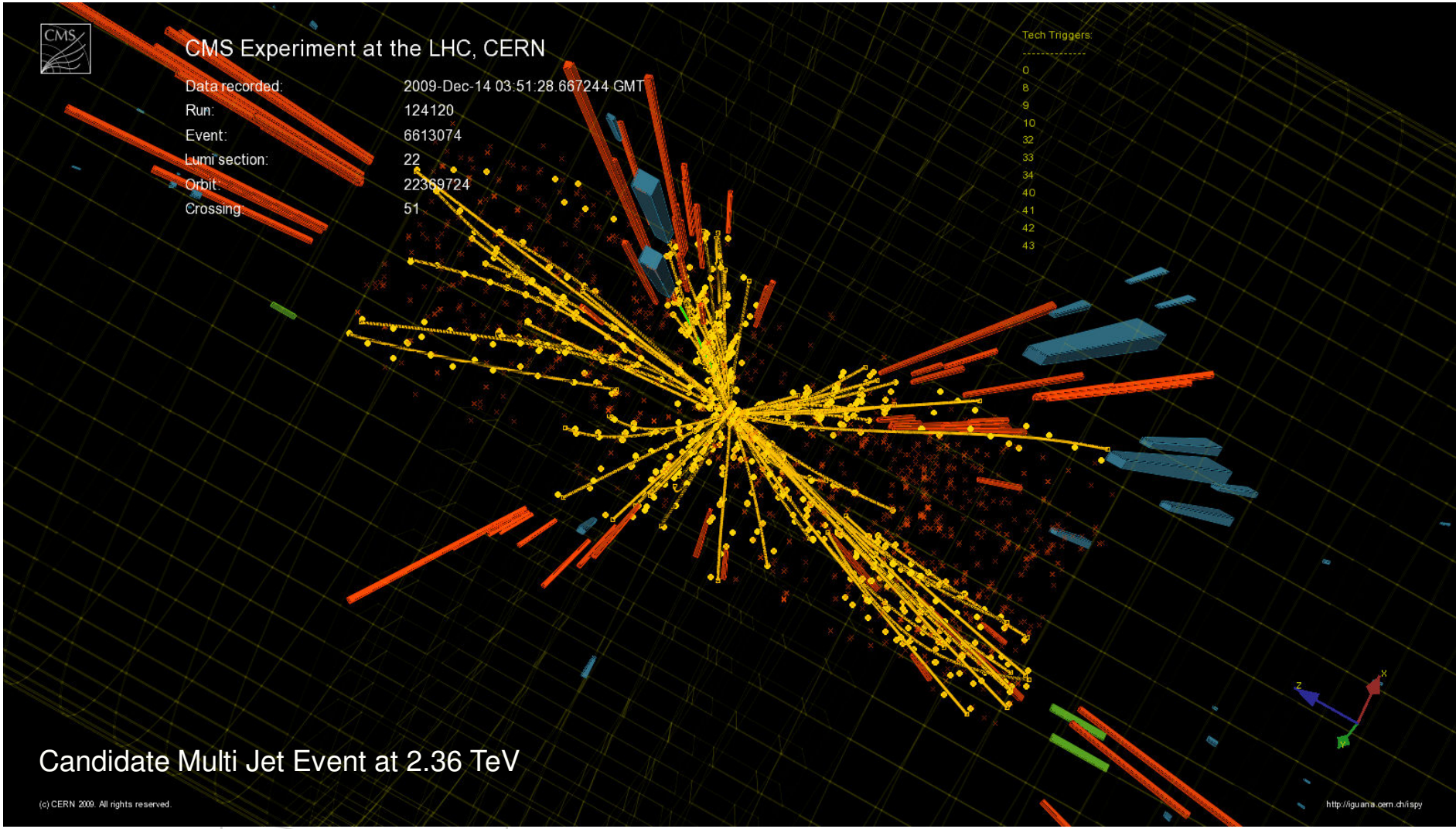


CMS 2nd LHC Status Report CERN 18 Dec'09

T. Virdee
On Behalf of the CMS Collaboration

Summary

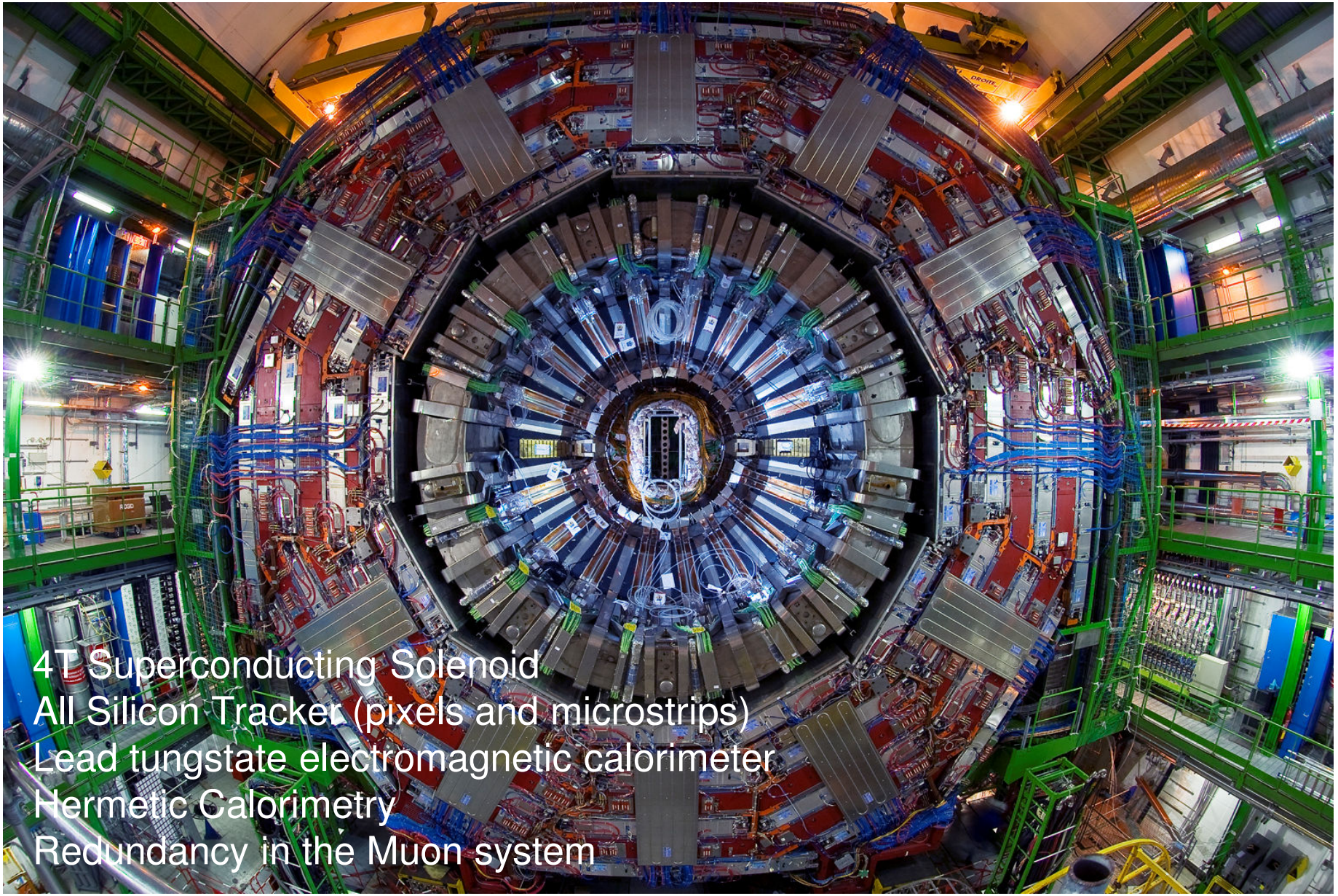
CMS has started taking collision data

On the average more than 99% of the sub-detector electronic channels are operational. High data-taking efficiency (> 80% for "quiet" or "stable beam" flag (all CMS ON))

All indications are that:

- **data can be analysed rapidly – all chains are working well,**
- **the performance is according to design (almost all distributions agree well with the simulations at the fine level),**
- **CMS is starting to produce results from collision data.**

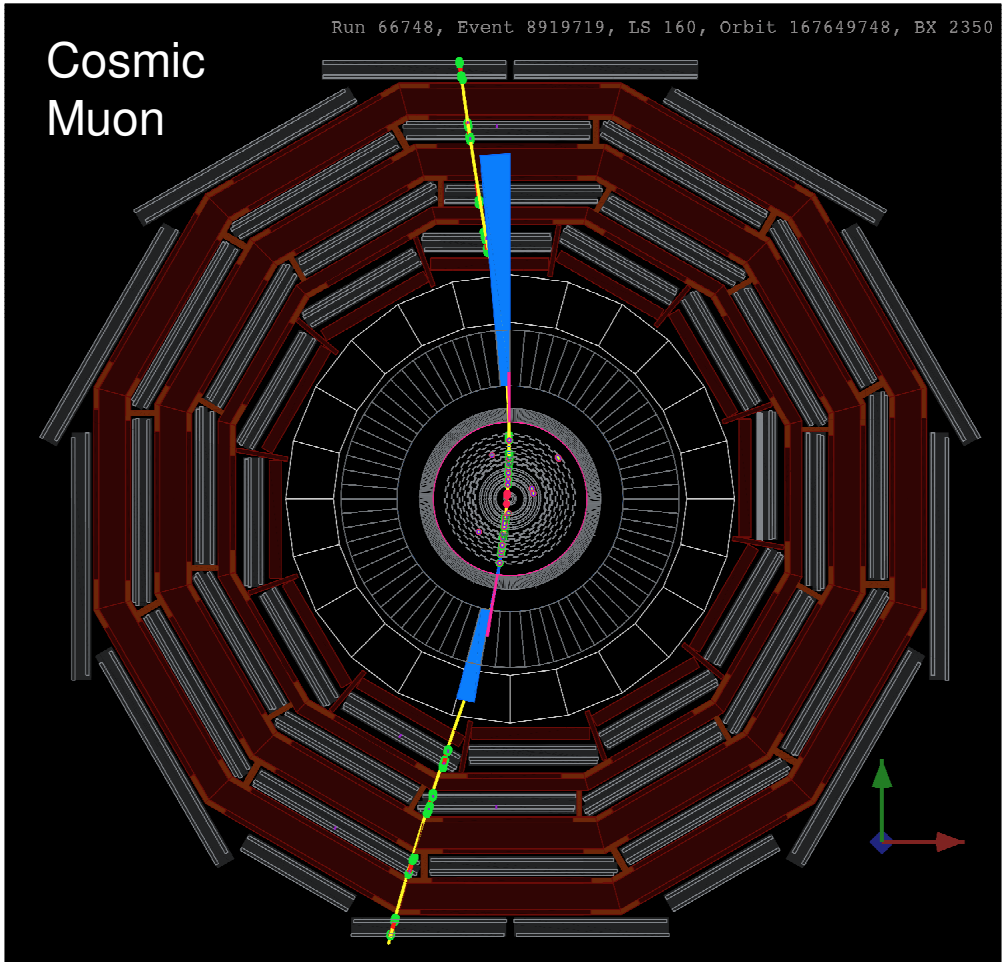
CMS Detector



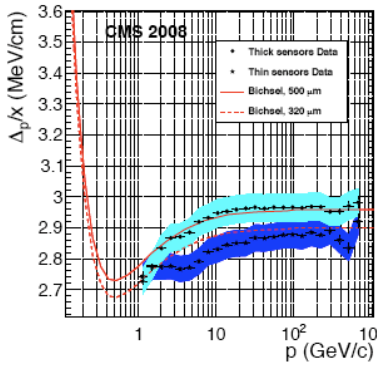
Prologue

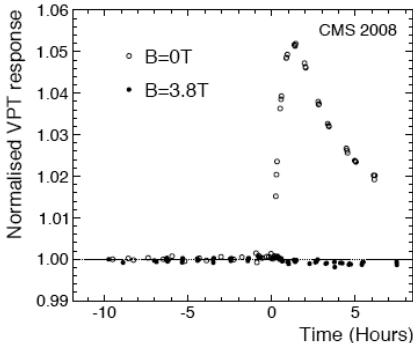
Since Sept. ‘08 – extensive tests

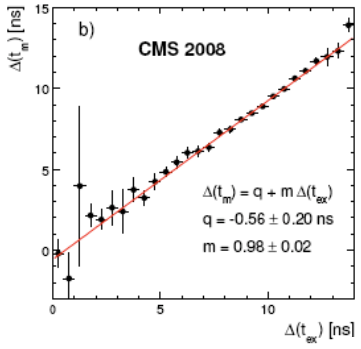
- **Cosmics data taking in Oct’08 and Aug’09 (CRAFT),**
- **Offline and Computing tests,**
- **Prompt physics analysis exercise in Oct’09.**

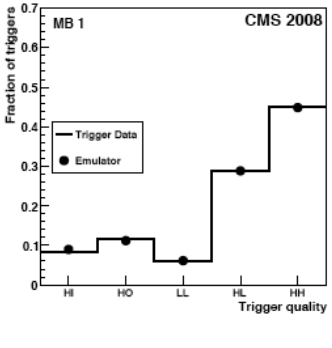


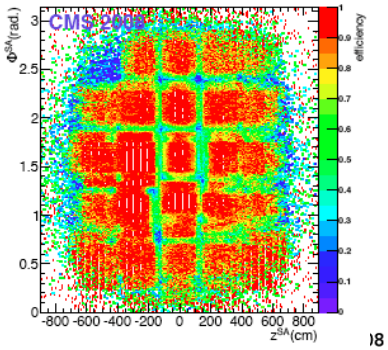
CRAFT: 23 Papers Submitted to JINST

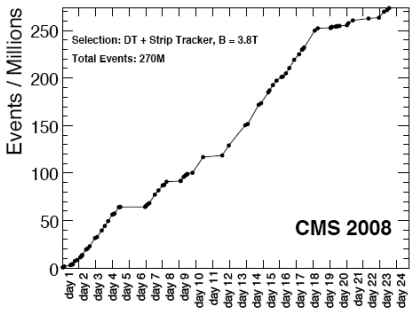


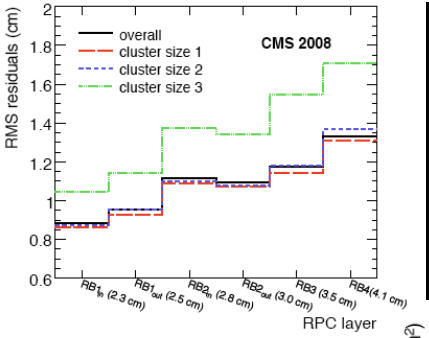


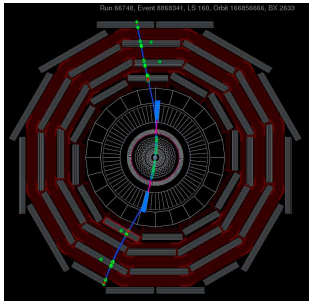


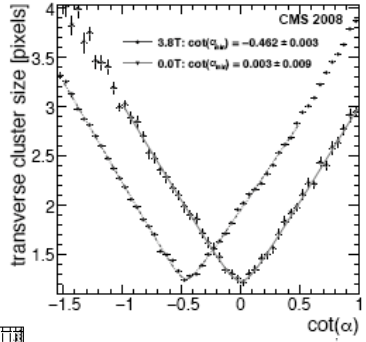


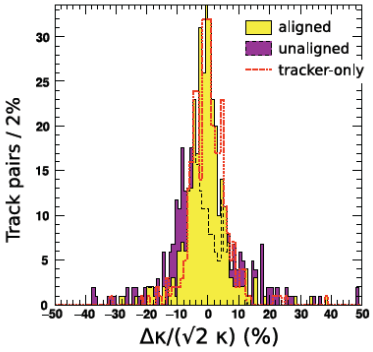


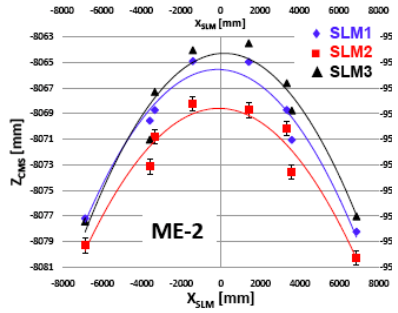


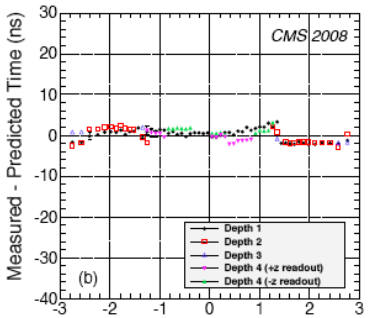


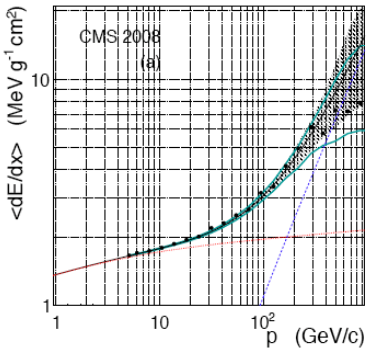


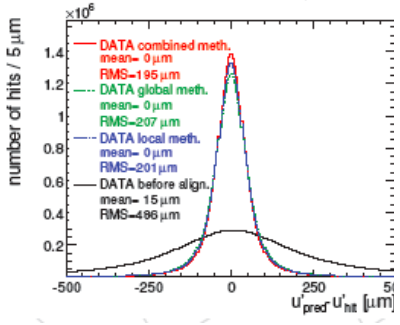


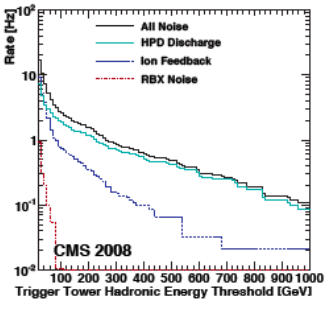


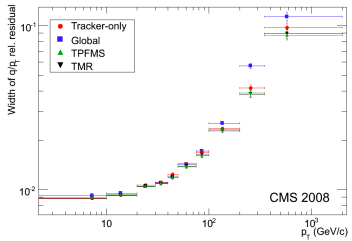


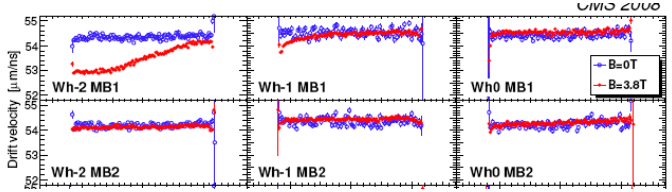


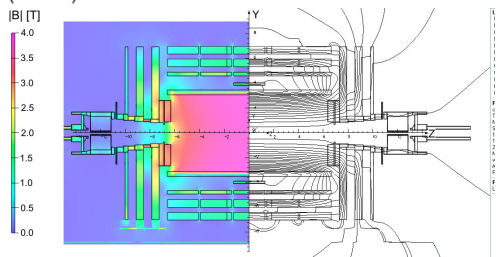


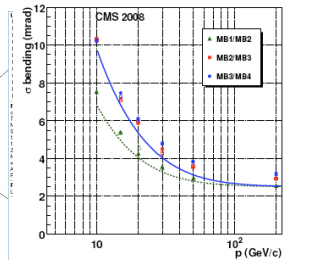








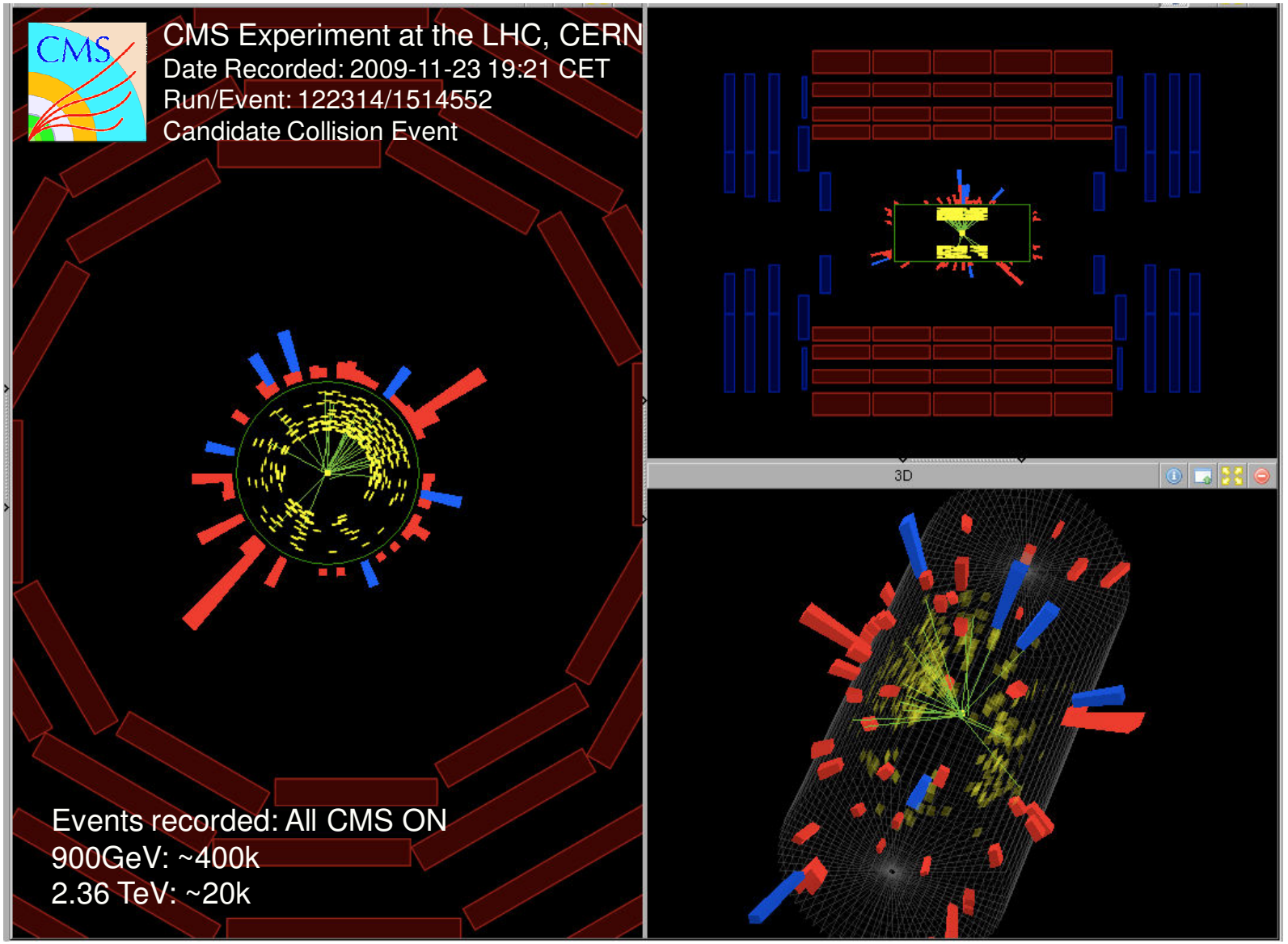




Dec09 LHC2- CMS

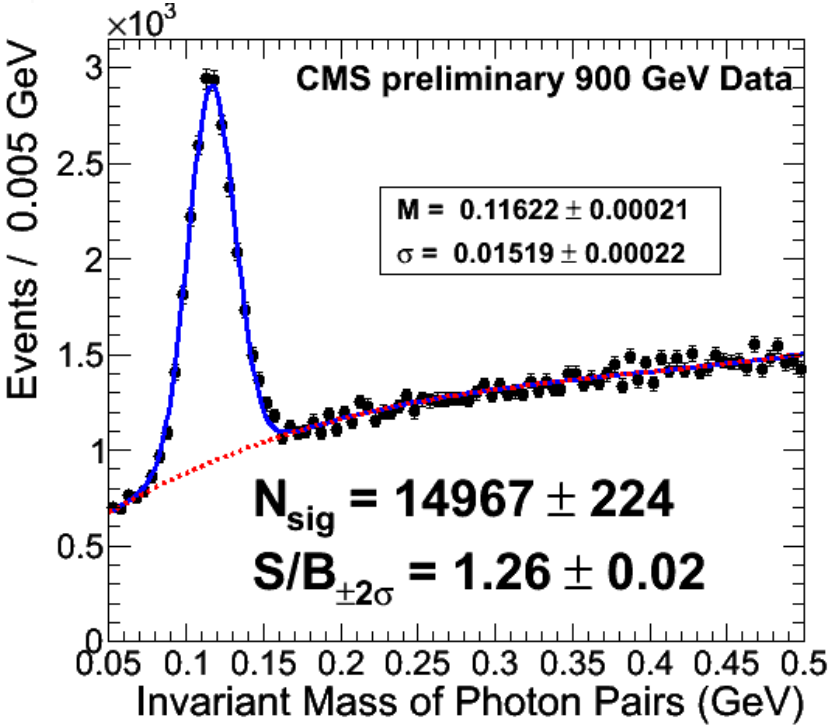
Start of the LHC: First Collisions

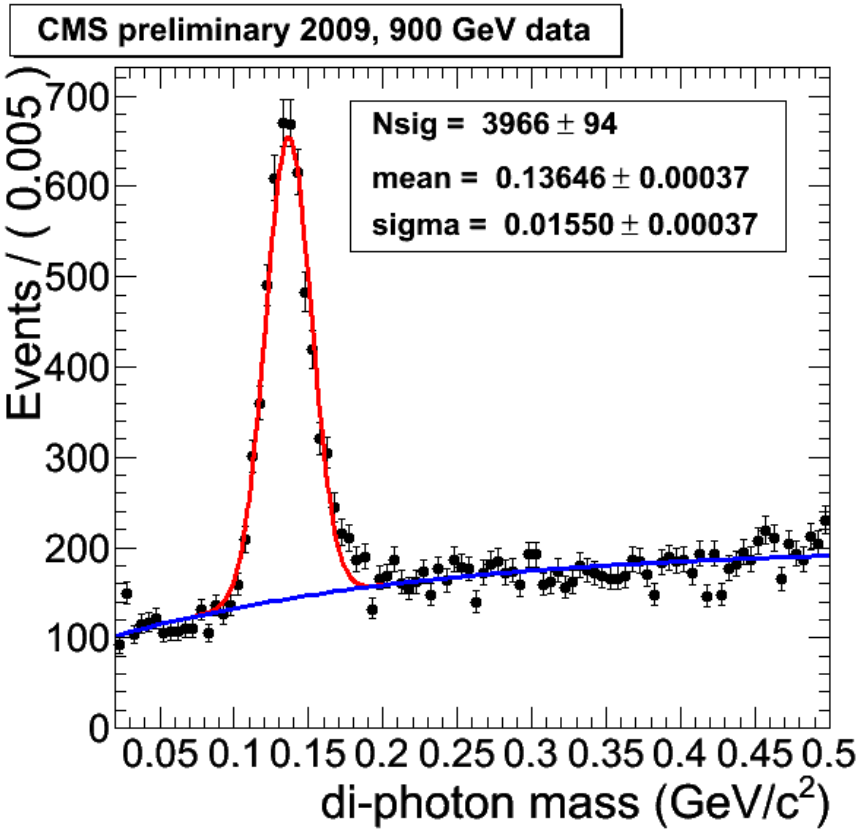
Monday 23rd November



First Di-photon Distribution in CMS

First shown on Thur 27th Nov, Today's distributions shown below





- **Data and MC comparison (uncorrected distributions)**
- Almost identical S/B, mass and width compatible
- M(π^0) is low in both data and MC - Mostly due to the readout threshold (100 MeV/Crystal) and conversions

Using "out of the box" corrections

Rapid Analysis

Sunday 6th Early Morning: First "Physics" Fill

4x4 bunches, Σ ~ e10 protons, Stable Beam Flag set for the first time

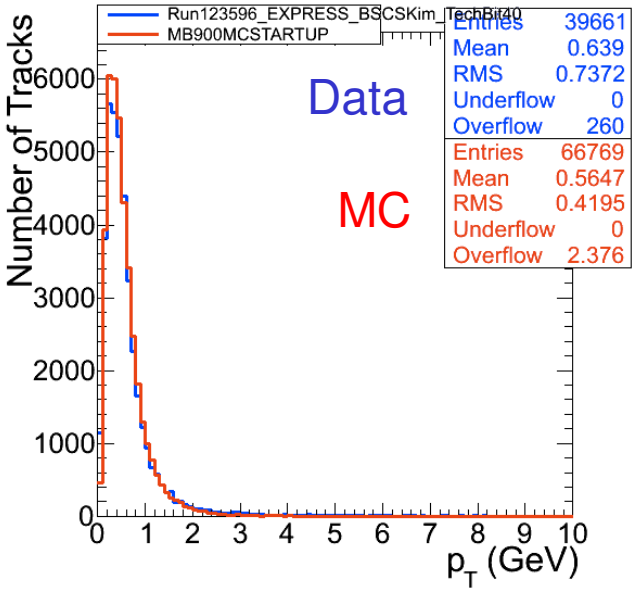
Sunday 6th : 9am

LHC Run Meeting

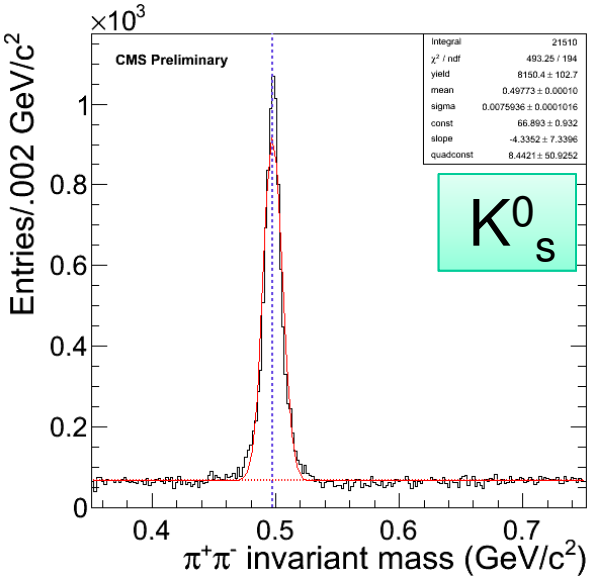
All of CMS was Switched ON

Monday 7th : First K^0_S & Λ

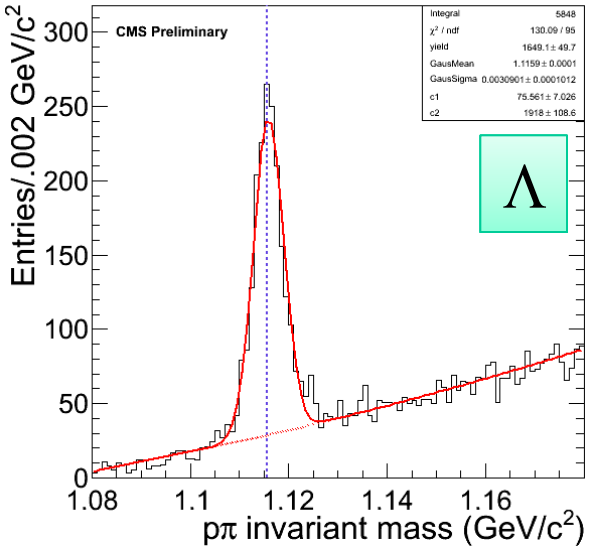
CMS 2009 Preliminary



Charged particle p_T spectrum



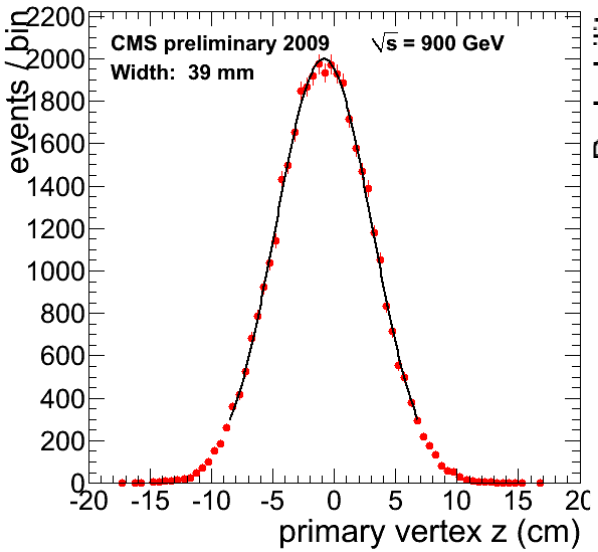
M=497.7 MeV/c², σ=7.6 MeV/c²

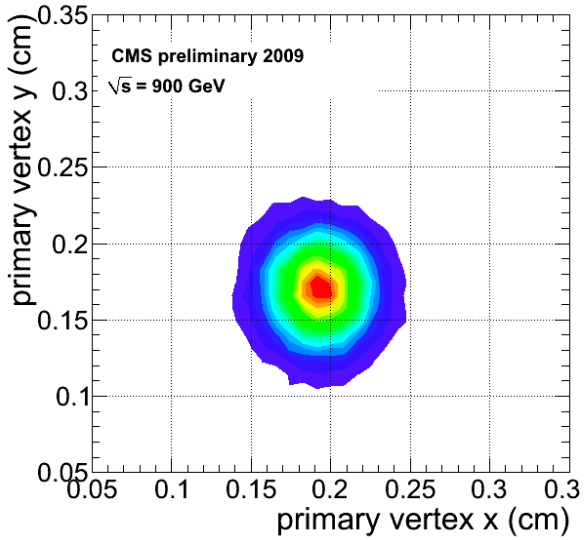


M=1.116 GeV/c², σ=3.1 MeV/c²

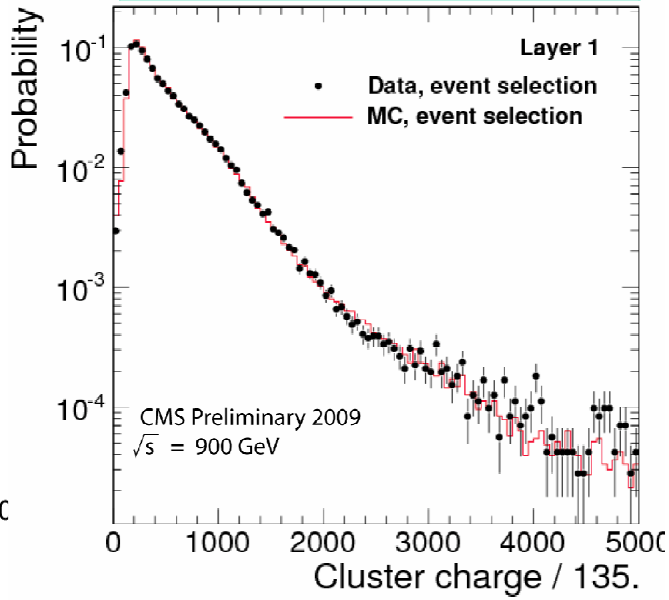
Detector Performance : Tracking

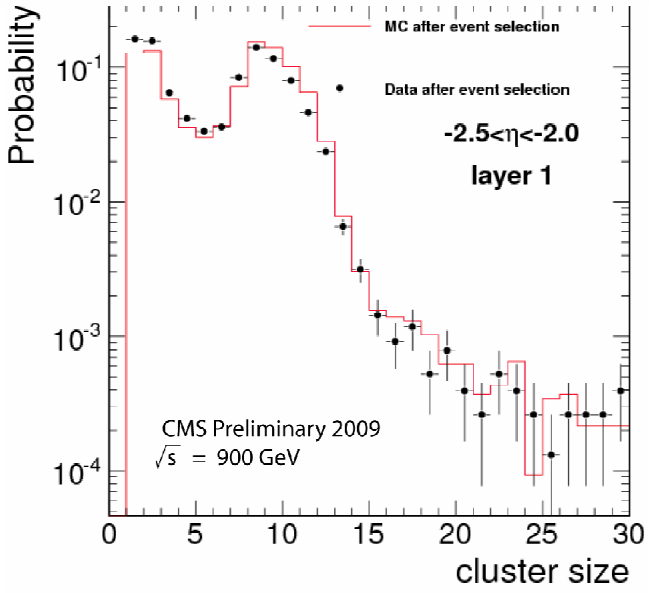
Primary Vertex



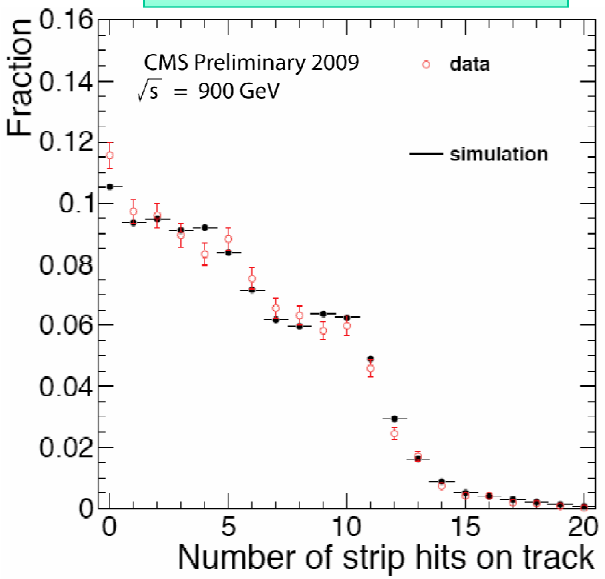


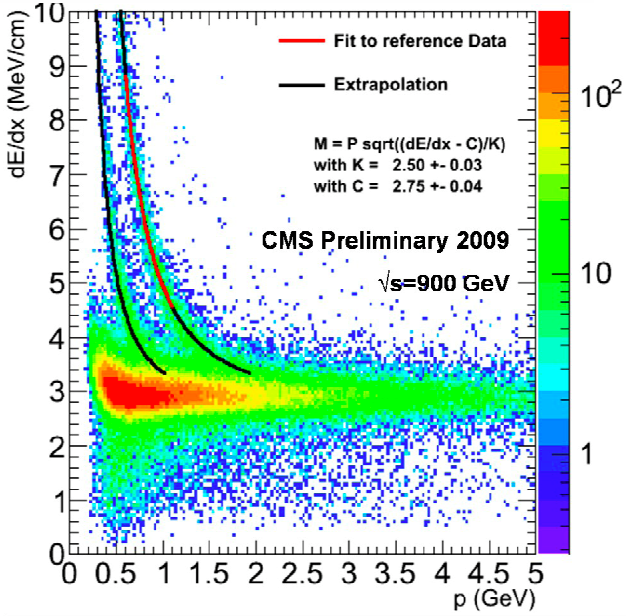
Pixels Clusters





Strip Tracker

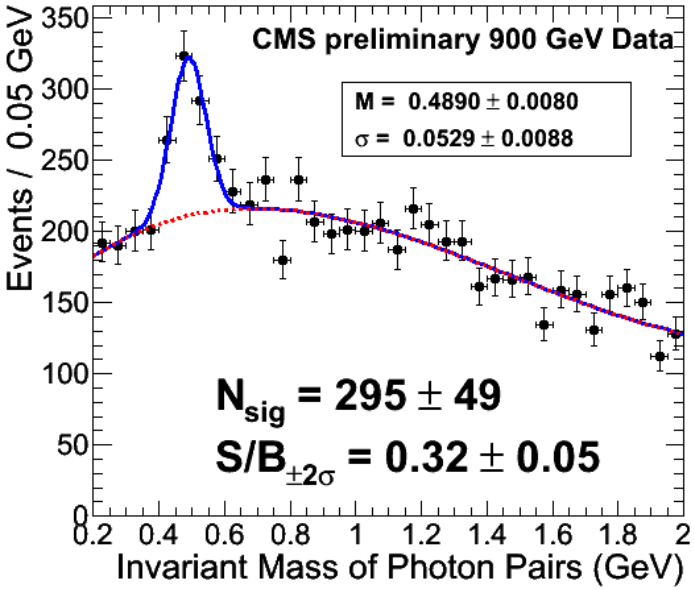




Eta and Phi

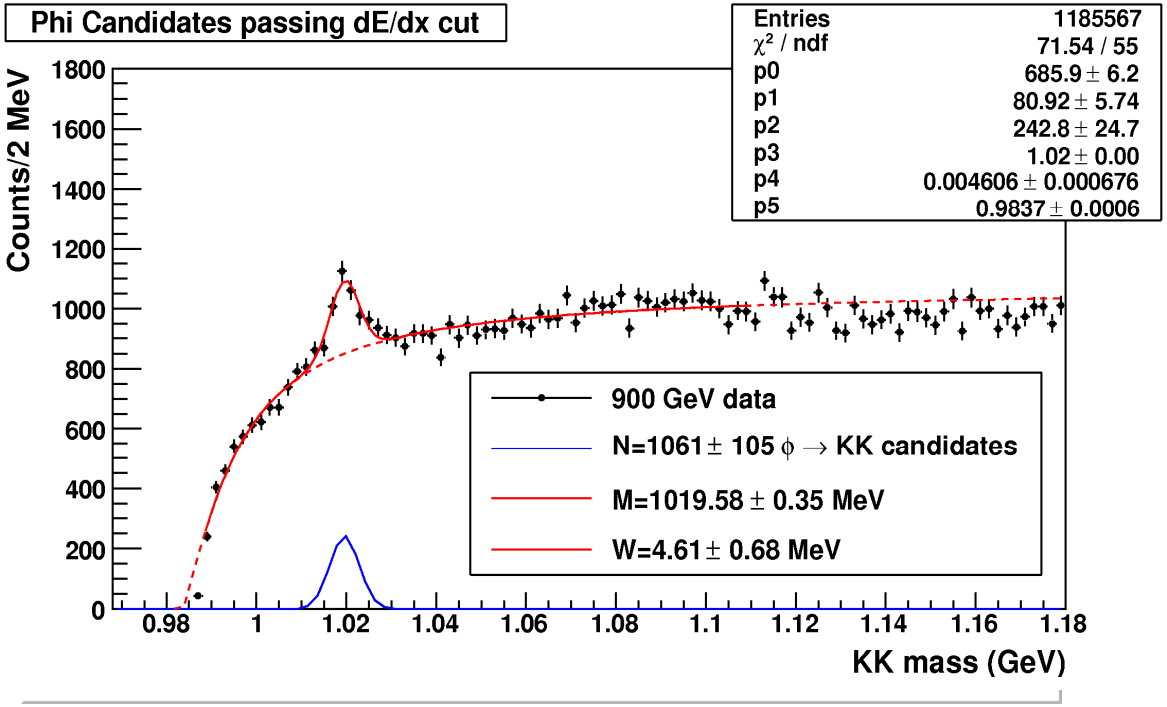
η

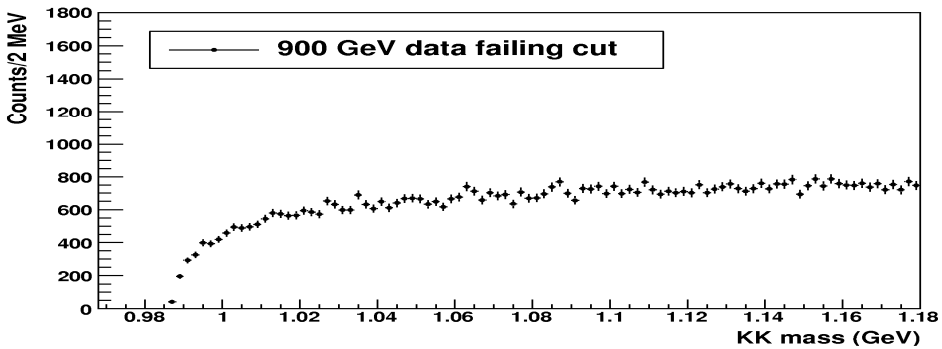
CMS 2009 Preliminary
Uncorrected



ϕ

CMS 2009 Preliminary

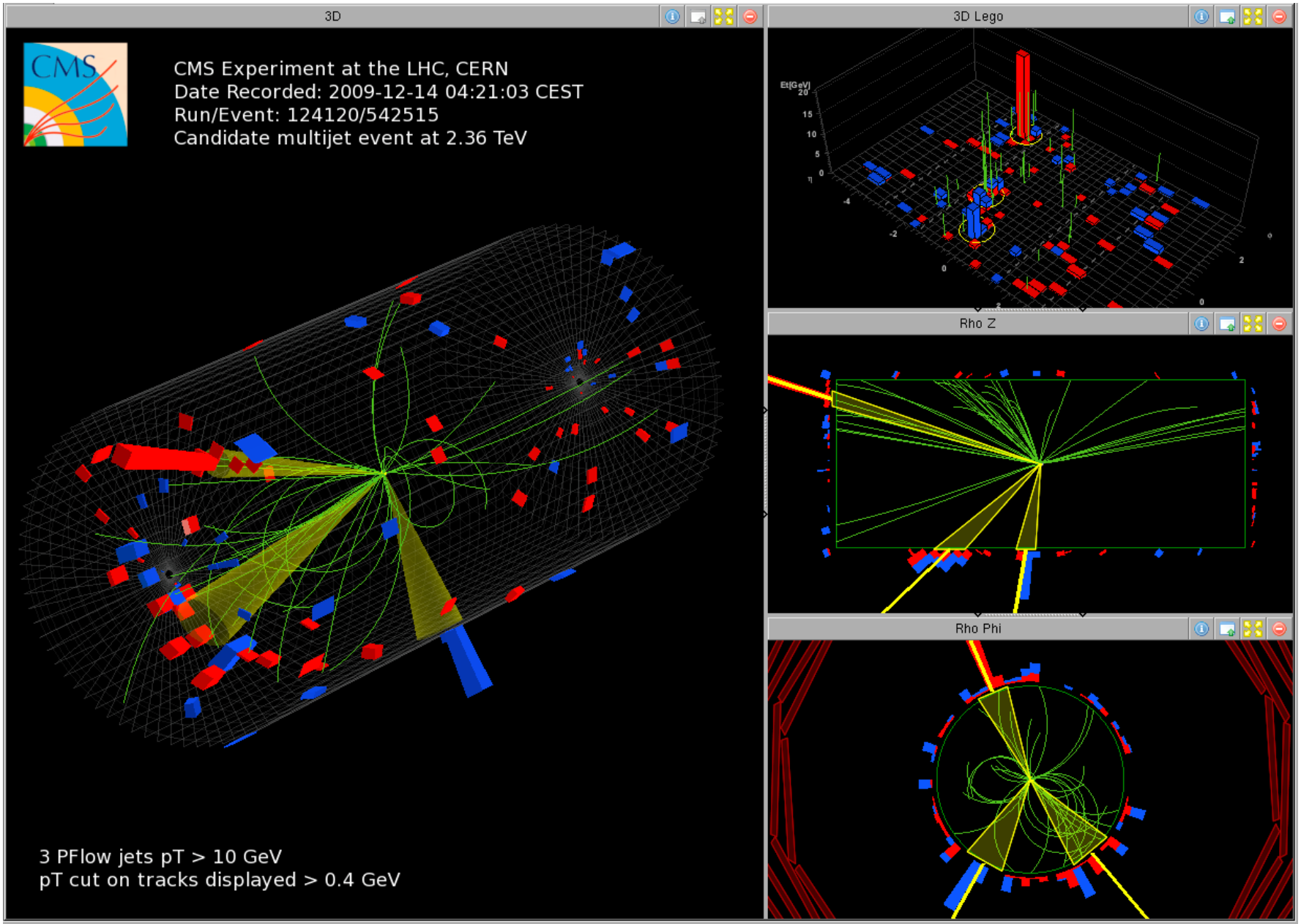




Data: $N(\eta)/N(\pi^0) = 0.020 \pm 0.003$

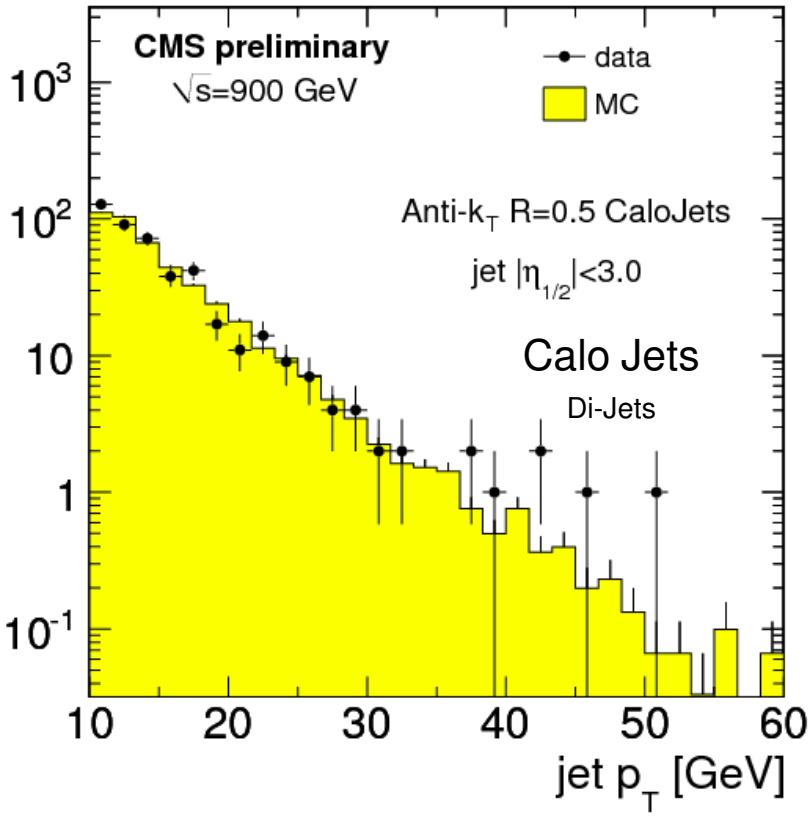
MC: $N(\eta)/N(\pi^0) = 0.021 \pm 0.003$

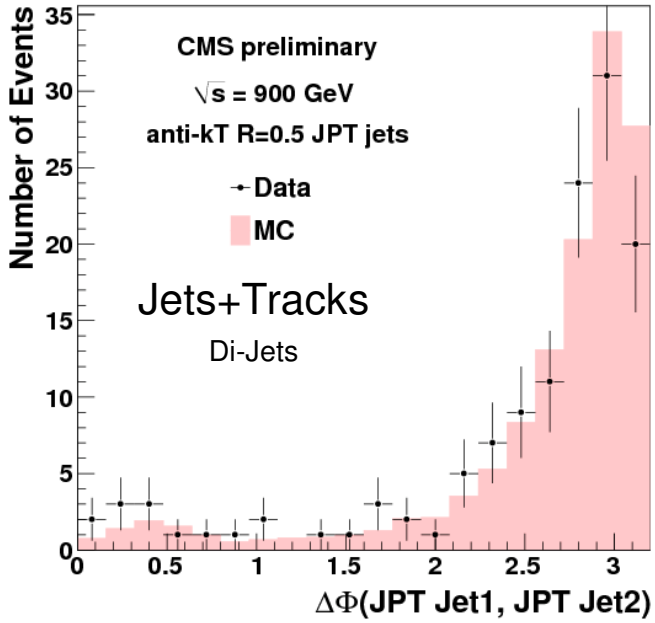
Calorimeters

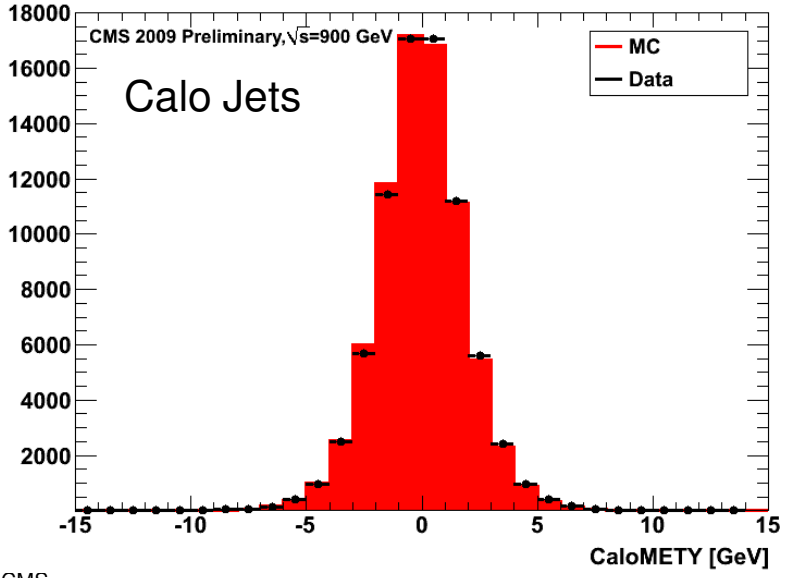


Detector Performance : Calorimetry

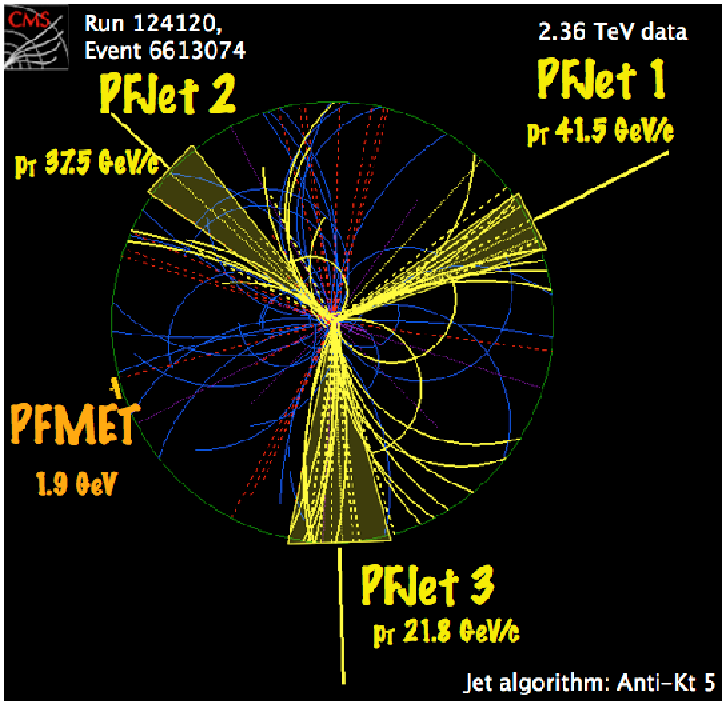
Jets and Missing E_T

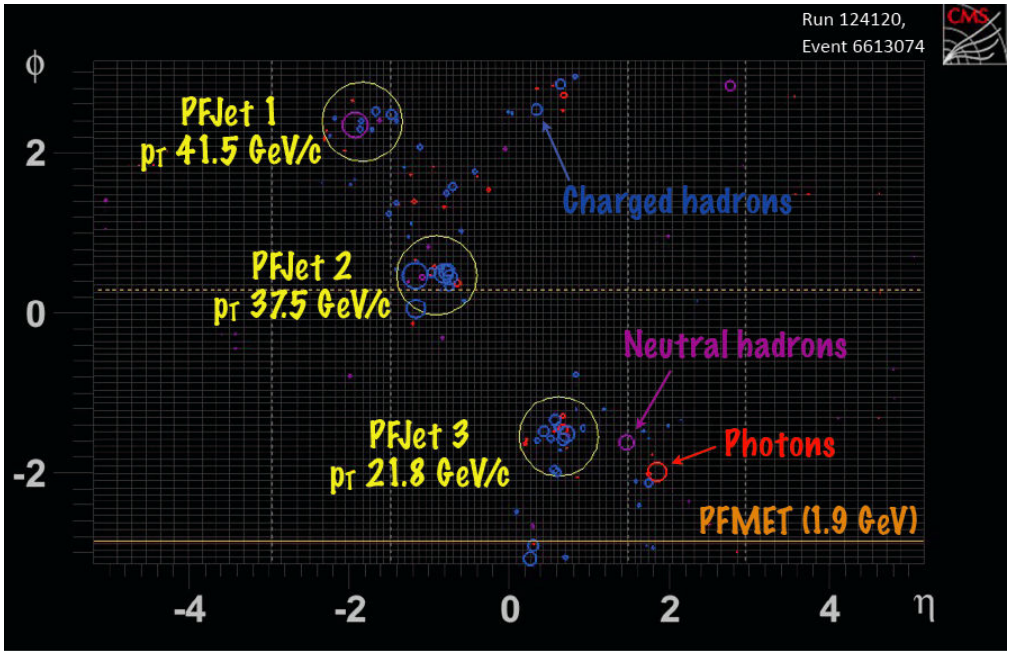


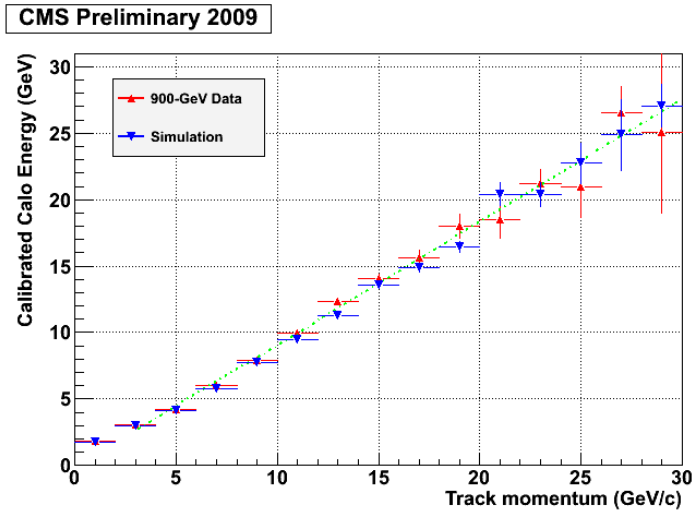


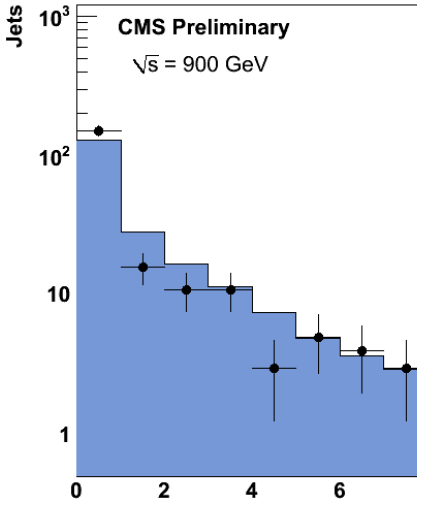


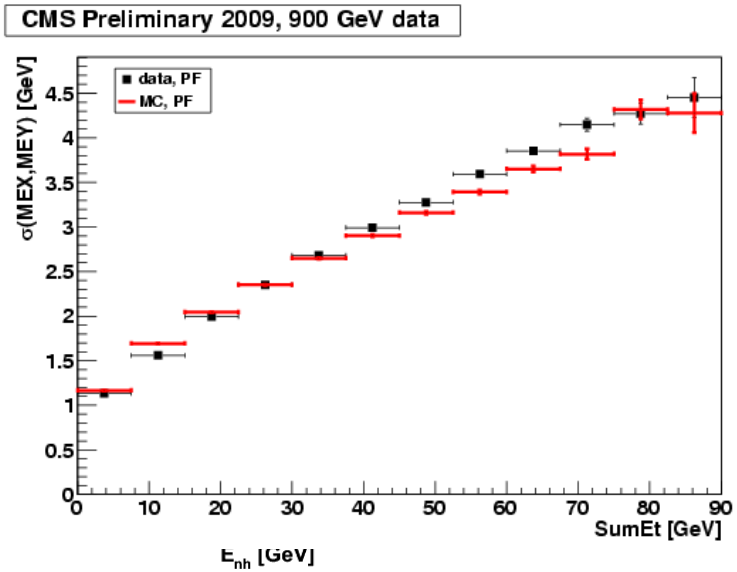
Detector Performance : Particle Flow



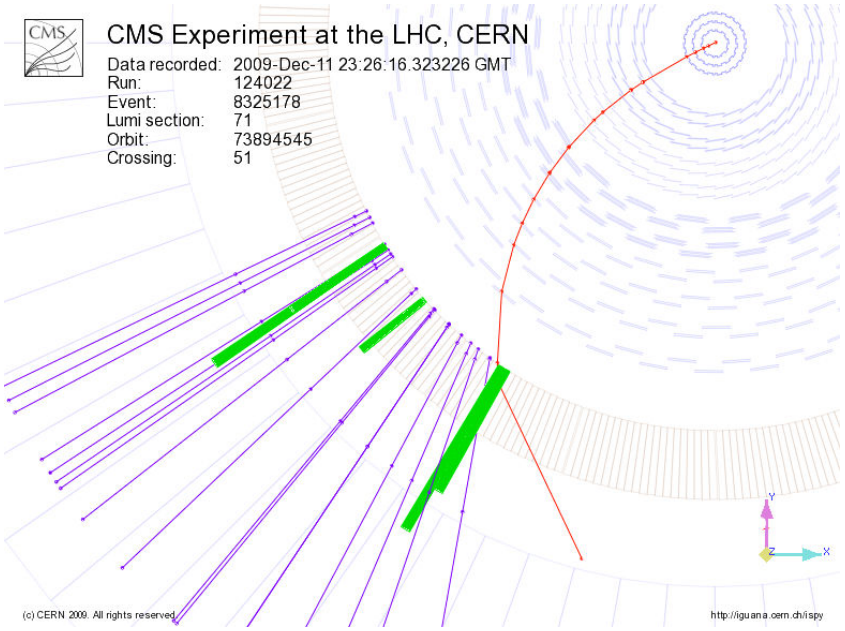


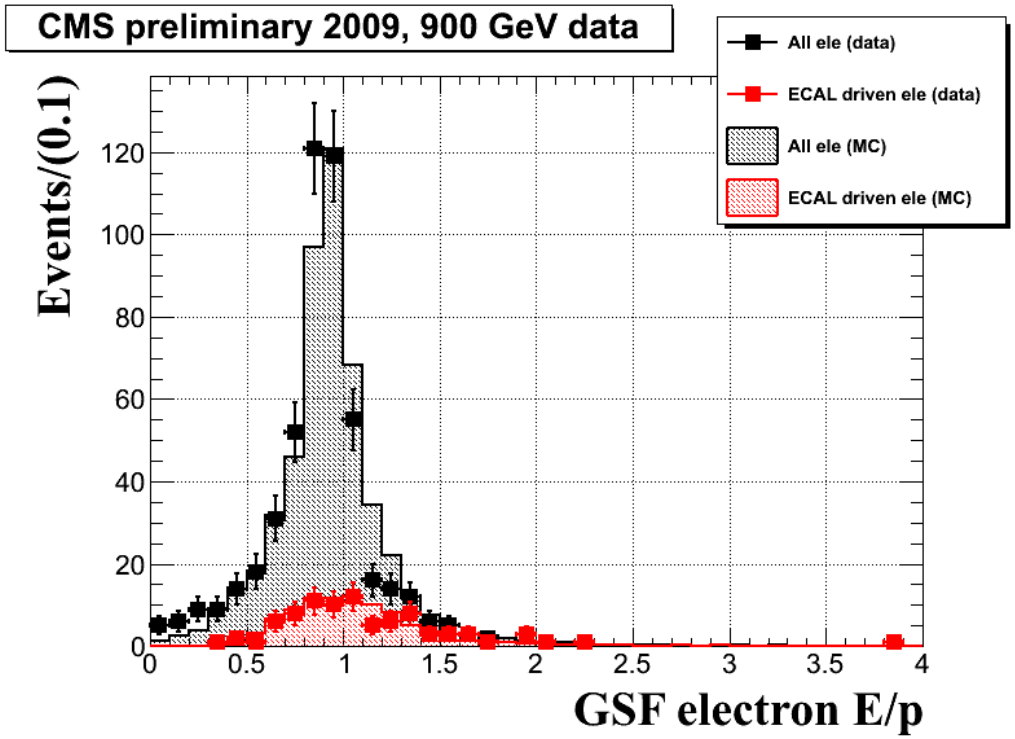






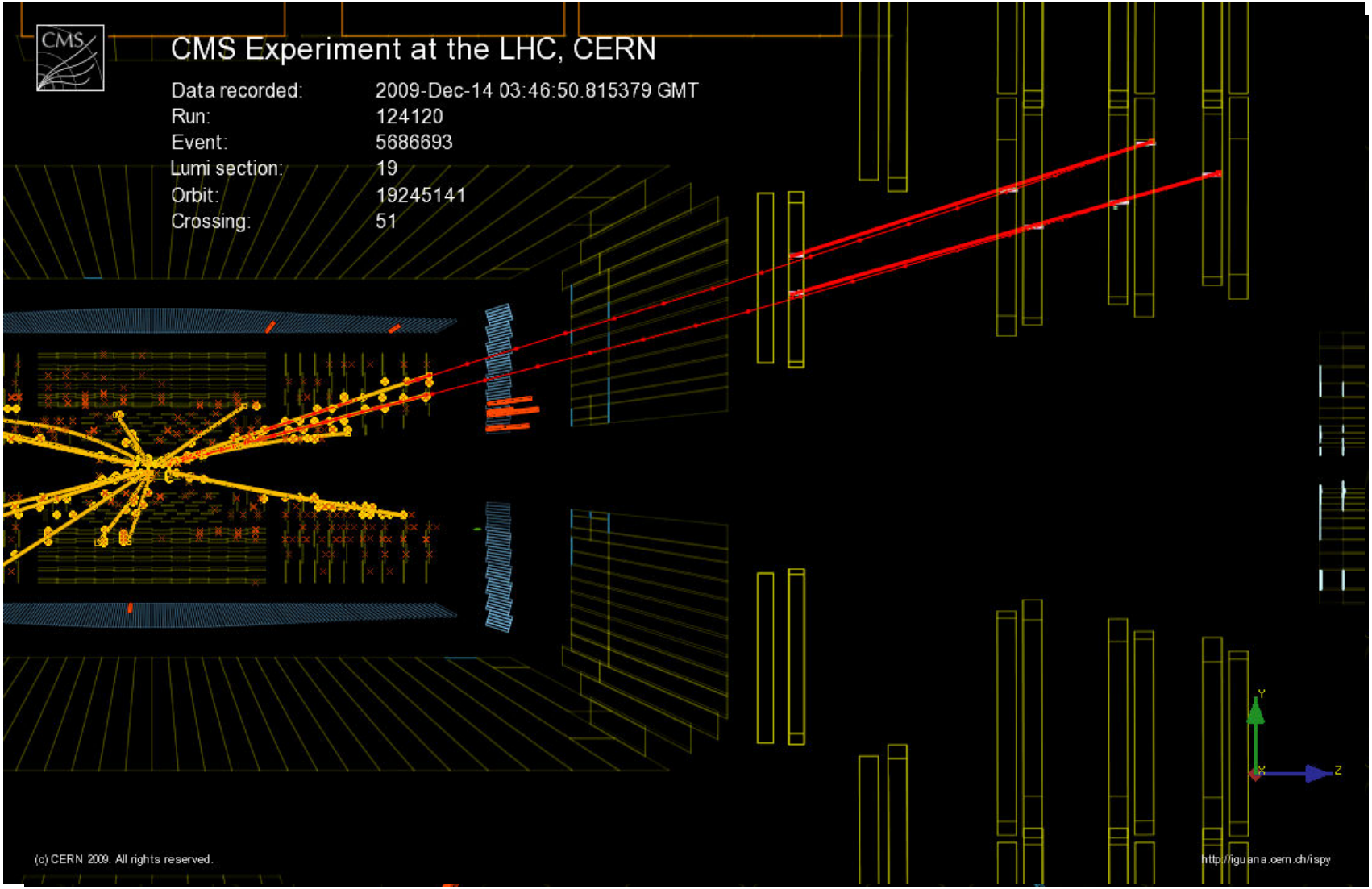
Reconstruction of Electrons





2.5 GeV electron with bremstrahlung

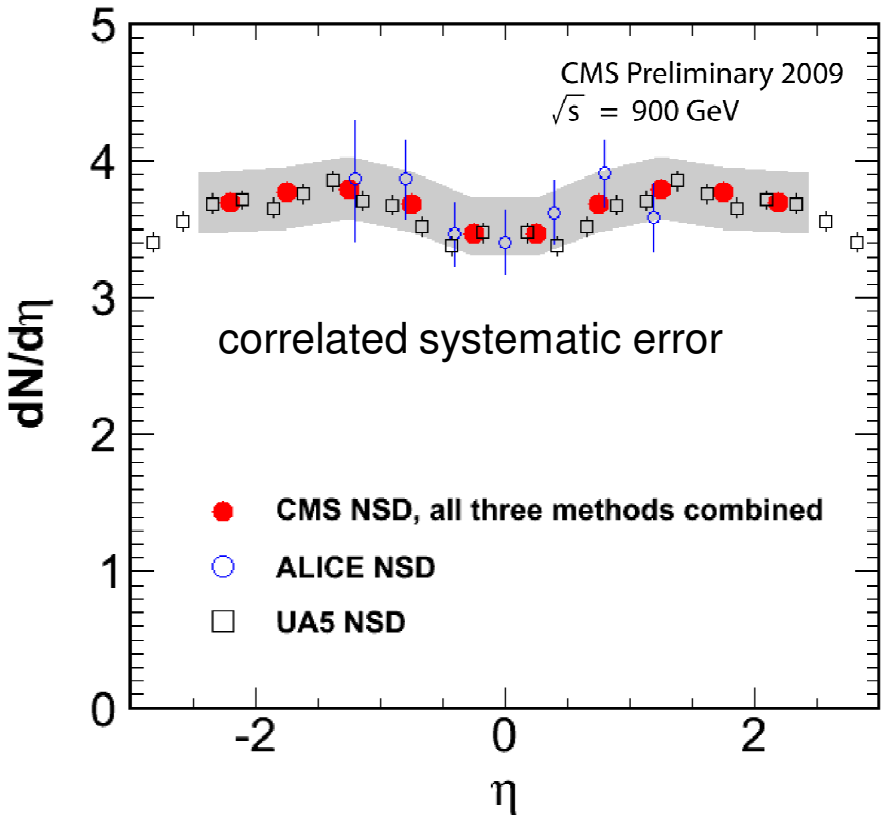
Muons: A Dimuon Event at 2.36 TeV



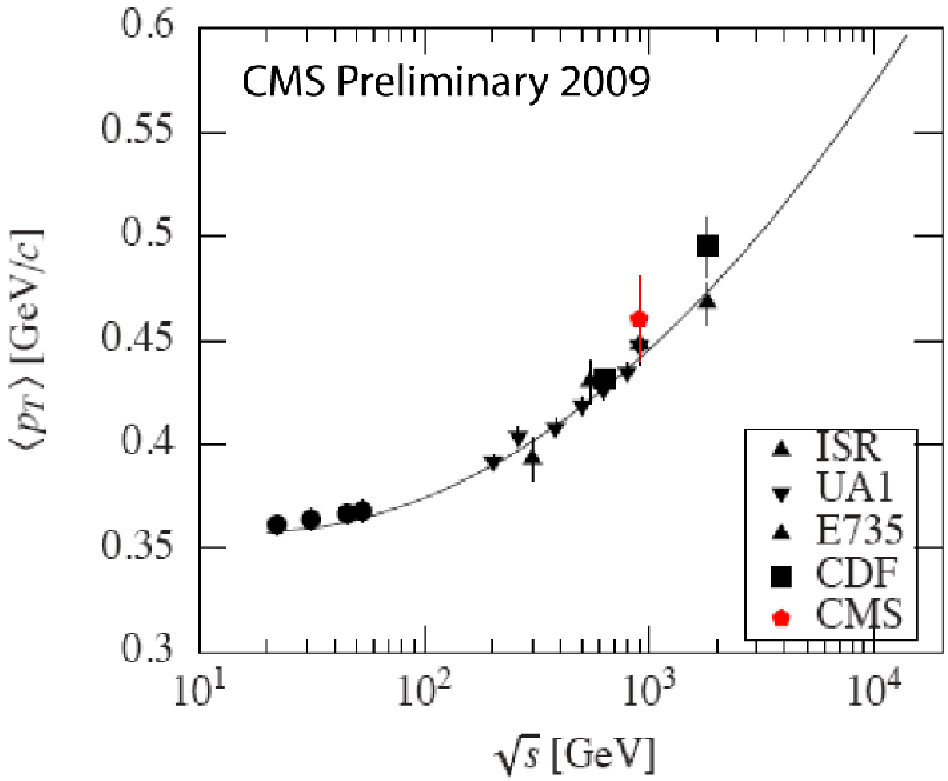
$p_T(\mu_1)$ = 3.6 GeV, $p_T(\mu_2)$ = 2.6 GeV, $m(\mu\mu)$= 3.03 GeV

First Physics Distributions

Charged Particle Multiplicity



Average p_T



Summary Again!

CMS has started taking collisions data

On the average more than 99% of the sub-detector electronic channels are operational. High data-taking efficiency (> 80% for "quiet" or "stable beam" flag (all CMS ON))

All indications are that:

- **data can be analysed rapidly – all chains are working well,**
- **the performance is according to design (almost all distributions agree well with the simulations at the fine level),**
- **CMS is starting to produce results from collision data.**

Very encouraging collision data-taking start which augurs well for the future.

Thanks to the LHC !!

We have finished the year on a high note BUT it is only the beginning of the physics exploitation phase of the LHC.