

- for $\cos\theta^*_{CS}$, it is assumed that quark direction is along the boost of the di-electron system
- SM Drell-Yan events favour positive values of $\cos\theta^*_{CS}$


CMS Experiment at LHC, CERN
Data recorded: Sat Aug 22 04:13:48 2015 CEST
Run/Event: 254833 / 1268846022
Lumi section: 846
Electron 1,
pt = 1278.63
eta = -1.312
phi = 0.420
Electron 0,
pt = 1256.20
eta = -0.239
phi = -2.741
CMS
Compact Muon Solenoid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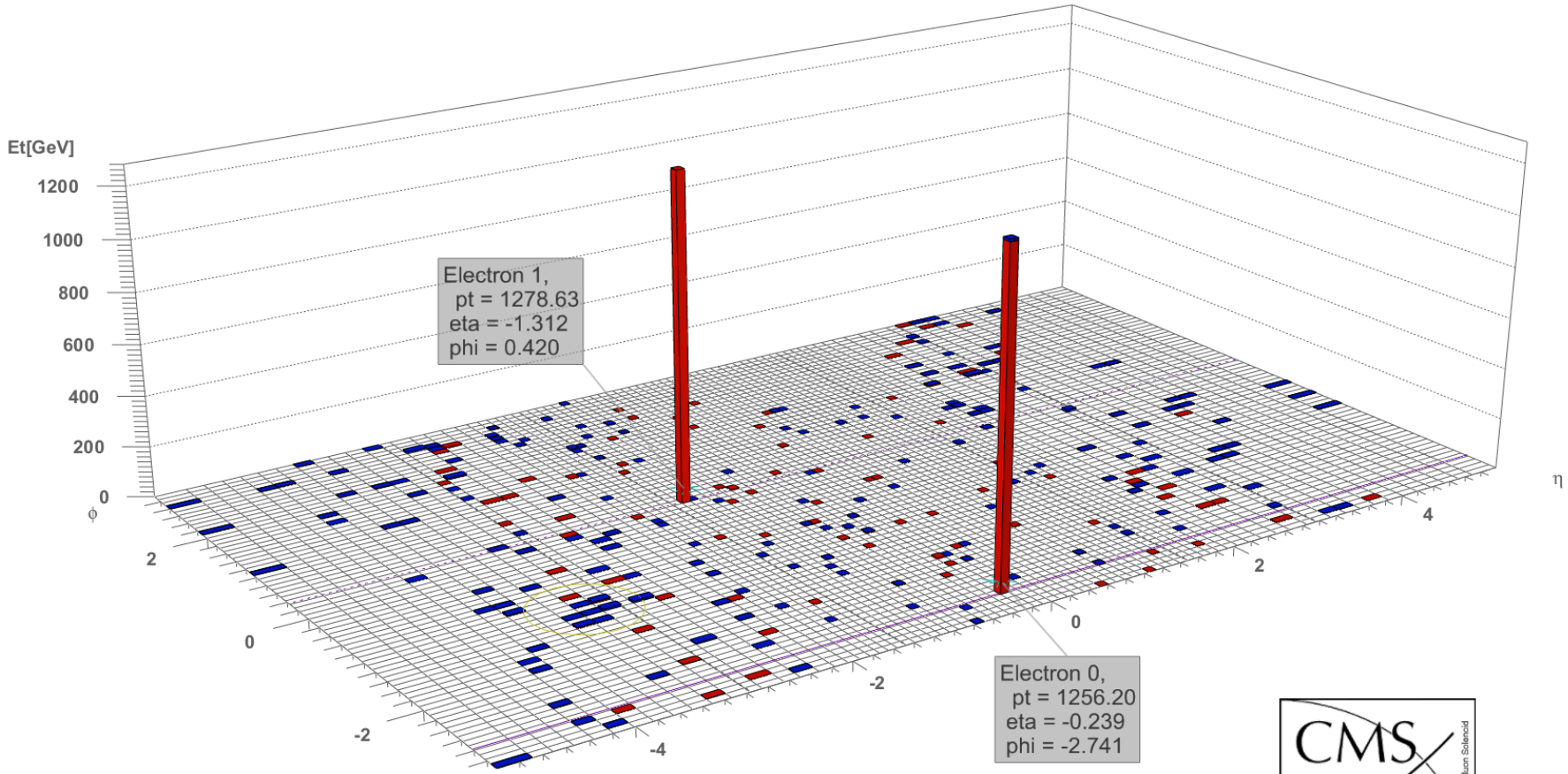

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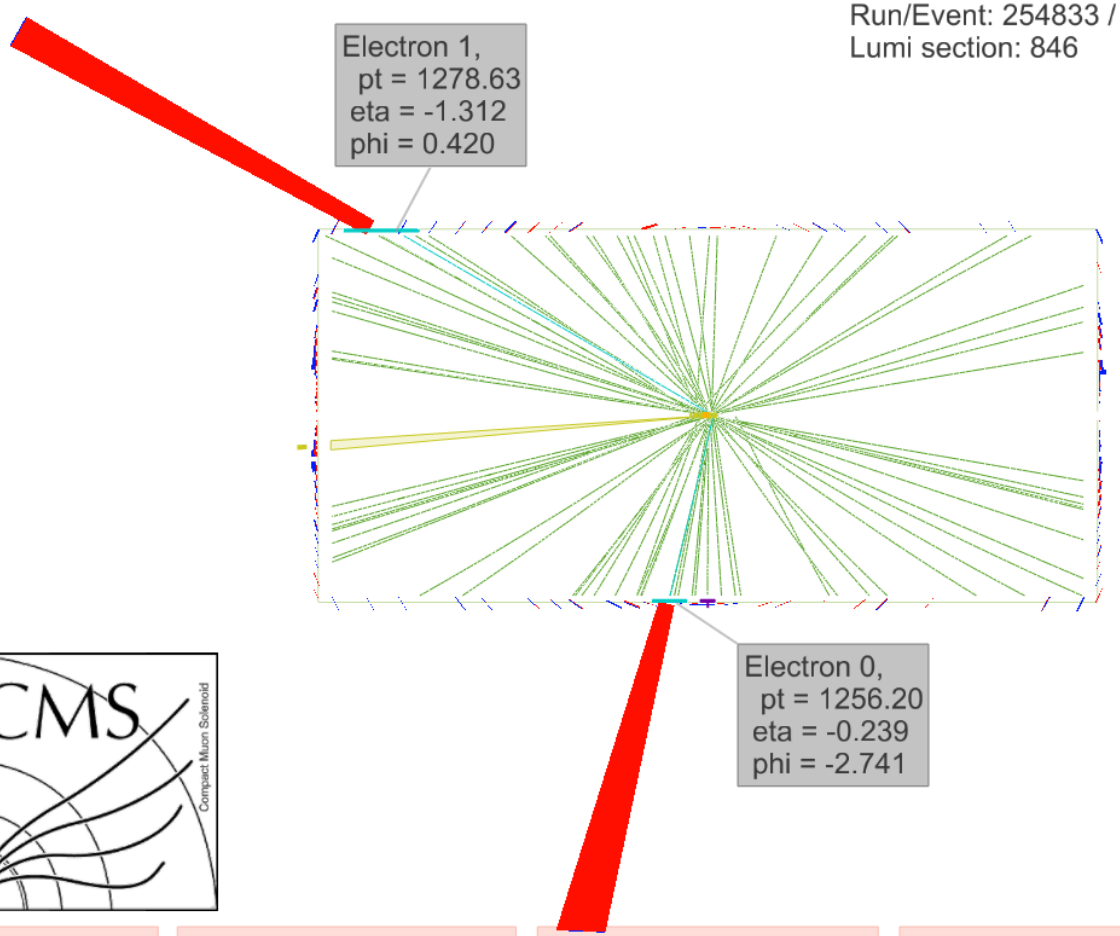
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SM Background Expectations

mass range	SM Bkg Expection
>1 TeV	0.21
> 2 TeV	0.007
> 2.5 TeV	0.002

electrons are required to satisfy:
$E_T > 35$ GeV
$|\eta| < 1.4442$ or $1.566 < |\eta| < 2.5$
pass high energy ele selection

in addition one electron must have
$|\eta| < 1.4442$

- the values of this table have been obtained from the mass spectrum distribution in CERN-CMS-PD-2015-037 and scaled to the luminosity of 65pb^{-1}, which is the luminosity of full 50ns dataset
  - to ensure a smooth distribution, the mass spectrum was fitted with the bkg function used by the RunI analysis (10.1007/JHEP04(2015)025)
- the mass spectrum is obtained directly from Monte Carlo simulated events
  - the Monte Carlo generators used are listed in the next slide
- the theoretical uncertainties on the background estimate are expected to be the dominant uncertainties on background estimate

Monte Carlo Generators used for Background Expectation

- SM Drell-Yan:
  - MadGraph5_aMCatNLO hadronised with PYTHIA 8
- ttbar, tW :
  - POWHEG hadronised with PYTHIA 8
- jets:
  - PYTHIA 8
- WW, WZ, ZZ :
  - PYTHIA 8
- W+jets:
  - MadGraph5_aMCatNLO hadronised with PYTHIA 8