

the LHC is back

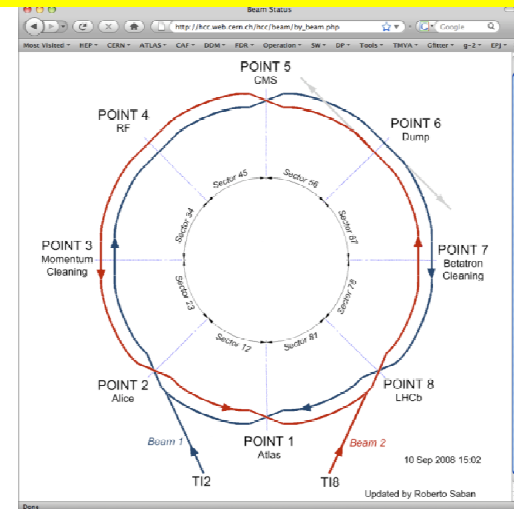
Friday November 20

18:30 Beam 1

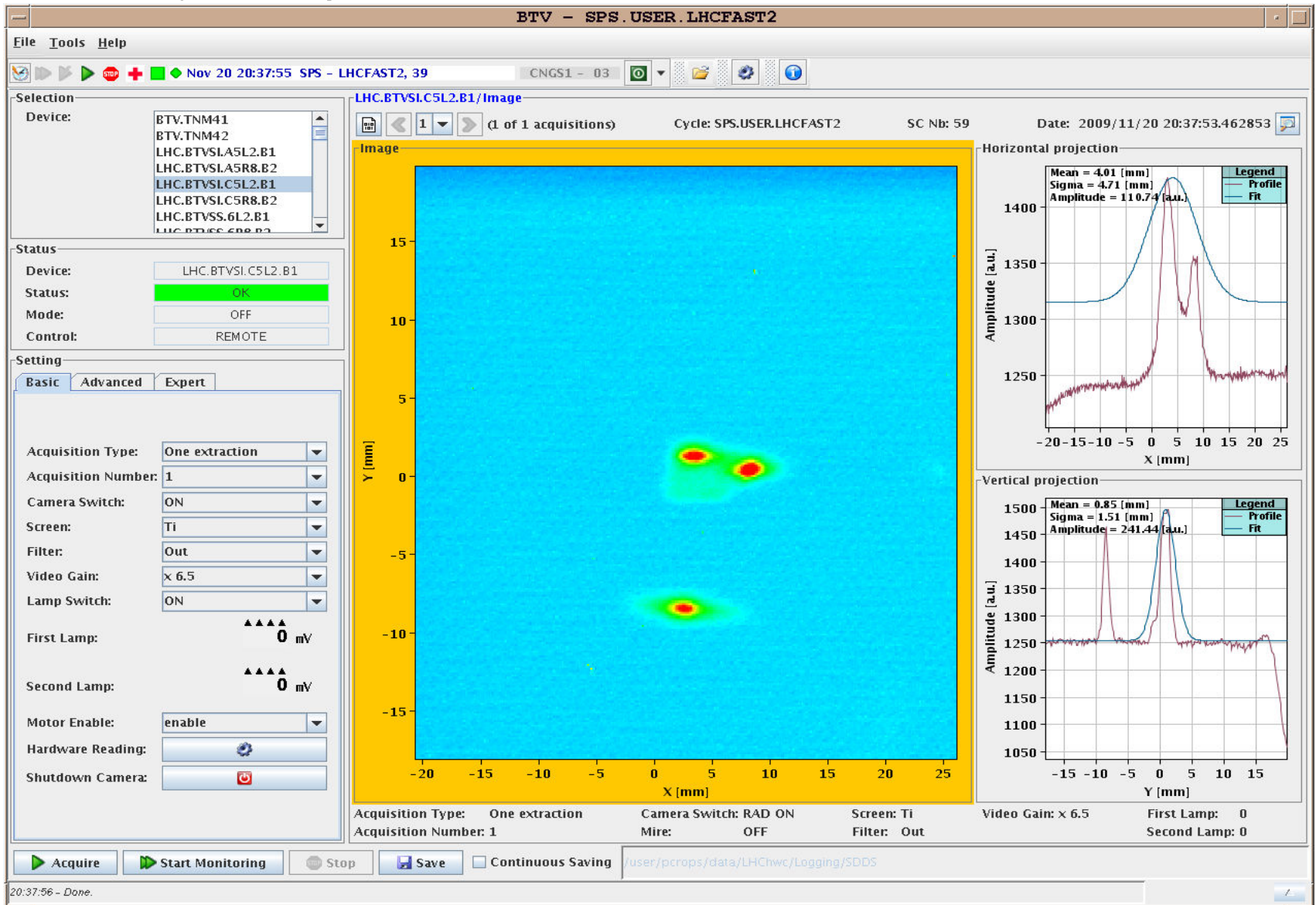
- 19.00 beam through CMS (23, 34, 45)
 - beam1 through to IP6 19.55 Starting again injection of Beam1
 - corrected beam to IP6, 7, 8, 1
- 20.40 **Beam 1 makes 2 turns** **2h10 for 27km: 12.5km/h average speed**
 - Working on tune measurement, orbit, dump and RF
 - Beam makes several hundred turns (not captured)
 - Integers 64 59, fractional around .3 (Qv trimmed up .1)
- 20.50 Beam 1 on beam dump at point 6
- 21.50 Beam 1 **captured**

22:15 Beam2

- 23.10 Start threading Beam2
 - Round to 7 6 5 2 1
- 23.40 **First Turn Beam2** **1h25 for 27km: a bit faster**
 - Working on tune measurement, orbit, dump and RF
 - Beam makes several hundred turns (not captured)
 - Integers 64 59, fractional around .3 (Qv trimmed up .05)
- 24.10 Beam 2 **captured**



Friday: 8:15pm: Beam 1 First 2 turns



First circulating Beam in LHC in 2009

Monday, 23rd afternoon

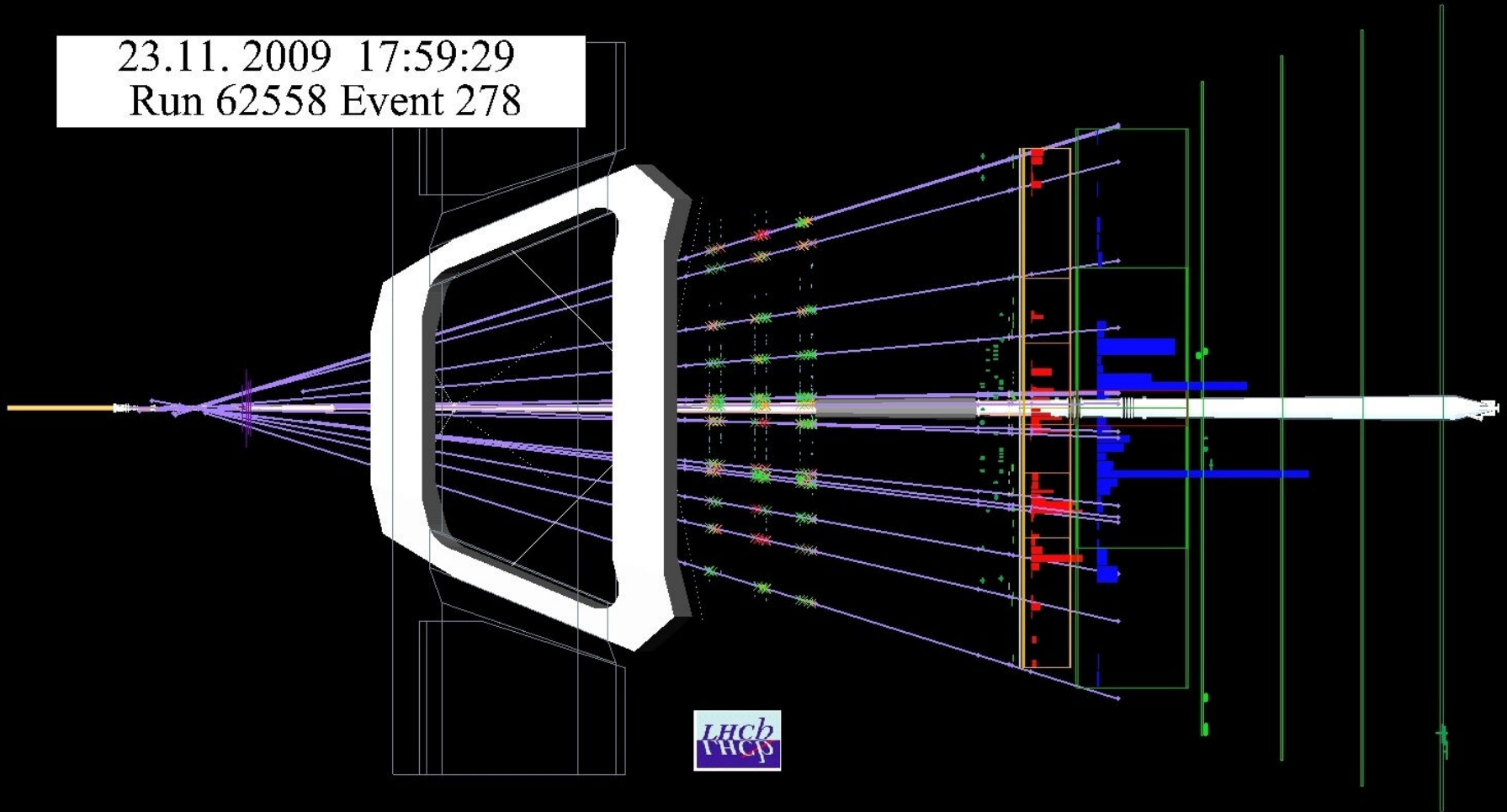
- **Recorded collision events in ATLAS and CMS**
- From 16:00
 - Two beams in LHC at buckets 1 and 8911
 - **Quiet beams for ALICE**
 - Then 2 beams in LHC at buckets 1 and 26701
 - **Quiet beams for LHCb**
- **Recorded collision events in ALICE and LHCb**

Monday, 30th at 0:42

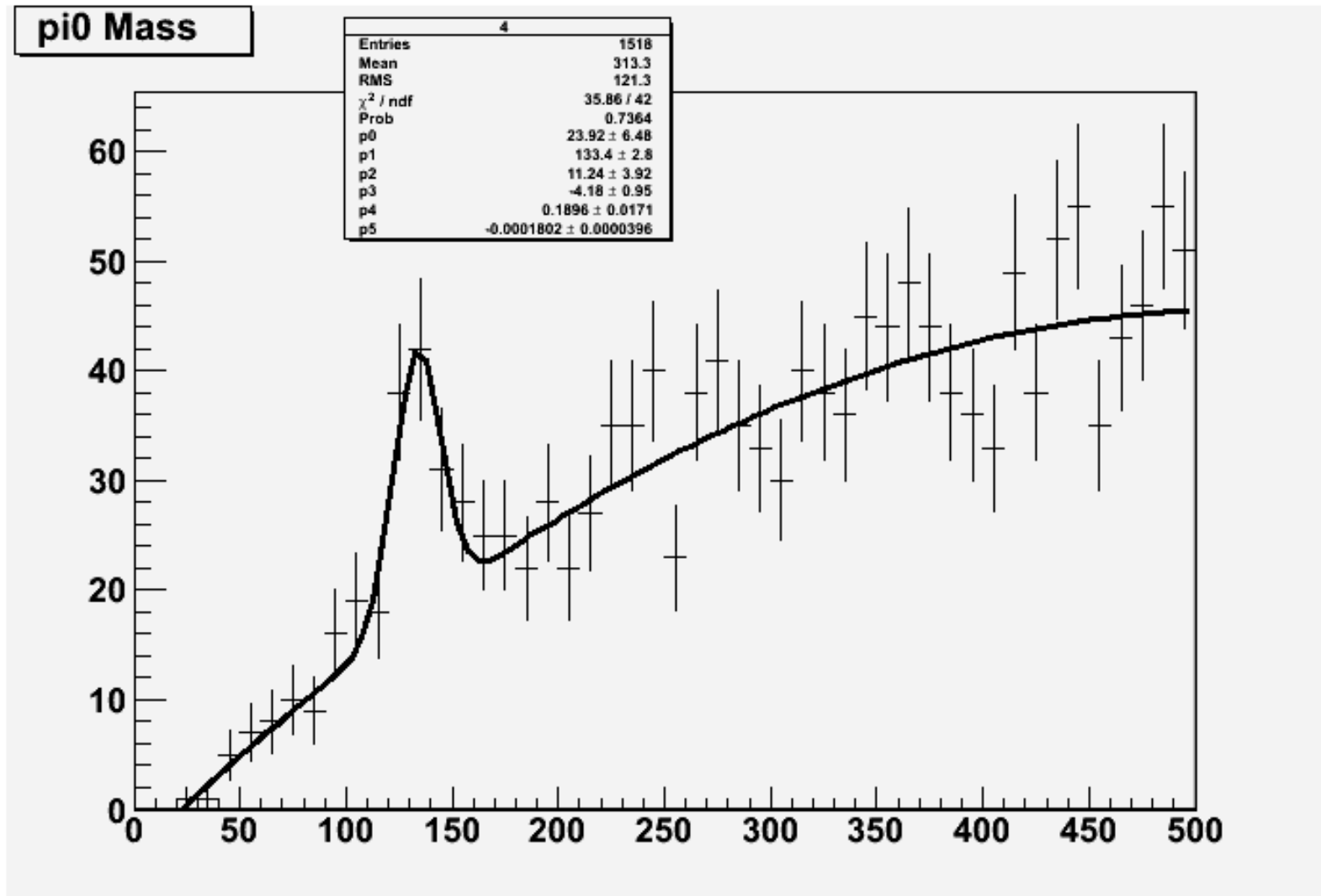
- **Both beams at 1.18 TeV**

◆ Events have nice vertices (extrapolating OT tracks)

23.11. 2009 17:59:29
Run 62558 Event 278



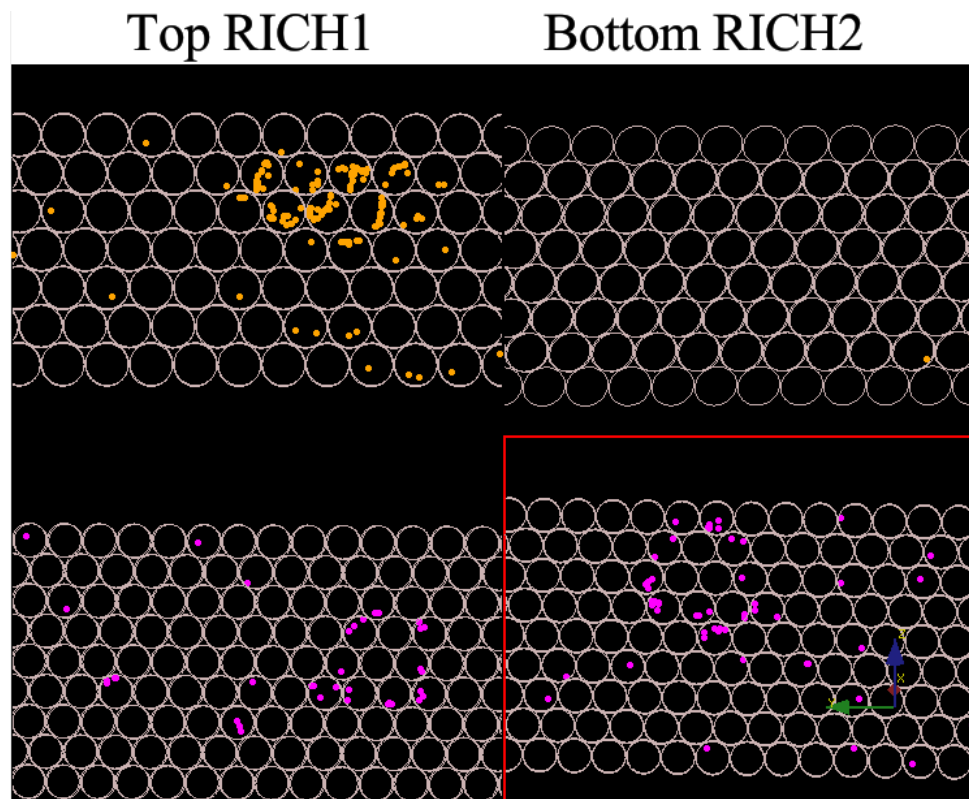
◆ π^0 have been reconstructed in the calorimeter



Towards collisions

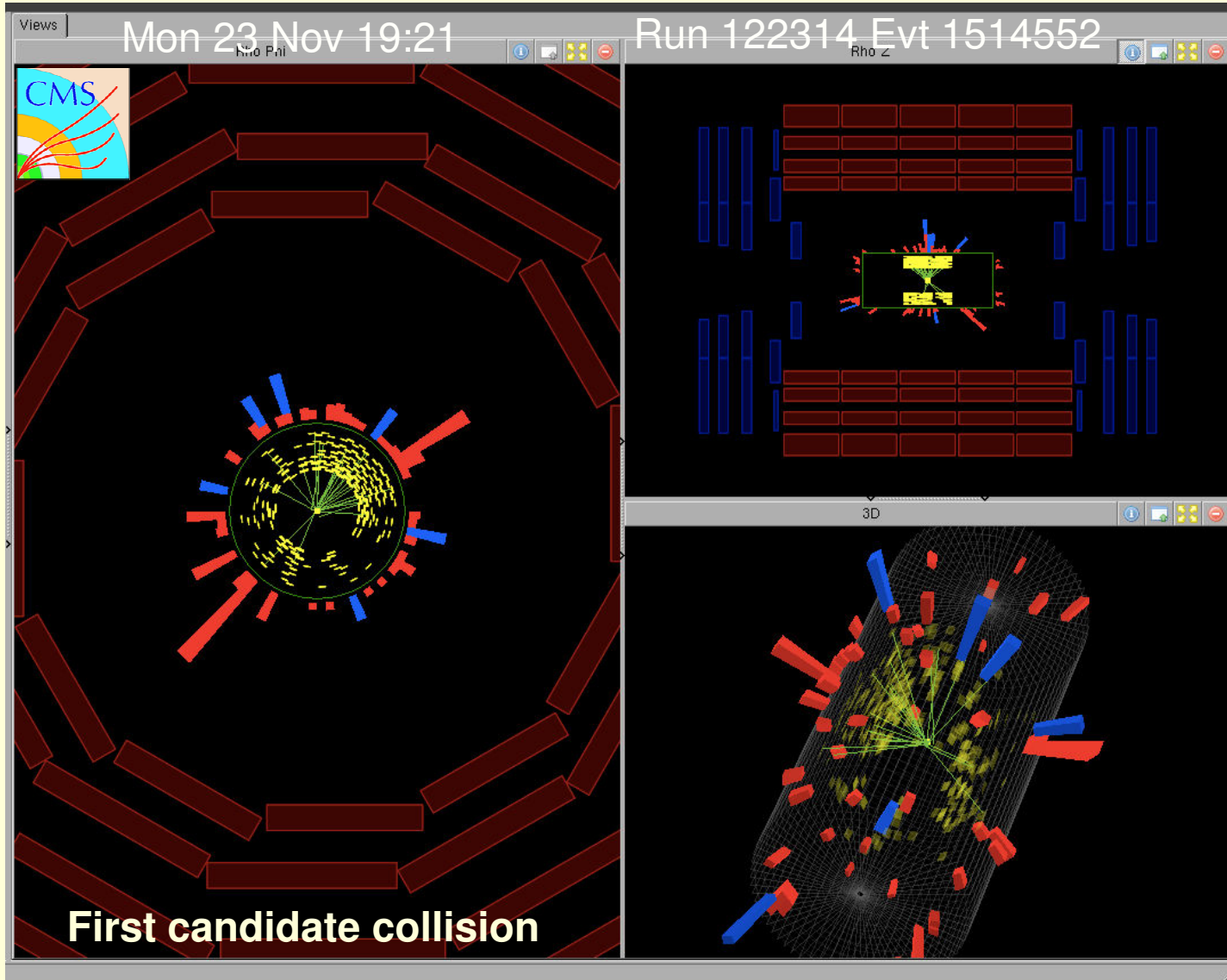
◆ Monday 23 November afternoon was fantastic

- First some “quiet” beam while beams were colliding in Atlas and CMS, then when colliding in Alice
- The RICH got its first rings due to beam-induced particles





An event from the Evening Fill

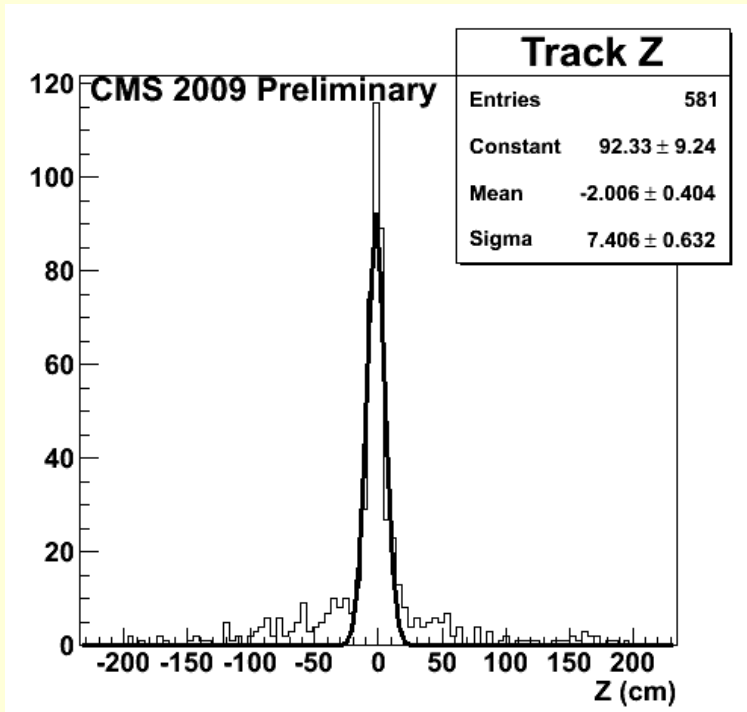




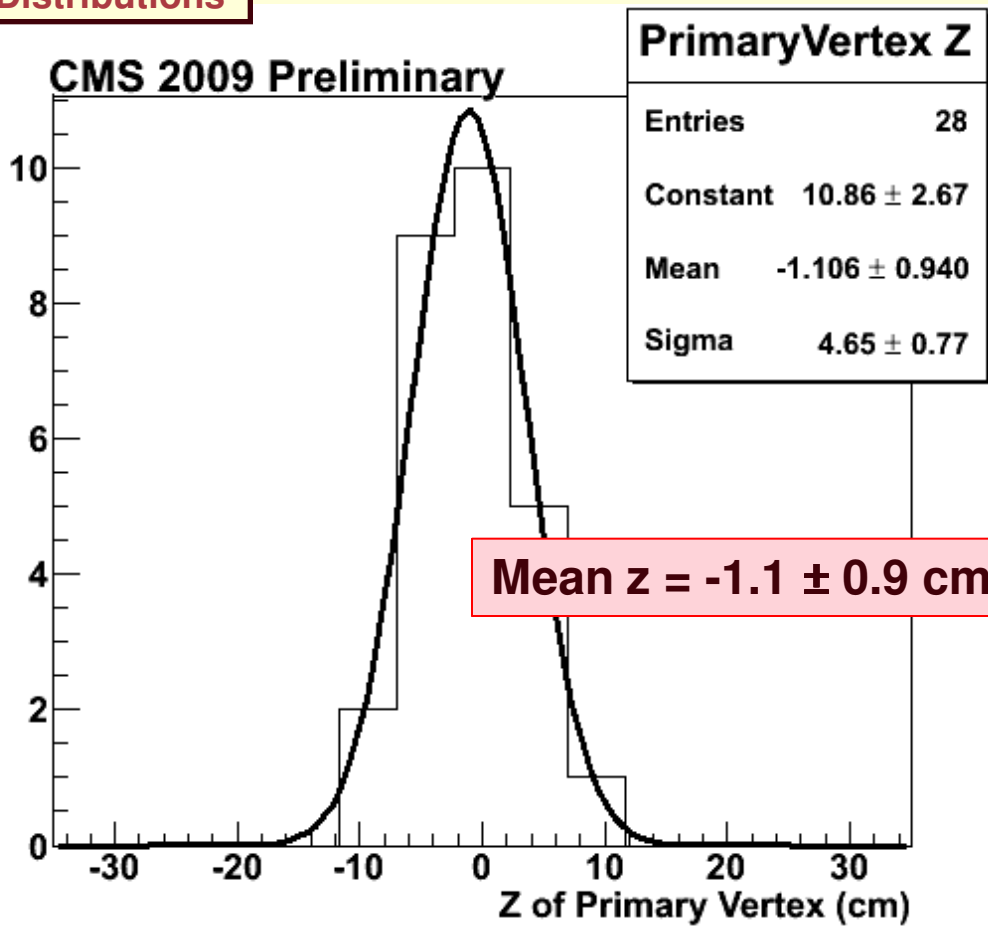
Reconstructed vertices using TOB

Evening Fill

CMS 2009 Preliminary
Uncorrected Distributions



All tracks with > 6 hits
and $\chi^2 < 10$

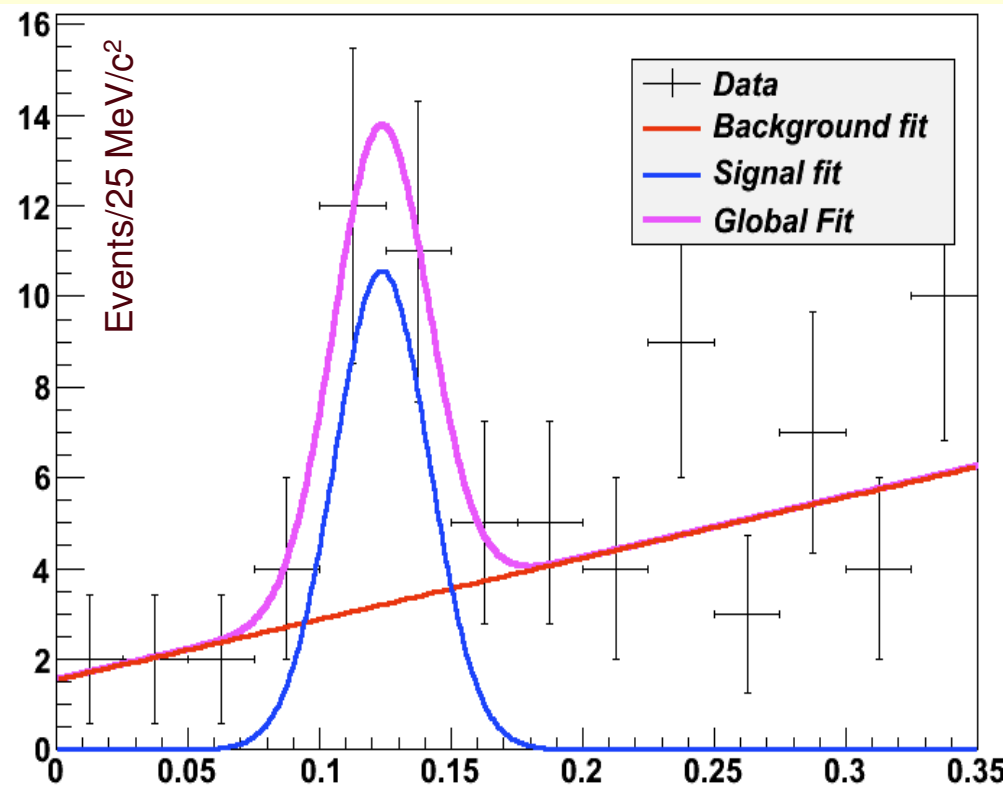
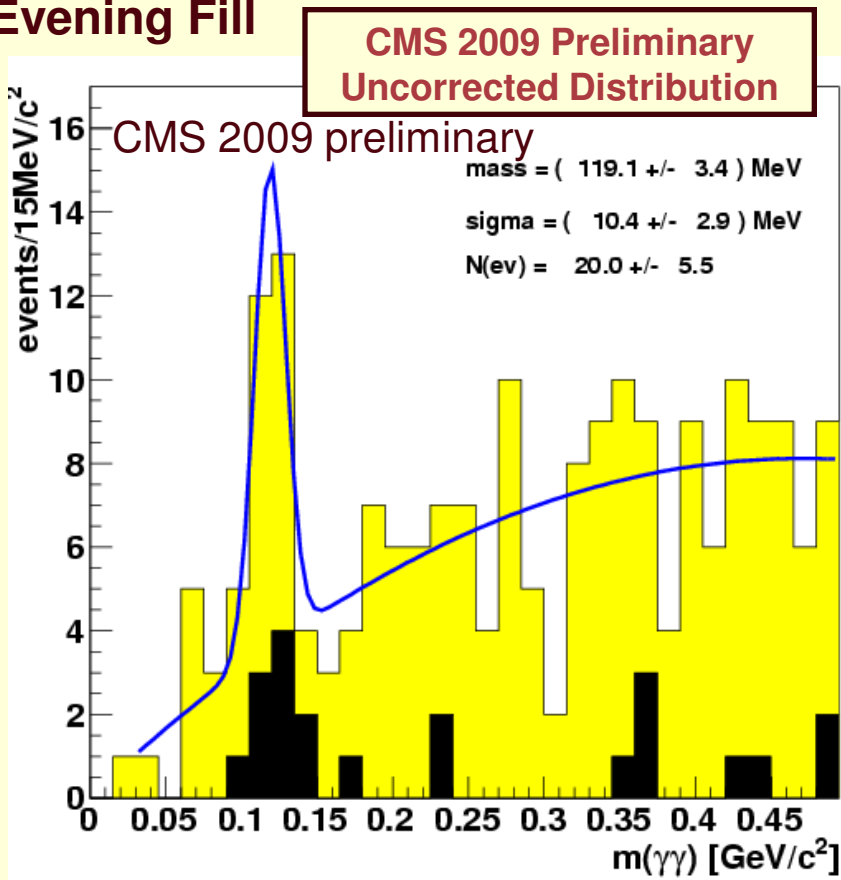


Clean vertices (≥ 3 tracks)



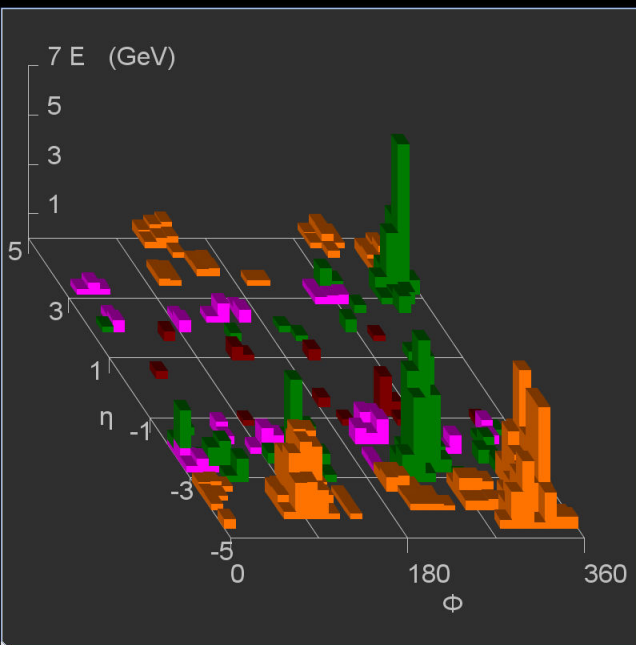
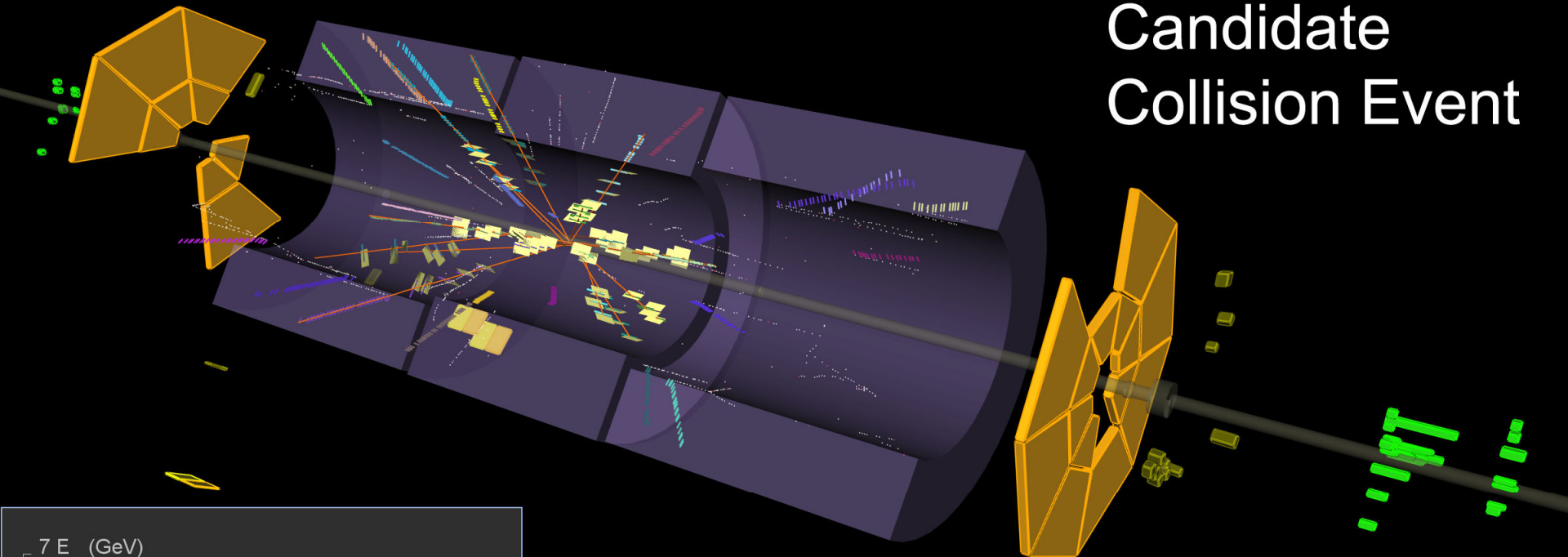
First Di-photon Distribution in CMS

Evening Fill



- $M(\pi^0)$ is lower in both data and MC
- Mostly due to the readout threshold (100 MeV/Crystal).
- Conversions: part of the energy is deposited upstream of ECAL.
- Event timing is consistent

Candidate Collision Event



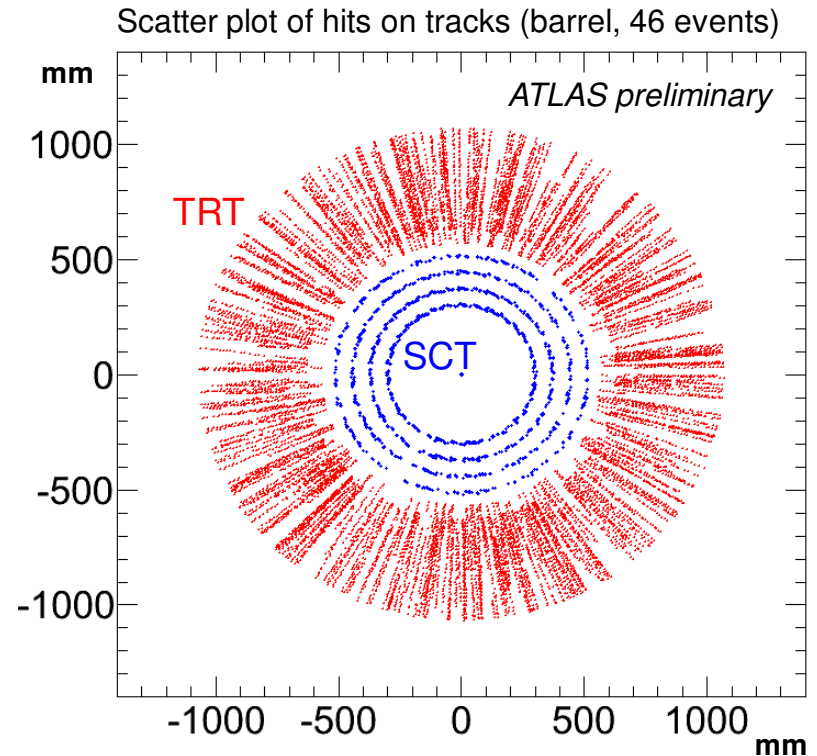
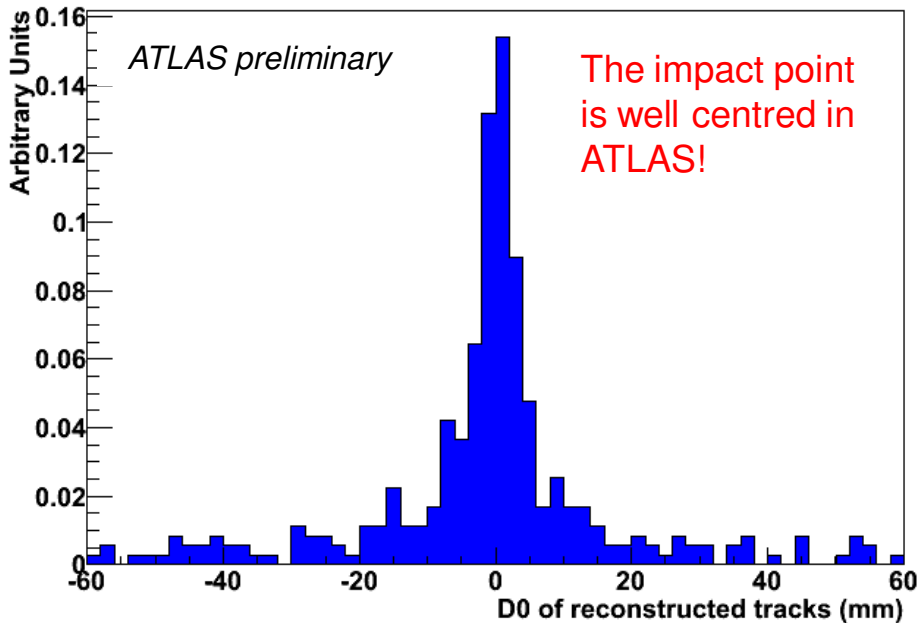
 **ATLAS**
EXPERIMENT

2009-11-23, 14:22 CET
Run 140541, Event 171897

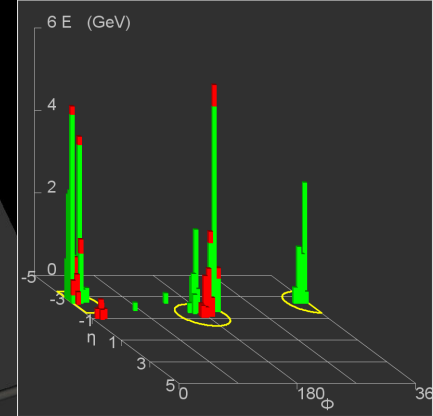
<http://atlas.web.cern.ch/Atlas/public/EVTDISPLAY/events.html>

Tracking (challenging w/o Pixel, limited SCT and solenoid field off!)

- Without solenoid field no separation of tracks by momenta
- Fit impact parameter in a “silver-plated” sample with SCT ≥ 20 V and number of SCT hits ≥ 6 (46 events)



A di-jet candidate

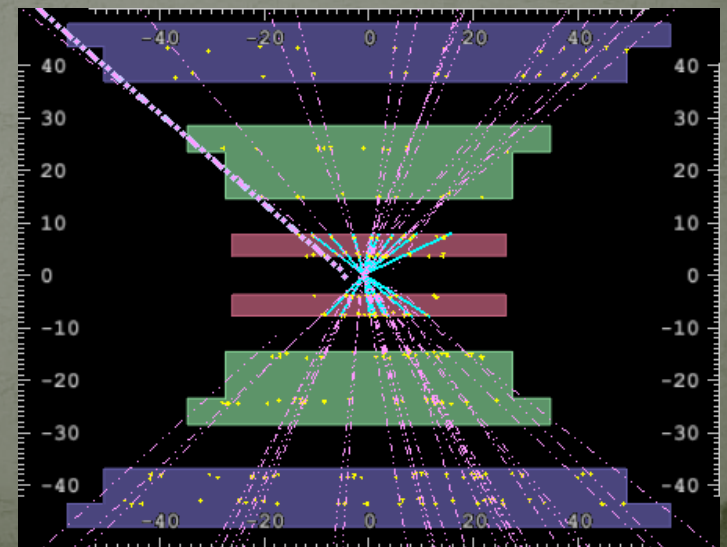
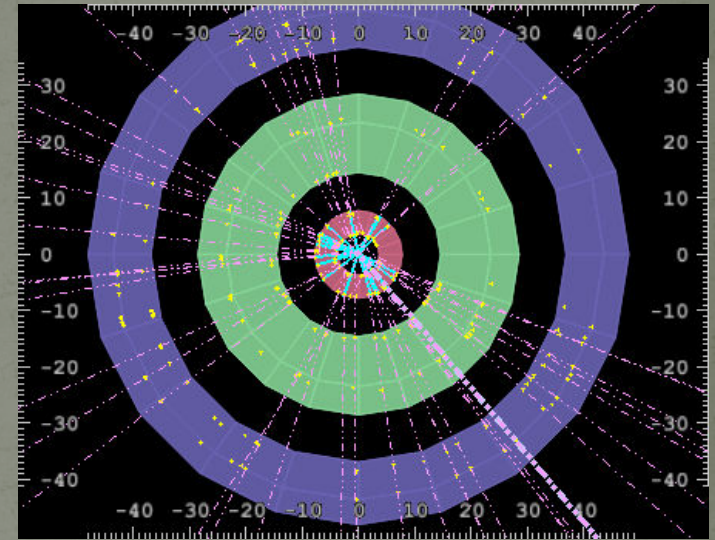
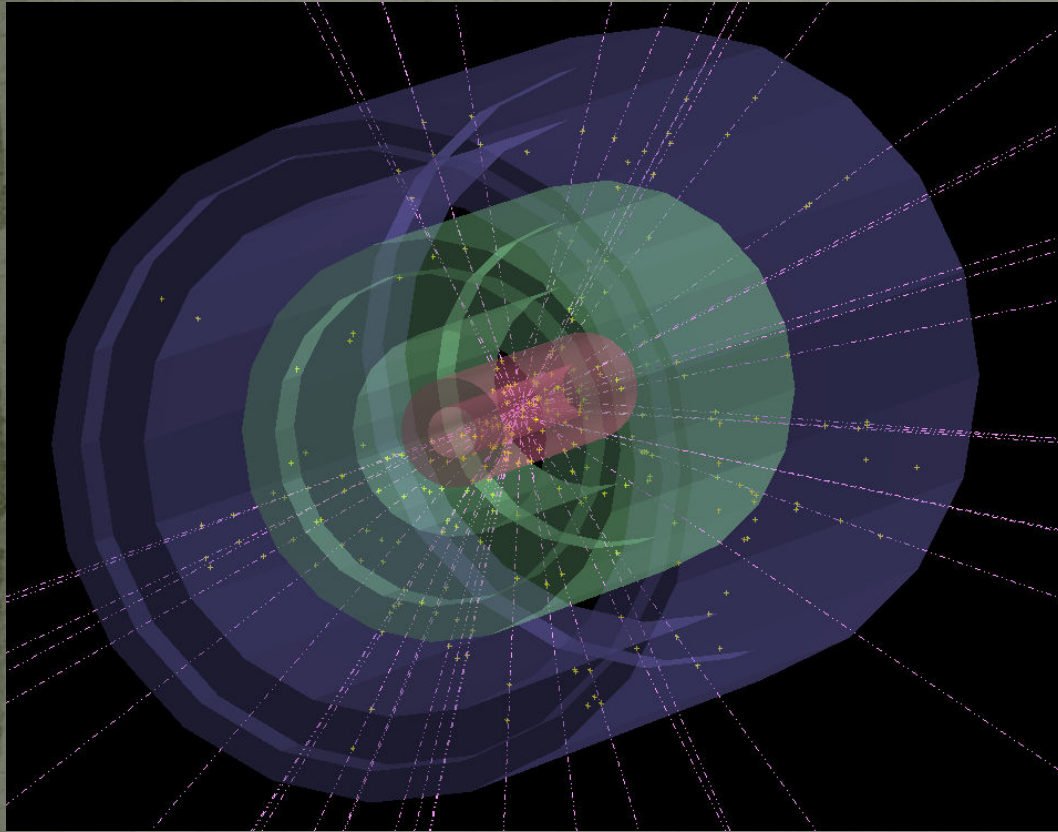


Run 140541
Event 416712

Two jets back-to-back in ϕ , both with (uncalibrated) $E_T \sim 10$ GeV, η of -1.3 and -2.5 , \sim no missing E_T

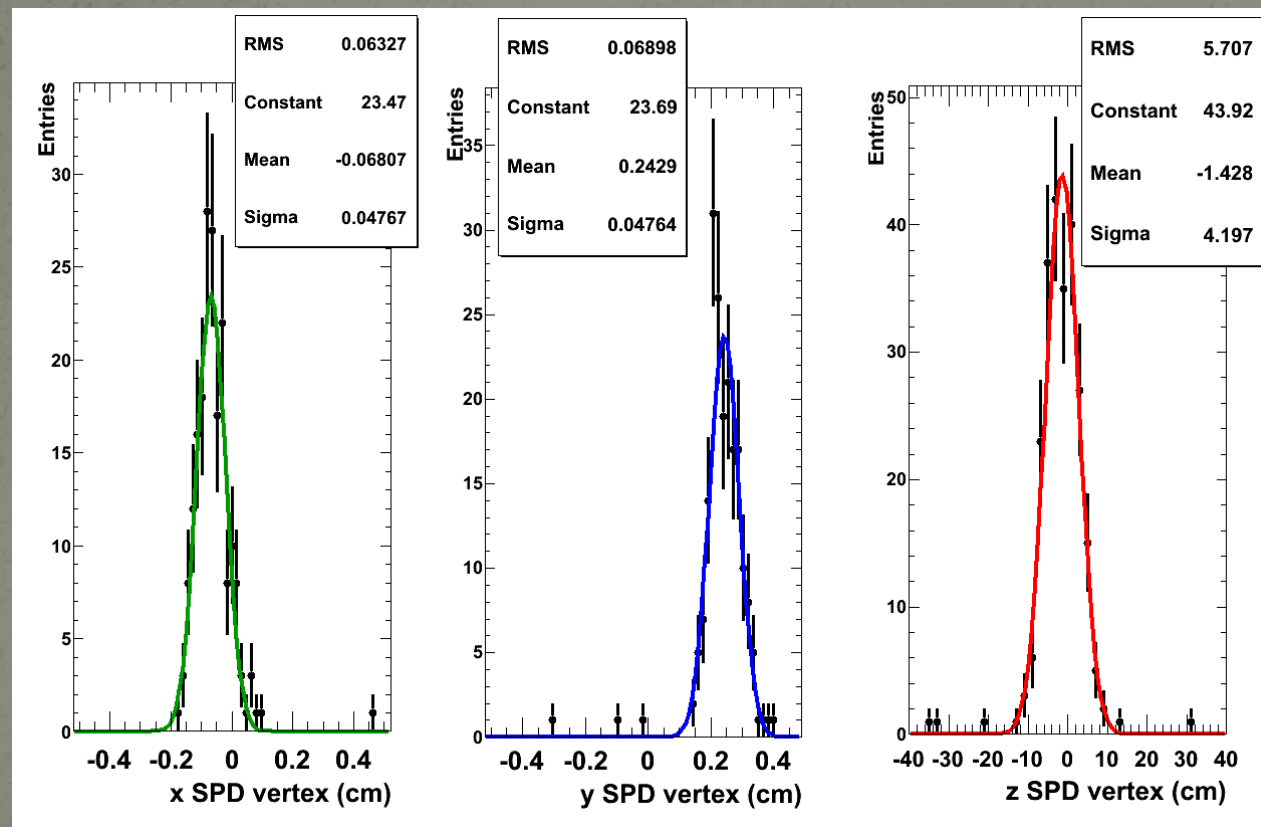
Triggered by MBTS A/B in time, several hits
Also triggered by L1Calo EM3

A high multiplicity event...



Vertex distributions (offline)

- Calculated in Offline from tracklets in Silicon Pixel Detector:

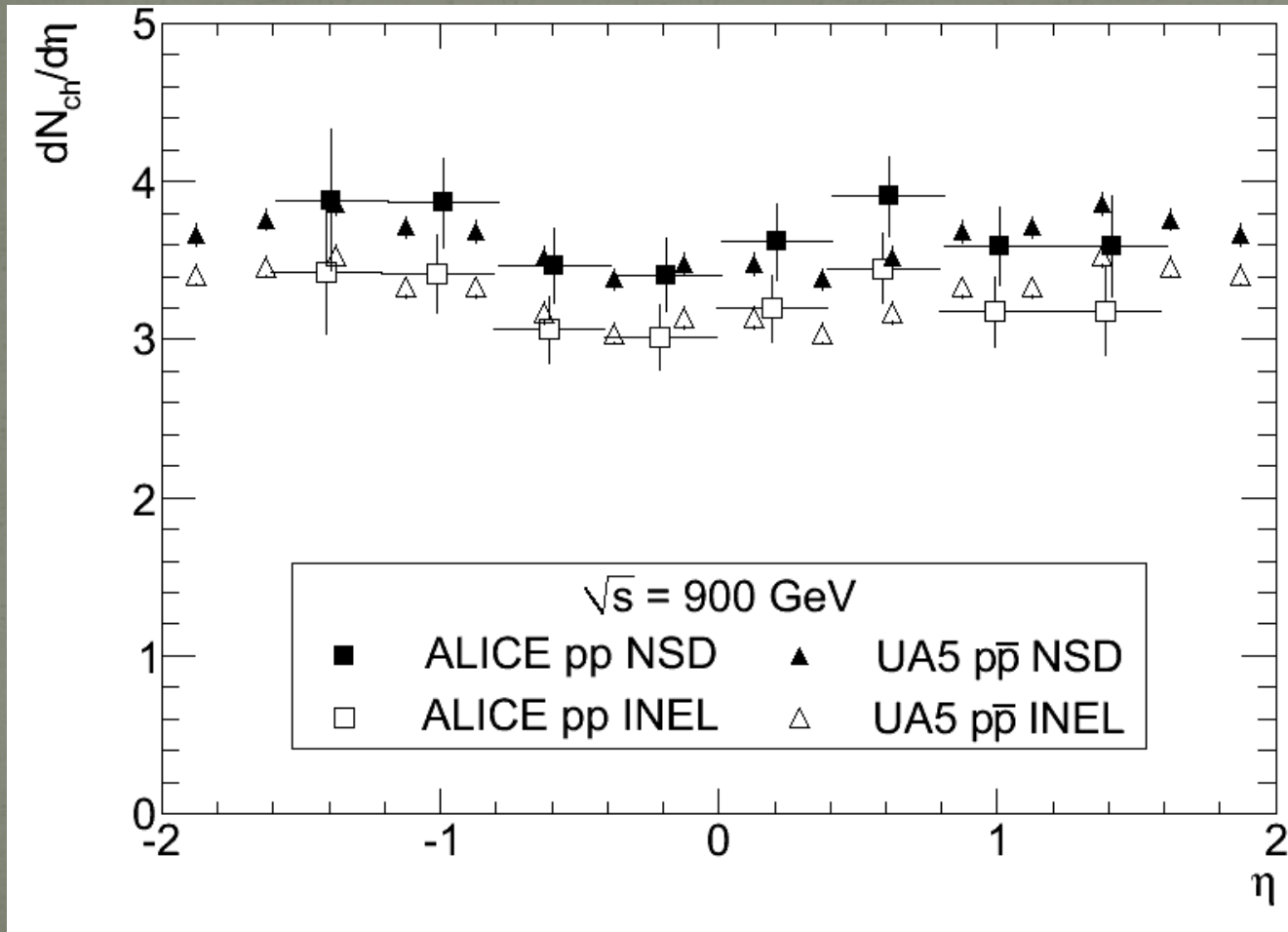


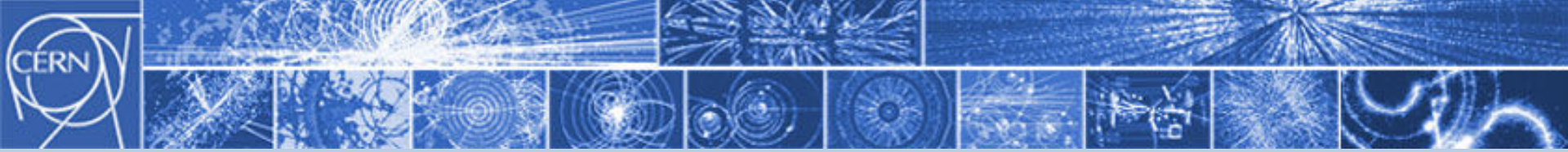
$$\sigma_x \sim 475 \mu\text{m}$$

$$\sigma_y \sim 475 \mu\text{m}$$

$$\sigma_z \sim 4.2 \text{ cm}$$

Pseudorapidity distribution





LHC physics is starting now

PS started 50 years ago. . .