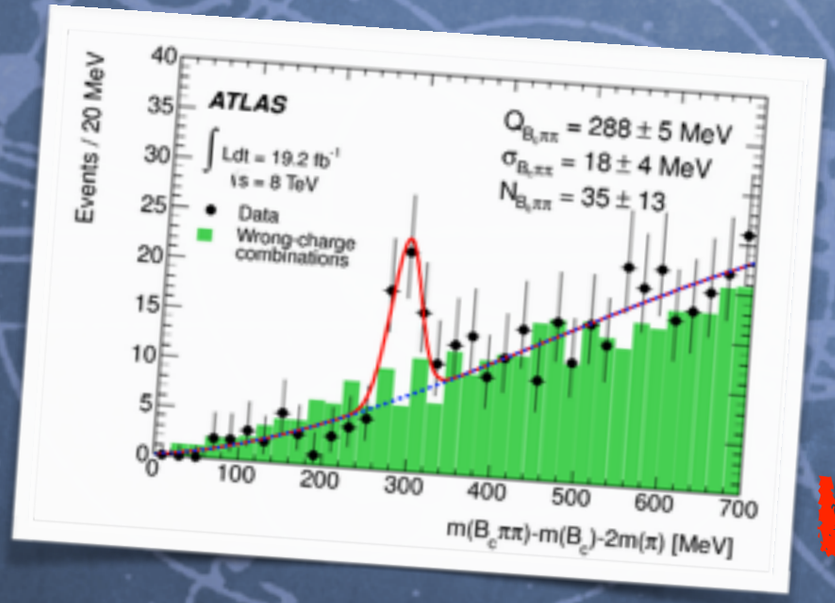
ATLAS Status Report

LS1 & Run2 Preparation



Physics Highlight

119th OPEN LHCC
24th June 2014
CERN, Geneva.

Daniel Dobos (CERN)
On behalf of the ATLAS Collaboration

Papers since last LHCC meetings & CONF & NOTES

Since last LHCC Status report:

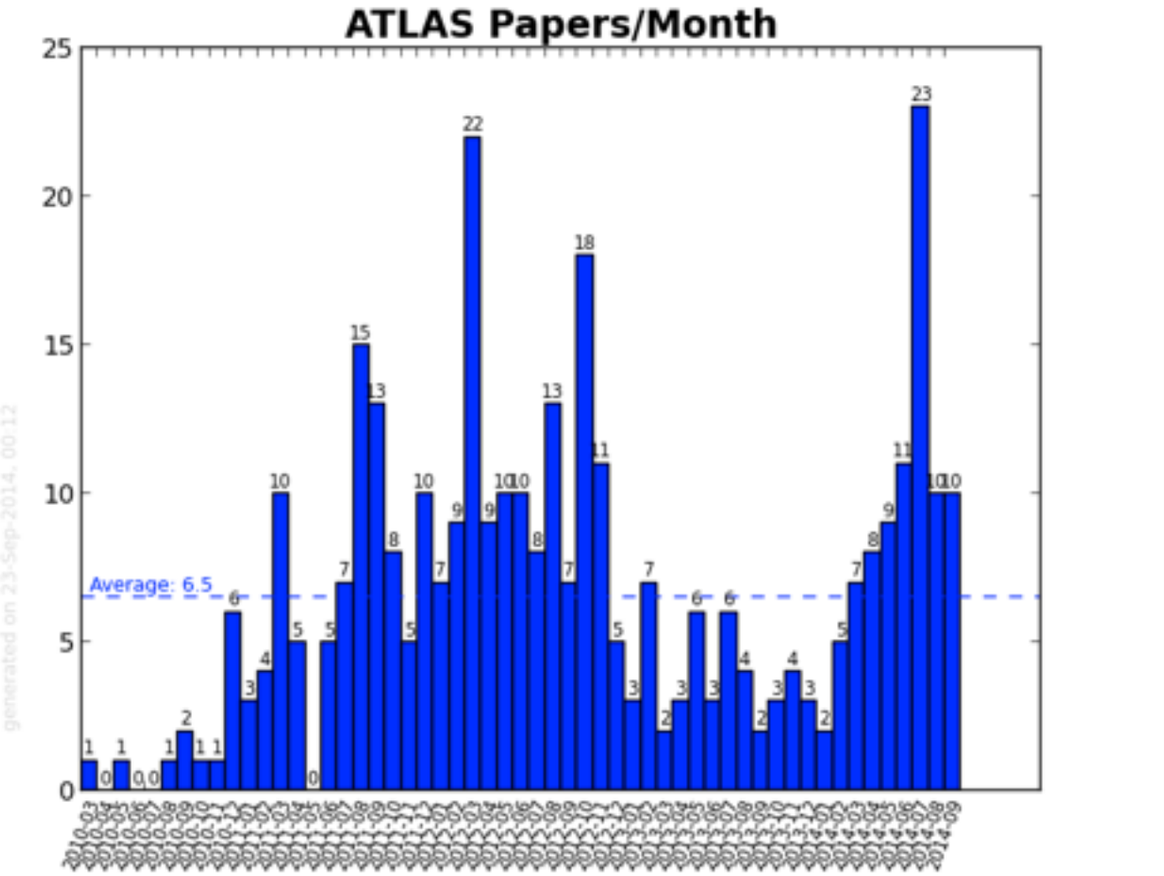
52 papers

18 CONF notes

A LARGE FRACTION OF THE RUN-1 RESULTS NOW FINAL

NEW RECORD OF PAPERS PER MONTH

CAN COVER HERE ONLY FEW OF THE HIGHLIGHTS



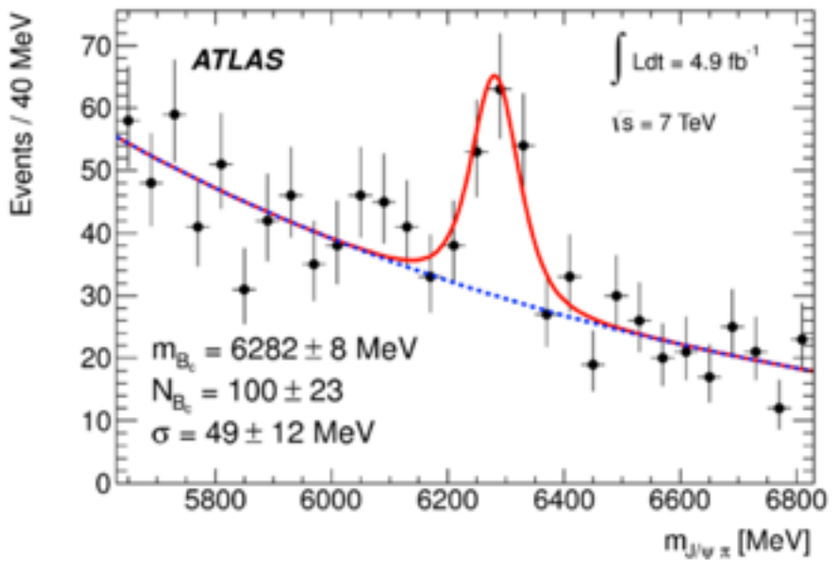
Observation of excited $B_c^{\pm}$

ARXIV:1407.1032

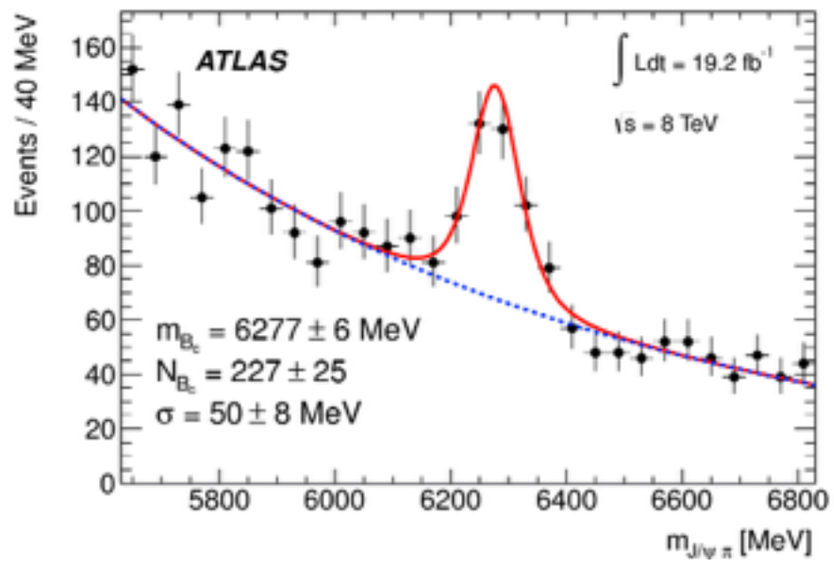
- 4.9 fb^{-1} at 7 TeV & 19.2 fb^{-1} of 8 TeV
- J/ψ candidates merged with same vertex pion candidate to form $B_C^{\pm}$ candidate
- $B_C^{\pm}(2S)$ candidate by adding two primary vertex pions
- 6842±4±5 MeV 5.2 σ and consistent with second S-wave state: $B_c^{\pm}(2S)$

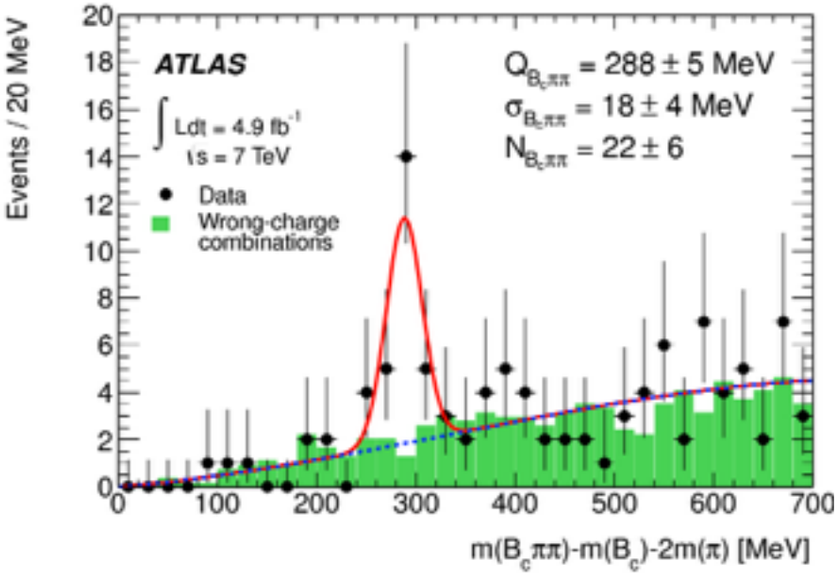
Data	Signal events	Peak mean [MeV]	Peak width [MeV]
7 TeV	100±23	6282±8	49±12
8 TeV	227±25	6277±6	50±8

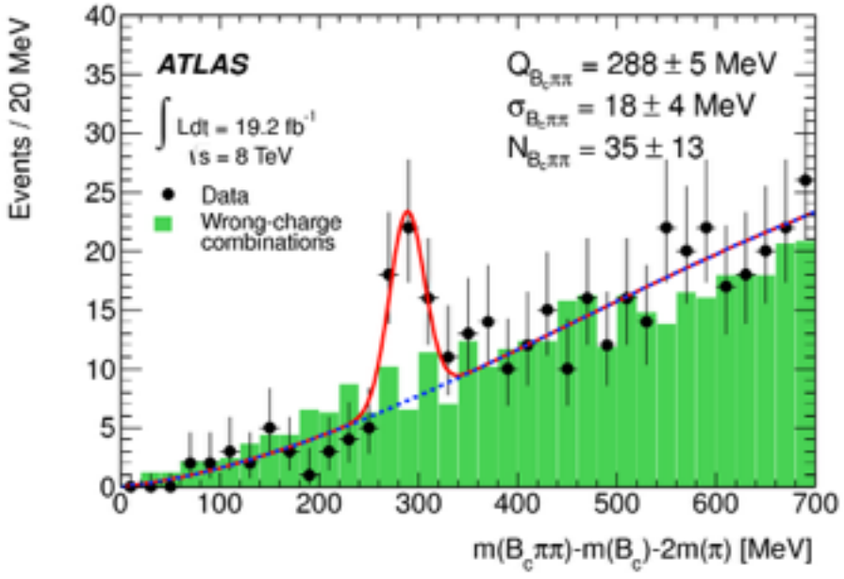
7 TEV



8 TEV



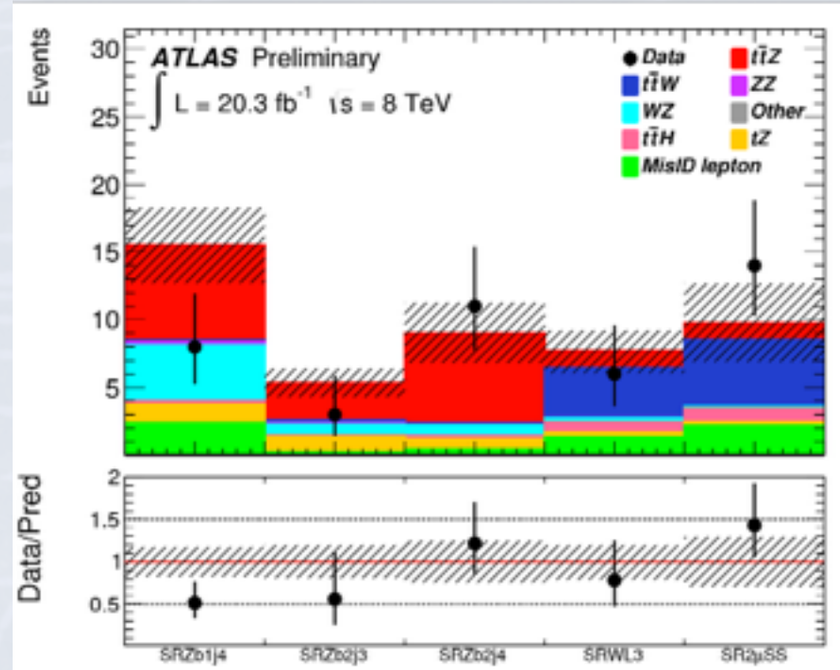




Evidence of associated tt+V production

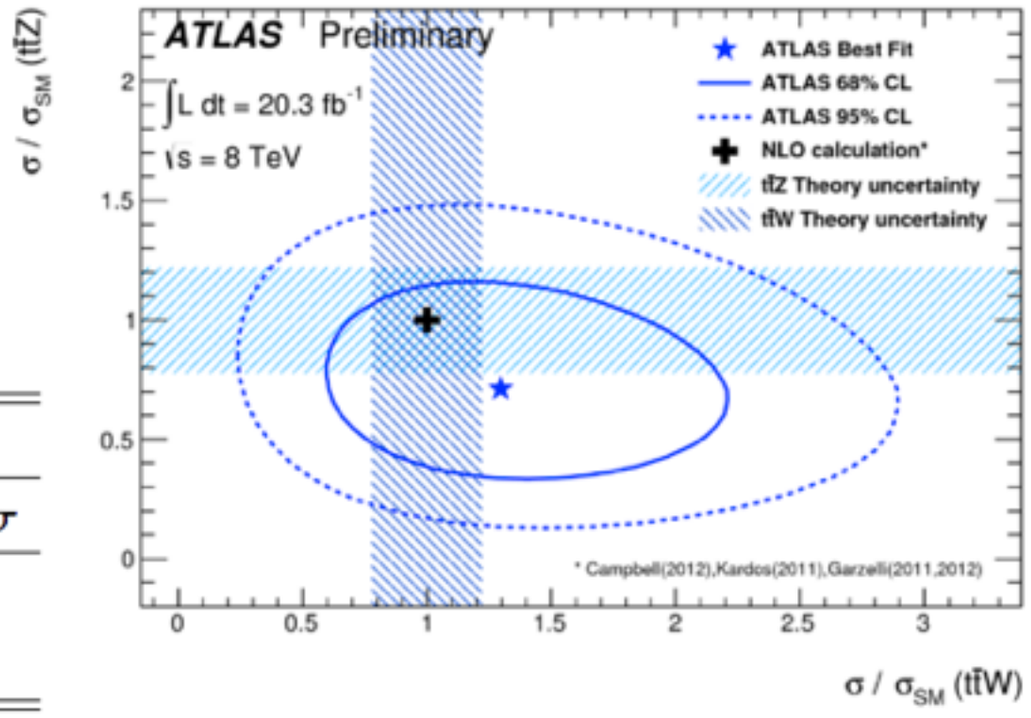
ATLAS-CONF-2014-038

- 20.3 fb^{-1} 8 TeV 2012 data
- 2 - 3 lepton channels:
  - Tri- & same sign di-lepton: cut & count
  - Opposite sign: multivariate neuronal network : best discriminant for (≥5j, 2b) region in 2ℓOSZ region
- 4.9σ evidence for combined ttV production
- Consistent with NLO QCD calculations



	Combination		
Process	Signal Strength	Observed σ	Expected σ
$t\bar{t}V$	$0.89^{+0.23}_{-0.22}$	4.9	4.9
$t\bar{t}W$	$1.25^{+0.57}_{-0.48}$	3.1	2.4
$t\bar{t}Z$	$0.73^{+0.29}_{-0.26}$	3.2	3.8

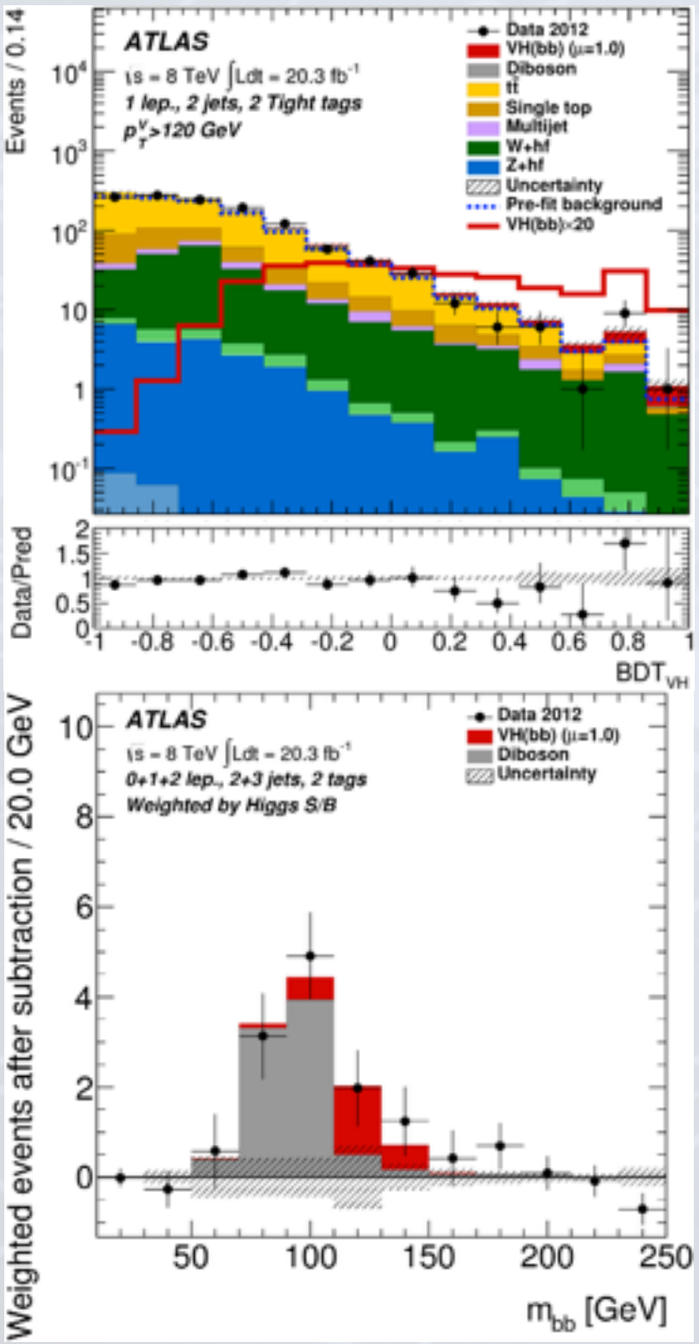
	Summary of combined simultaneous fit results		
Process	Measured cross-sections	Observed σ	Expected σ
$t\bar{t}Z$	150^{+58}_{-54}(total) = 150^{+55}_{-50}(stat.) ± 21(syst.) fb	3.1	3.7
$t\bar{t}W$	300^{+140}_{-110}(total) = 300^{+120}_{-100}(stat.)$^{+70}_{-40}$(syst.) fb	3.1	2.3



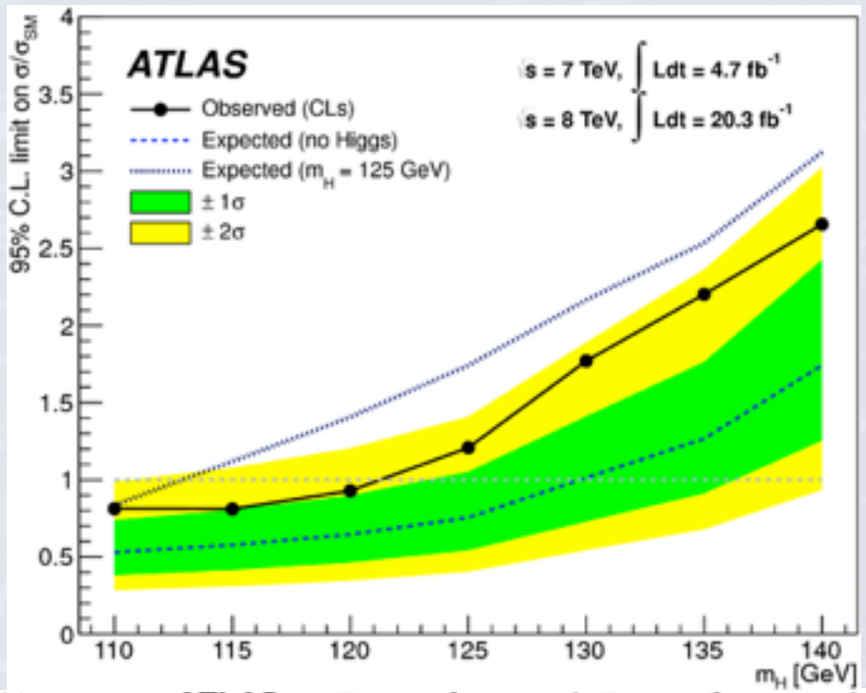
Higgs: H→bb

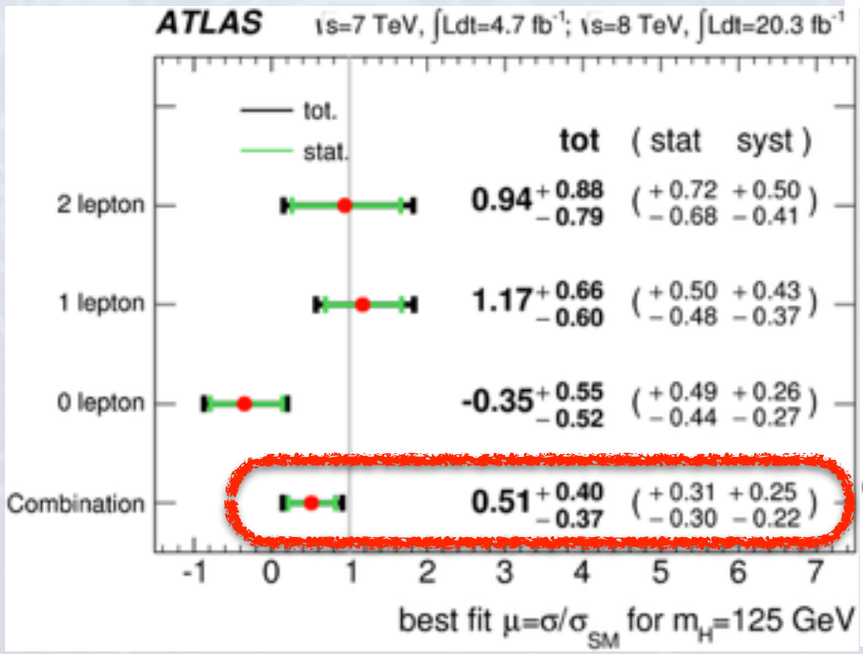
arXiv:1409.6212

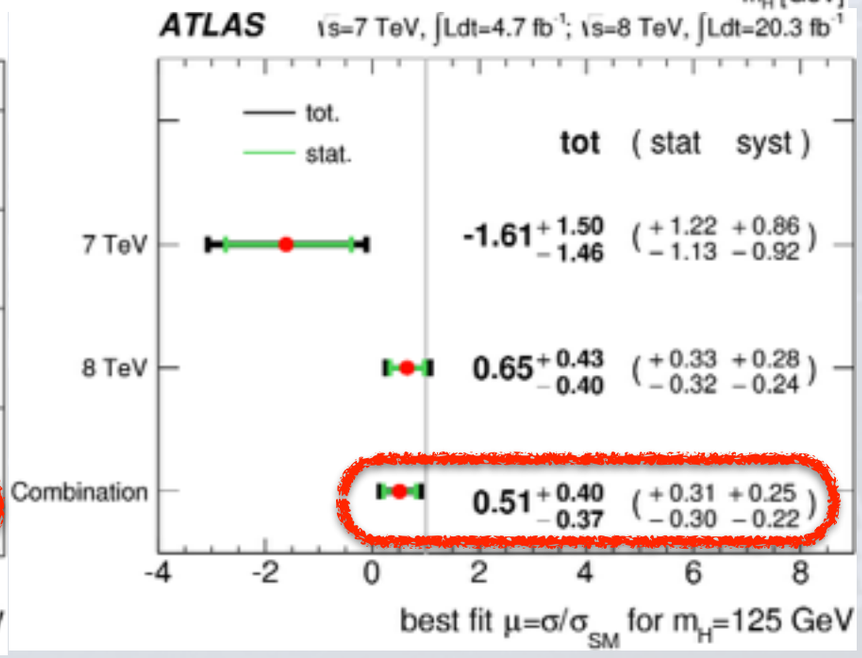
- 4.7 fb^{-1} at 7 TeV & 20.3 fb^{-1} of 8 TeV
- Associated W/Z production



- W→ℓν, Z→ℓℓ, Z→ν ν
- Consistent results between multivariate (BDT) & invariant di-jet mass distributions based analysis



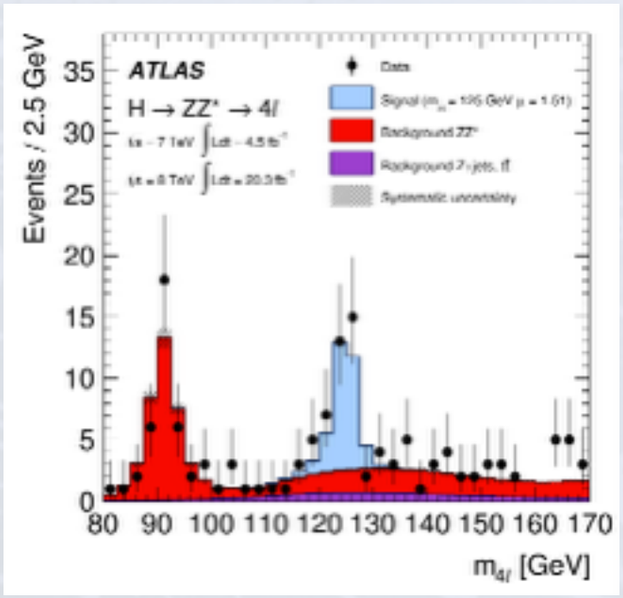




B-Tagging Performance: ATLAS-CONF-2014-046

Higgs: $H \to ZZ^* \to 4\ell$ arXiv:1408.5191 & arXiv:1407.4222

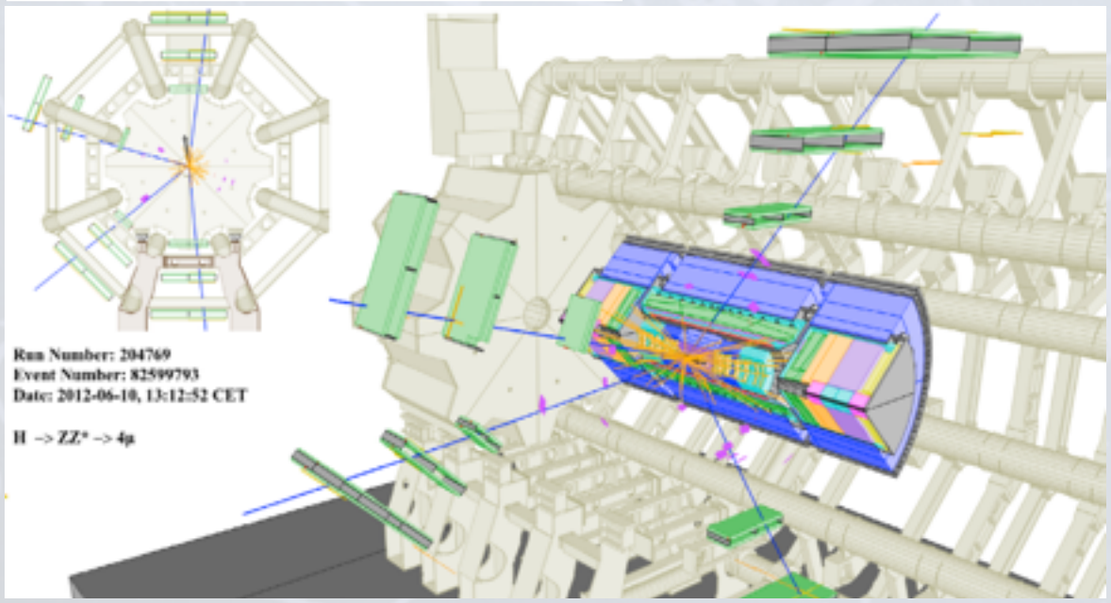
- Run1 finale: $H \to ZZ^* \to \ell^+\ell^-\ell'^+\ell'^-$
- 8.1σ at m_H = 125.36 GeV
- Signal strength: $1.44^{+0.40}_{-0.33}$



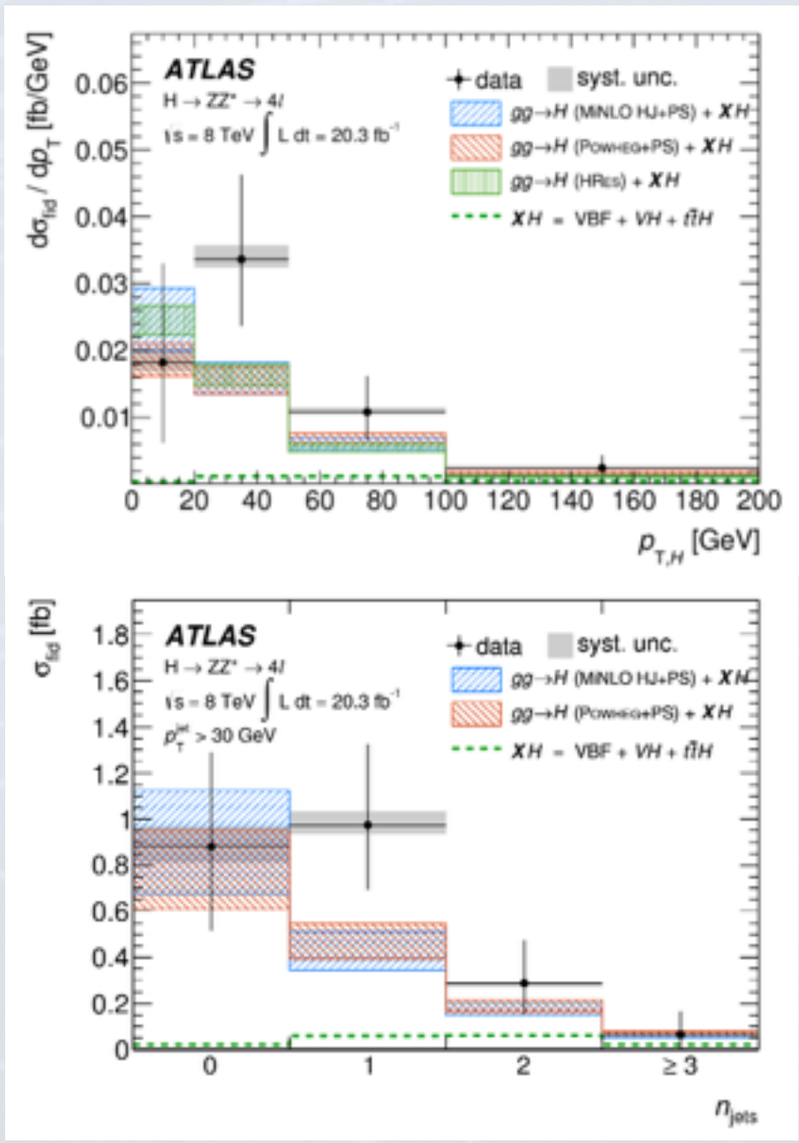
e/γ calibration:
arXiv:1407.5063

muon performance:
arXiv:1407.3935

Inner Detector alignment:
ATLAS-CONF-2014-047



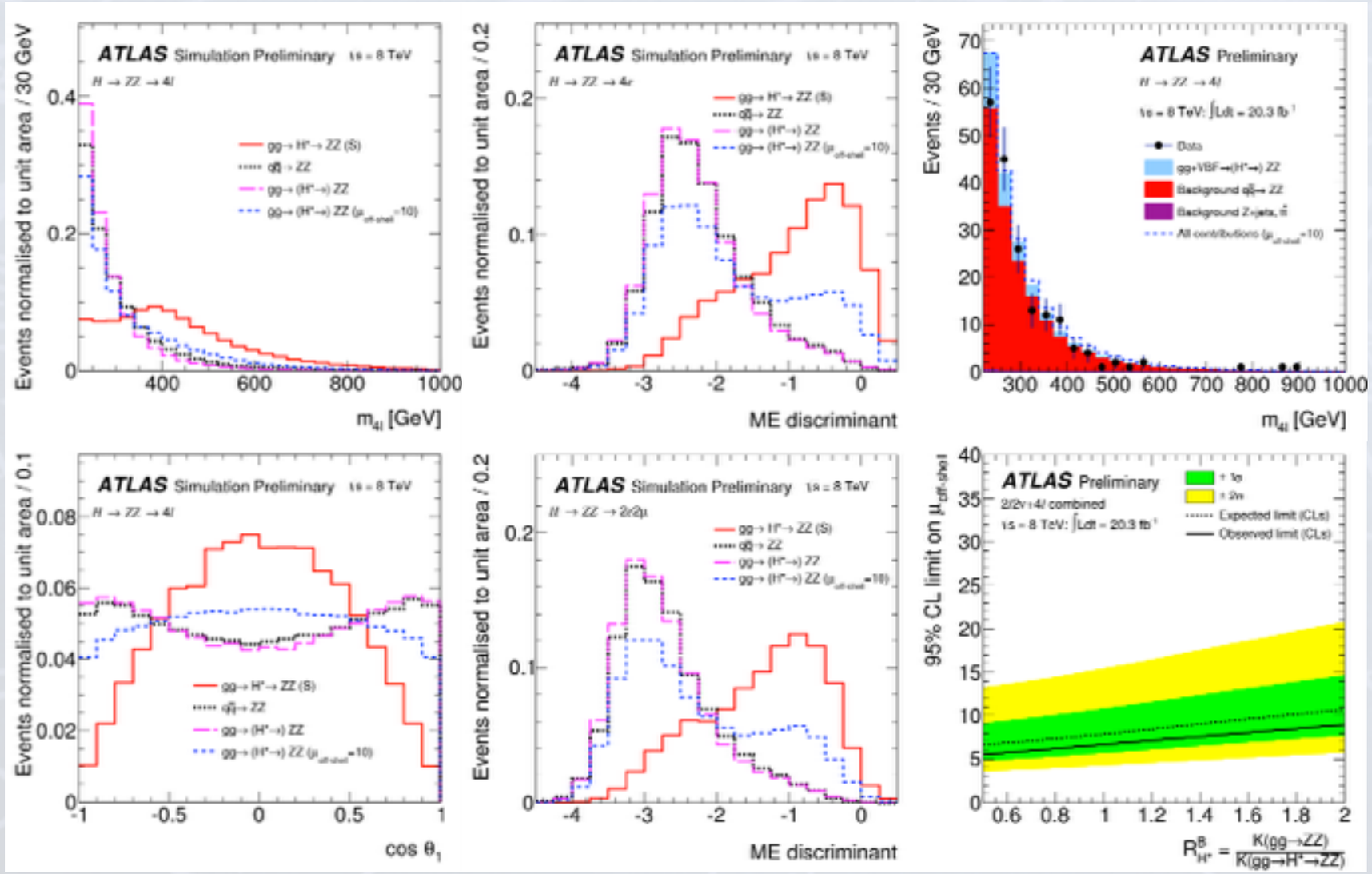
- differential cross sections:
  $p_{T,H}$, y_H, m_{34}, $|\cos\theta^*|$, n_{jets}, $P_{T,jets}$



- total uncertainties dominated by statistical uncertainties

Higgs high mass prod.: $H^* \to ZZ$ ATLAS-CONF-2014-042

- 20.3 fb^{-1} of 8 TeV - measure Higgs off-shell coupling strength
- Higgs signal strengths for $ZZ \to 4\ell$ + $ZZ \to 2\ell 2\nu$
- 4ℓ: using matrix element kin. discriminant (8 obs., 3*m, 3*θ, 2*ϕ)
- $2\ell 2\nu$: counting in high m_T & E_T^{mis} enriched signal region

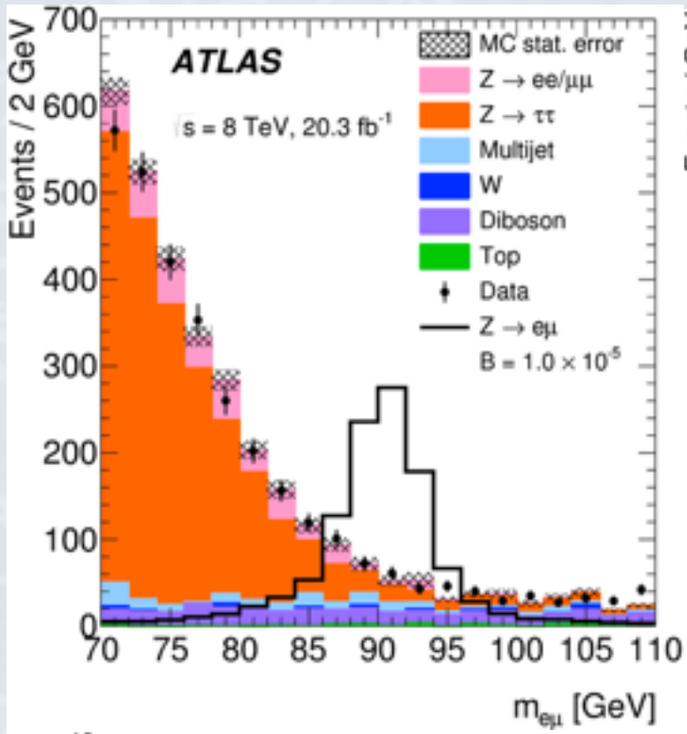


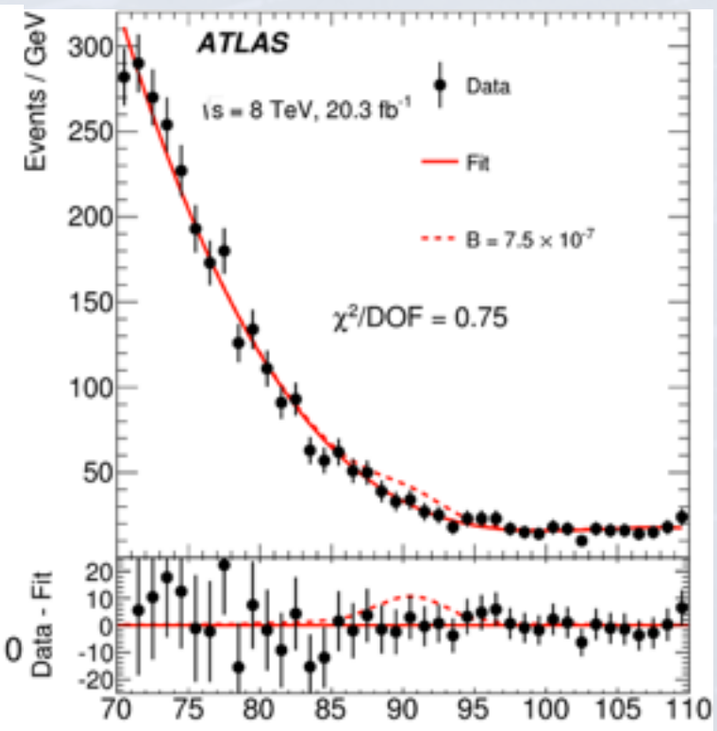
- Under assumption of identical on- and off shell production and decay couplings
- On-shell signal strength can be interpreted as a constrain on the total higgs width Γ_H/Γ_H^{SM}

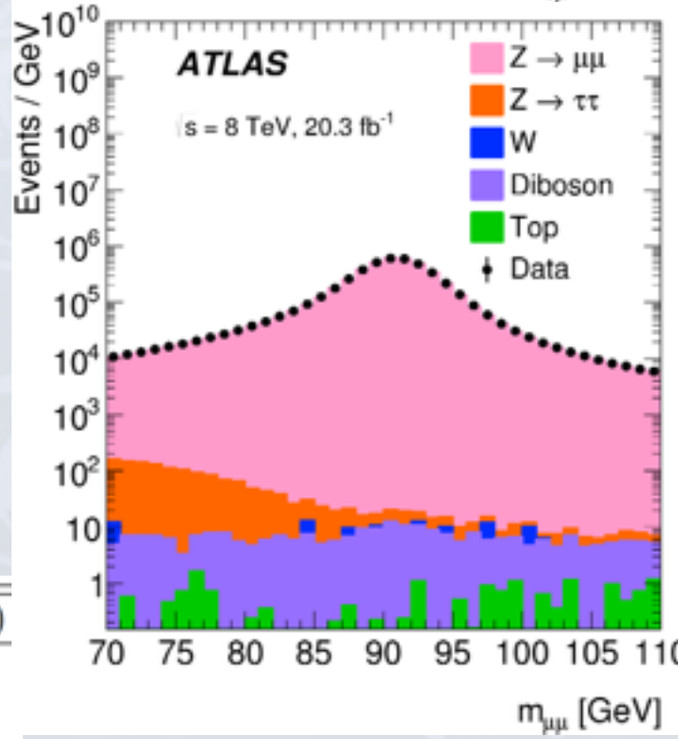
Lepton flavour violating decay $Z \to e\mu$

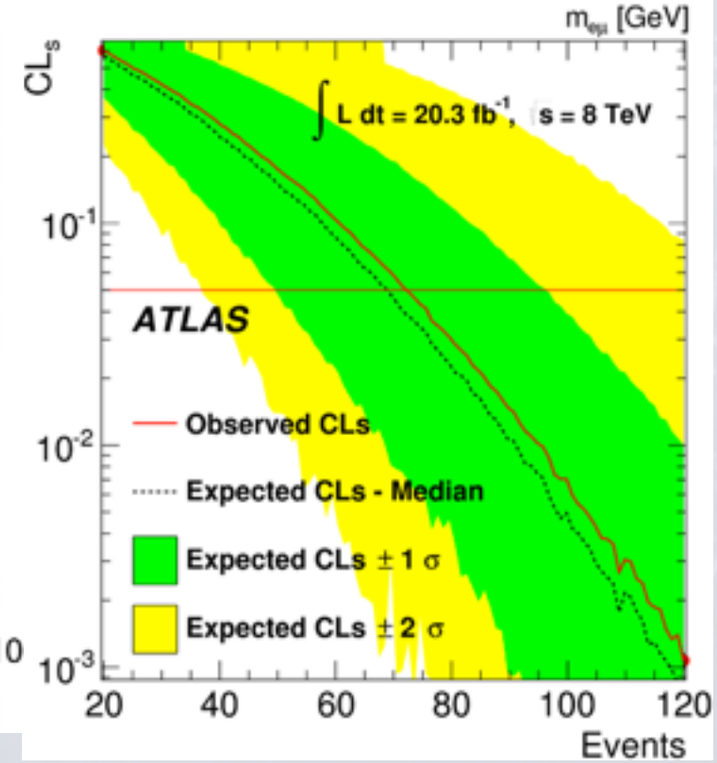
ARXIV:1408.5774

- 20.3 fb^{-1} of 8 TeV
- mass spectrum consistent with MC background expectation & no evidence of enhancement at Z mass
- mass spectrum fit as sum of background and signal yields a signal of 4±35 events
- upper limit on the branching fraction (at 95% CL) of: $B(Z \to e\mu) < 7.5 \times 10^{-7}$
- more stringent than LEP OPAL: $< 17 \times 10^{-7}$





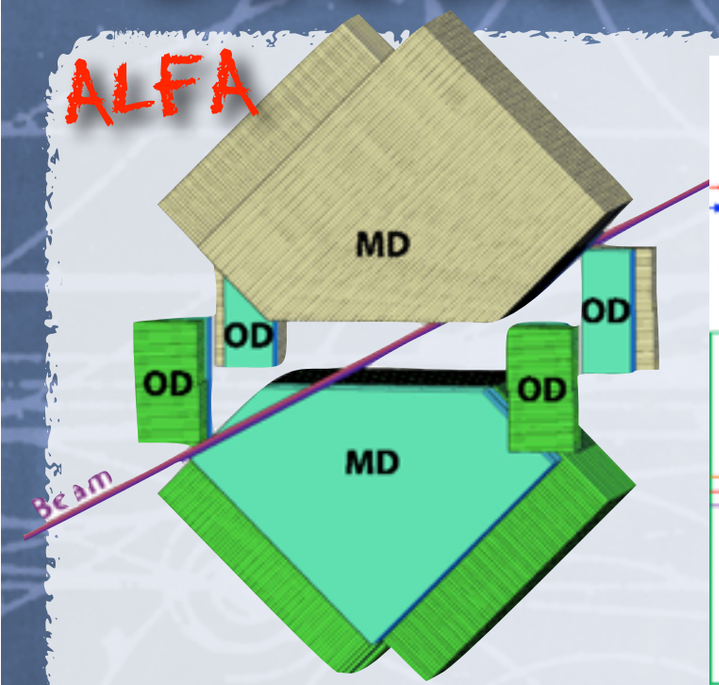


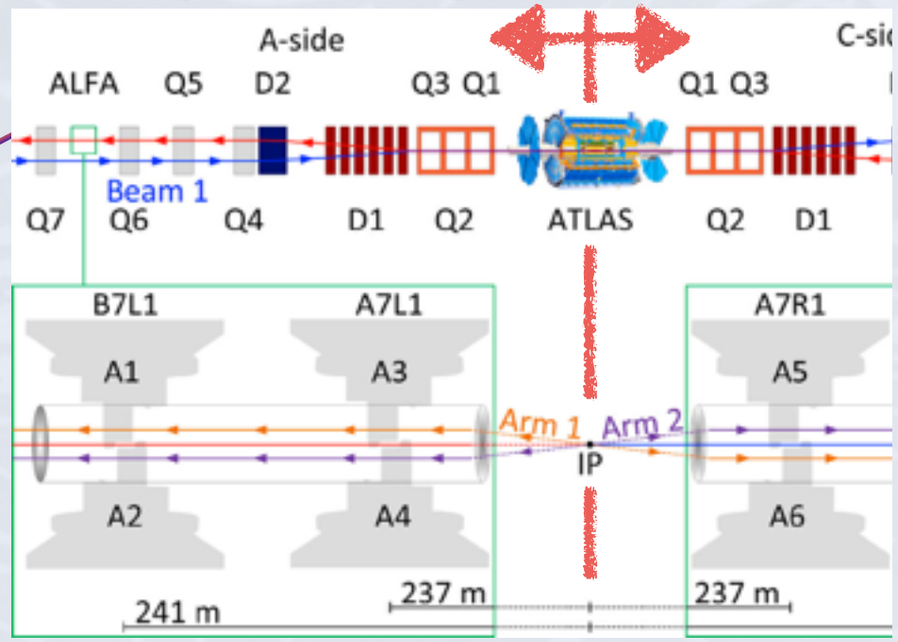


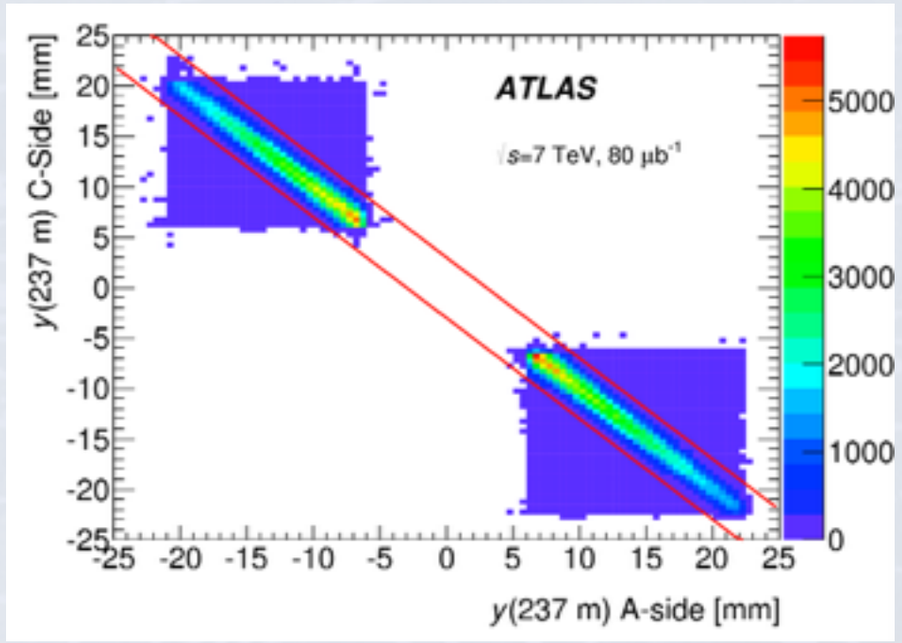
Z decay	Acceptance (%)	Efficiency (%)
ee	37.6	28.7
$\mu\mu$	43.3	41.2
$e\mu$	38.9	36.5

Total cross section measurement

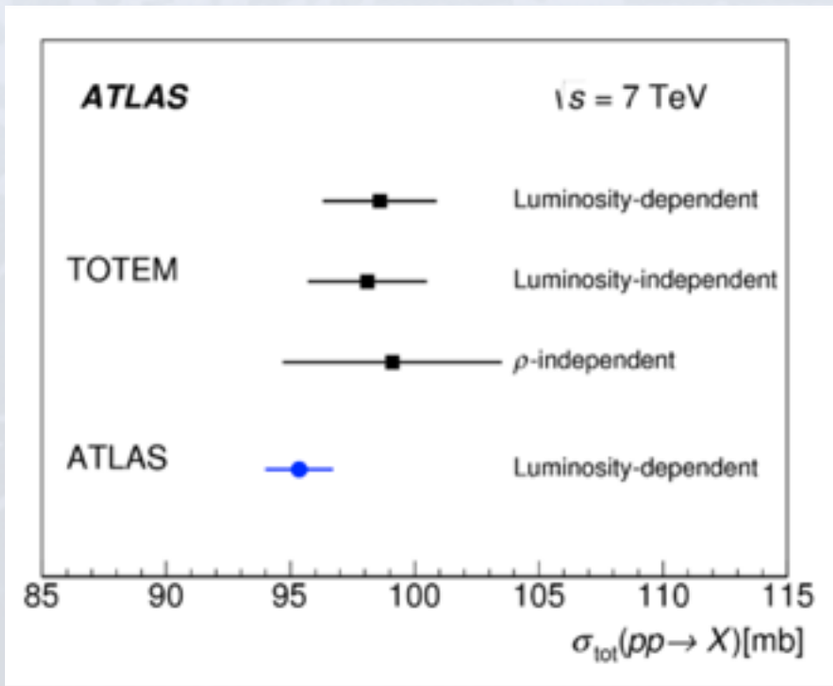
ARXIV:1408.5778

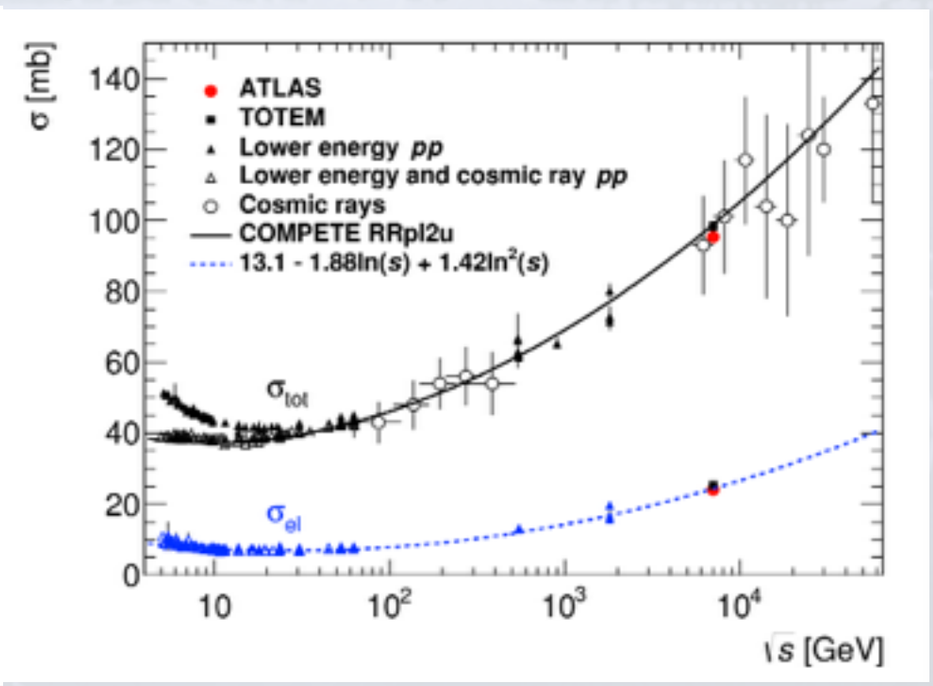






- 80 μb^{-1} 7 TeV 2011 data, with 90m β^* optics
- Data-driven determination of effective beam optics & simulation
- Dedicated effort to determine abs. luminosity ($L \sim 5 \times 10^{27}$), ID vertex counting, LUCID & BCM calibrated with van der Meer

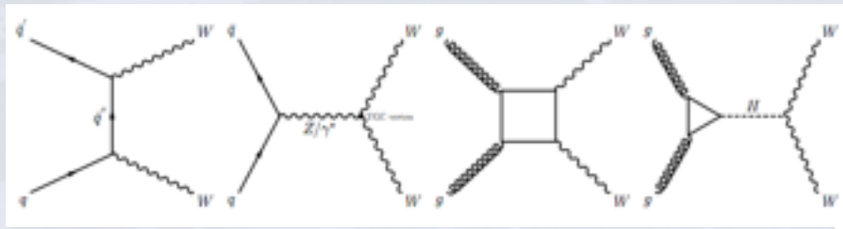




WW production cross section

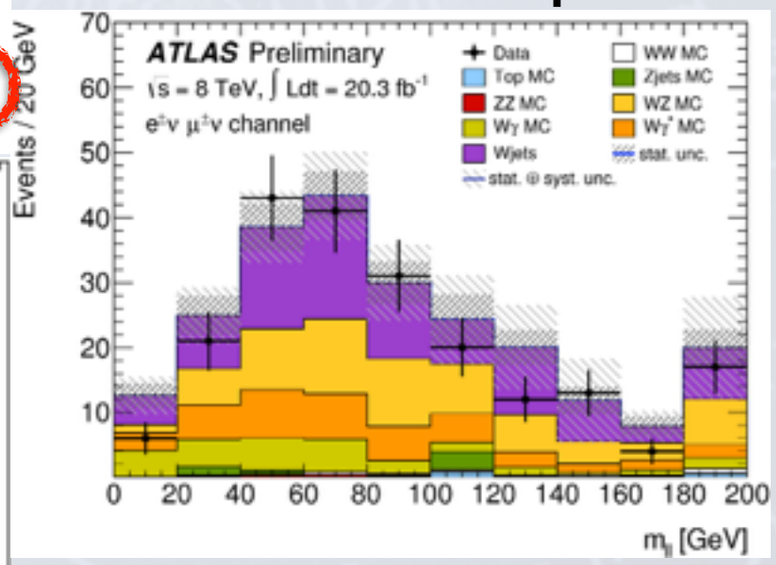
ATLAS-CONF-2014-033

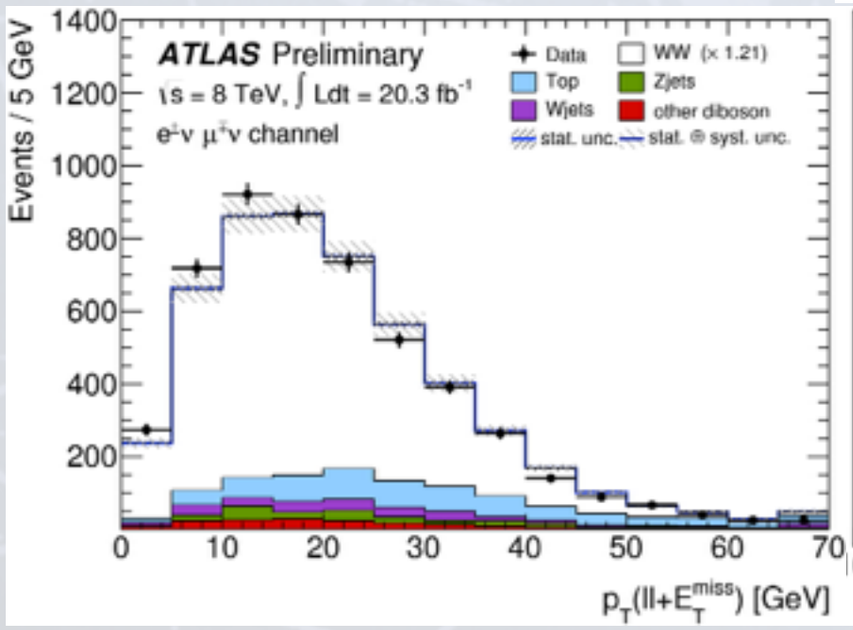
- 20.3 fb^{-1} 8 TeV 2012 data
- Theoretical predictions: NLO for qq->WW, LO for gg->WW, NNLO for gg->H->WW
- Main backgrounds, Drell-Yan, top production, W+jets & di-boson

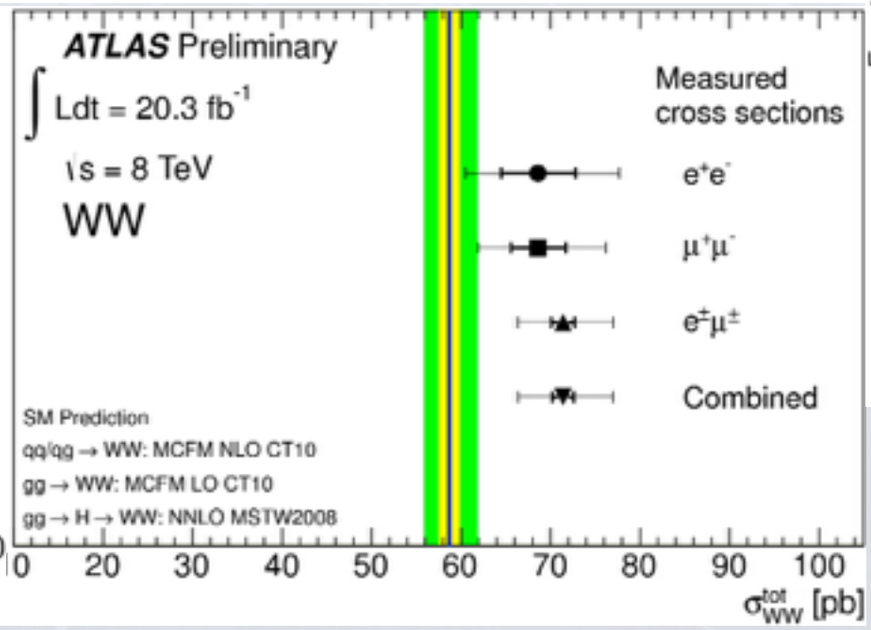


Channel	$\sigma_{WW}^{\text{total}}$ [pb]
$e\mu$	$71.4^{+1.3}_{-1.3}$ (stat) $^{+5.0}_{-4.4}$ (syst) $^{+2.1}_{-2.0}$ (lumi)
ee	$68.6^{+4.2}_{-4.1}$ (stat) $^{+7.8}_{-6.7}$ (syst) $^{+2.1}_{-2.0}$ (lumi)
$\mu\mu$	$68.6^{+3.1}_{-3.0}$ (stat) $^{+6.6}_{-5.6}$ (syst) $^{+2.1}_{-2.0}$ (lumi)
Combined	$71.4^{+1.2}_{-1.2}$ (stat) $^{+5.0}_{-4.4}$ (syst) $^{+2.2}_{-2.1}$ (lumi)

- WZ/Wγ* dominated same sign validation sample



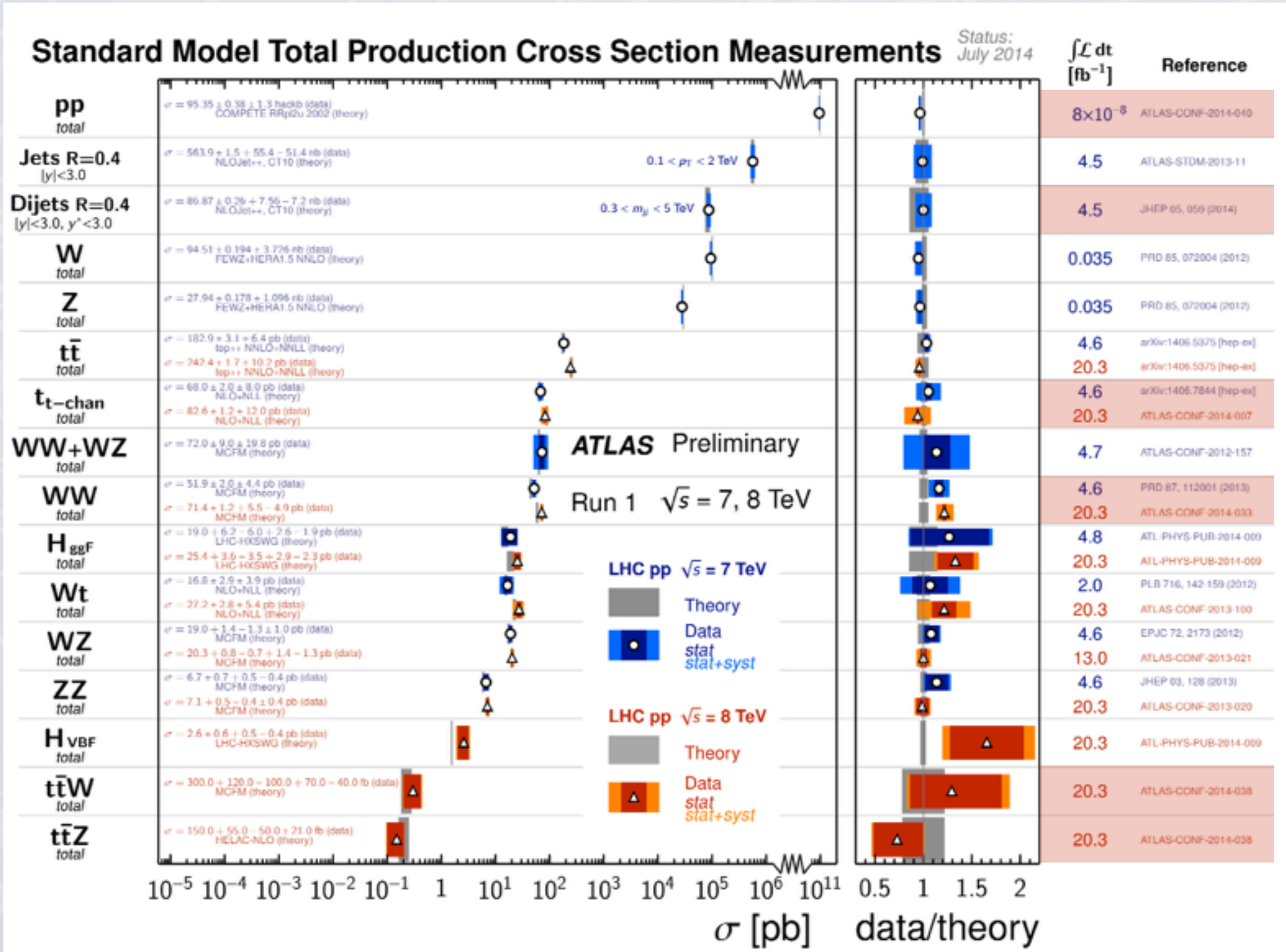




Standard Model Summary Plots

UPDATED & RECENT RESULTS

ATLAS Status
D.Dobos



UPDATED

PREVIOUS BUT ONE LHCC

PREVIOUS LHCC

UPDATED

UPDATED

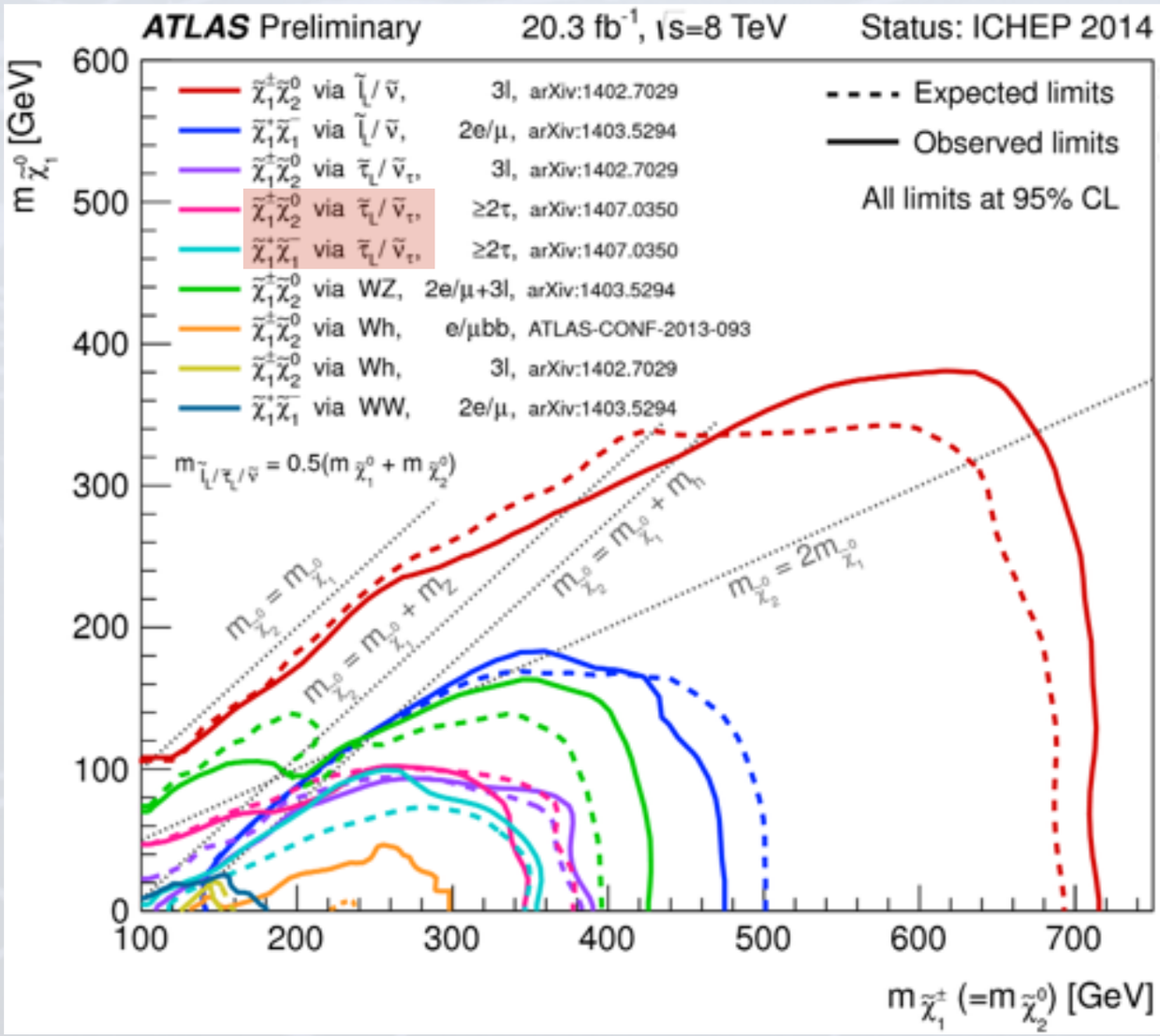
New SUSY Search Results

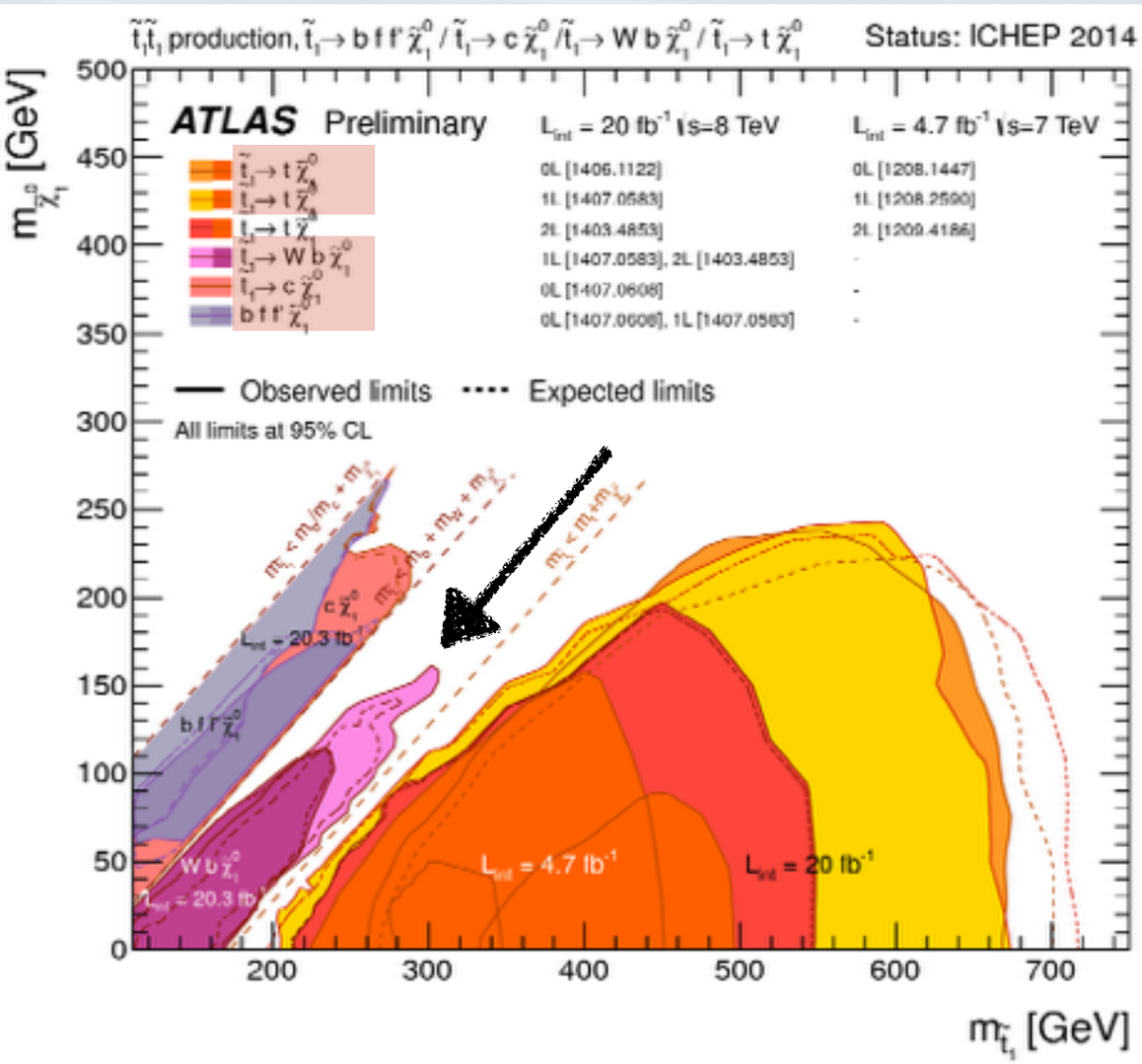
UPDATED FOR ICHEP

- Concluded signature based searches for EW SUSY and stop pair production - plots summarising many analyses

ARXIV:1407.0608

- Stop→c+neutralino: 2 different strategies: monojet-like & c-tagged selection - agreement with SM -> significantly extended exclusion





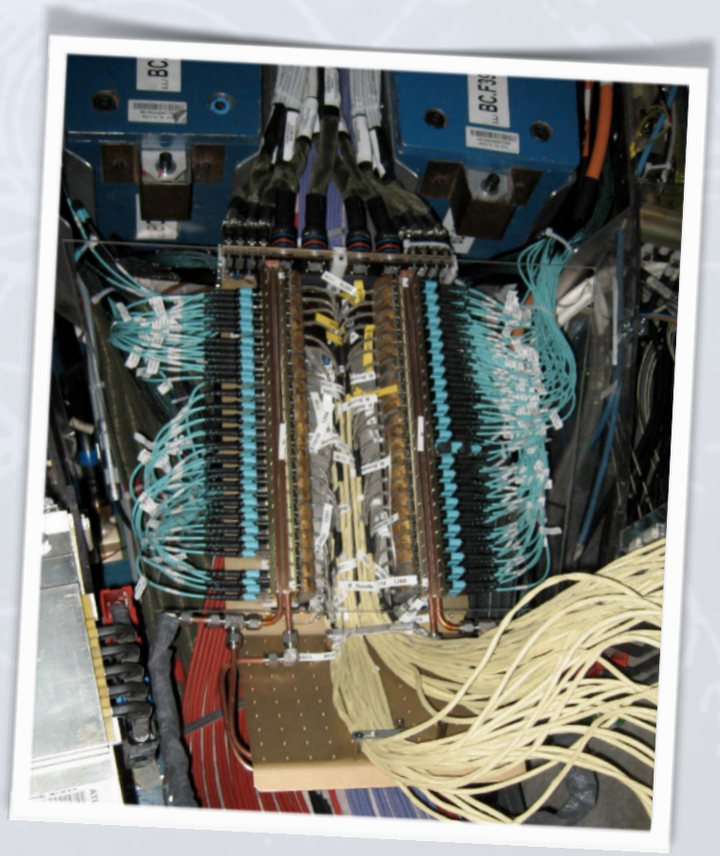
LS1 Summary & Status of Run2 Preparations

Pixel Re-installed & Connected

NEW SERVICE QUARTER PANELS

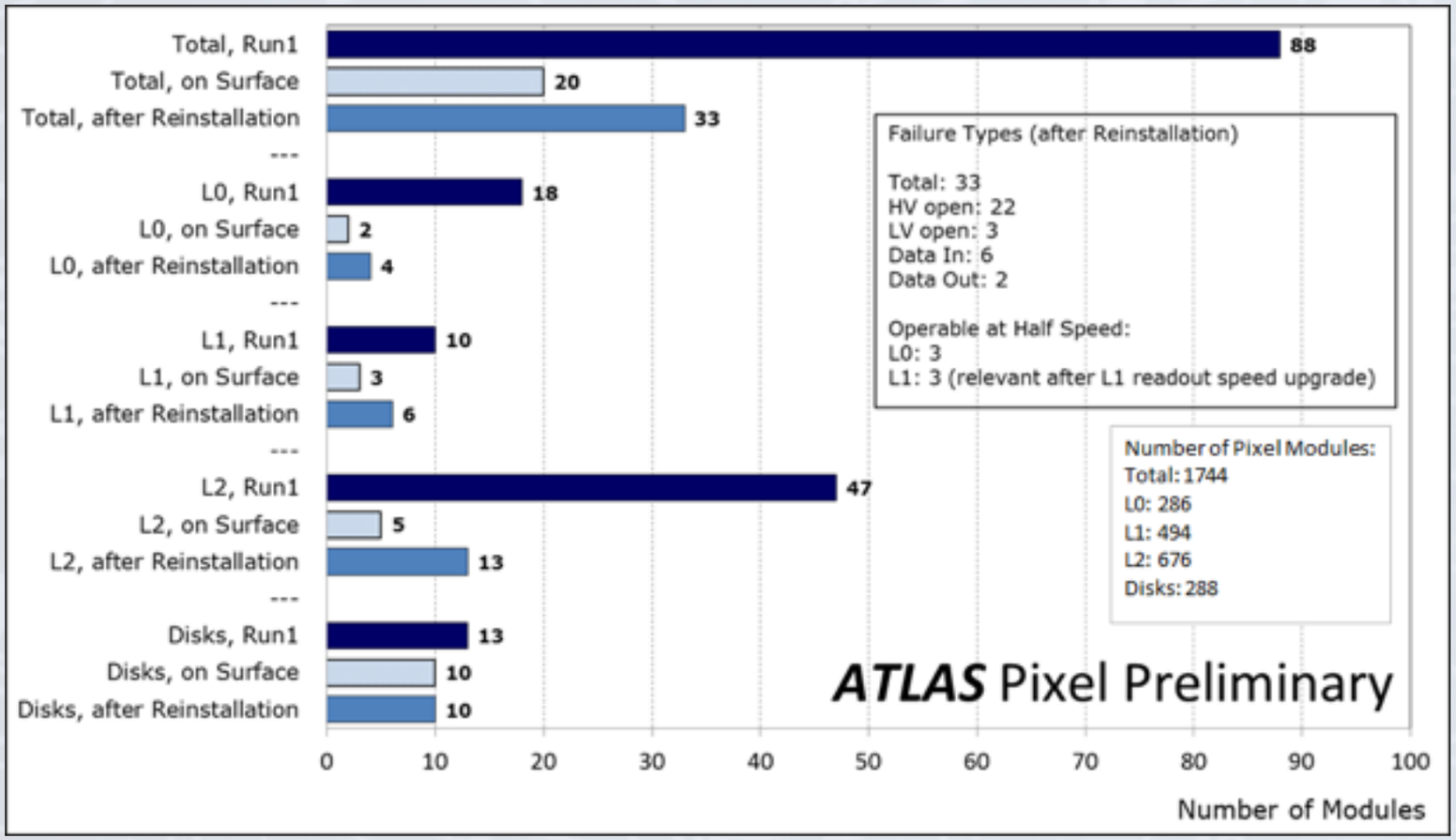
- On-detector services up to innermost patch panel replaced
- Repaired all accessible failures
- Opto electronics moved to off-detector location for improved accessibility
- Power supply system upgraded
- All cables & cooling connected (Jan - May)
- Increase data bandwidth for Run 2 & beyond (2-3 10^{34}) - IBL ROD/BOC for Layer 1 & 2 under construction

- New fibres to counting room connected and tested
- Refurbished C_3F_8 cooling and heater system



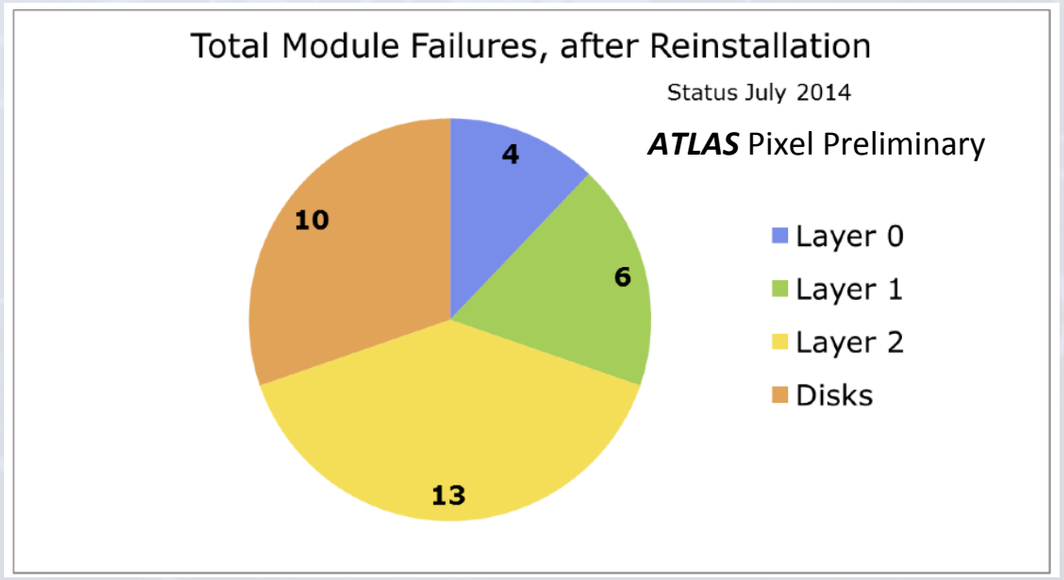
Pixel Re-installed & Connected

STATUS AFTER RE-INSTALLATION

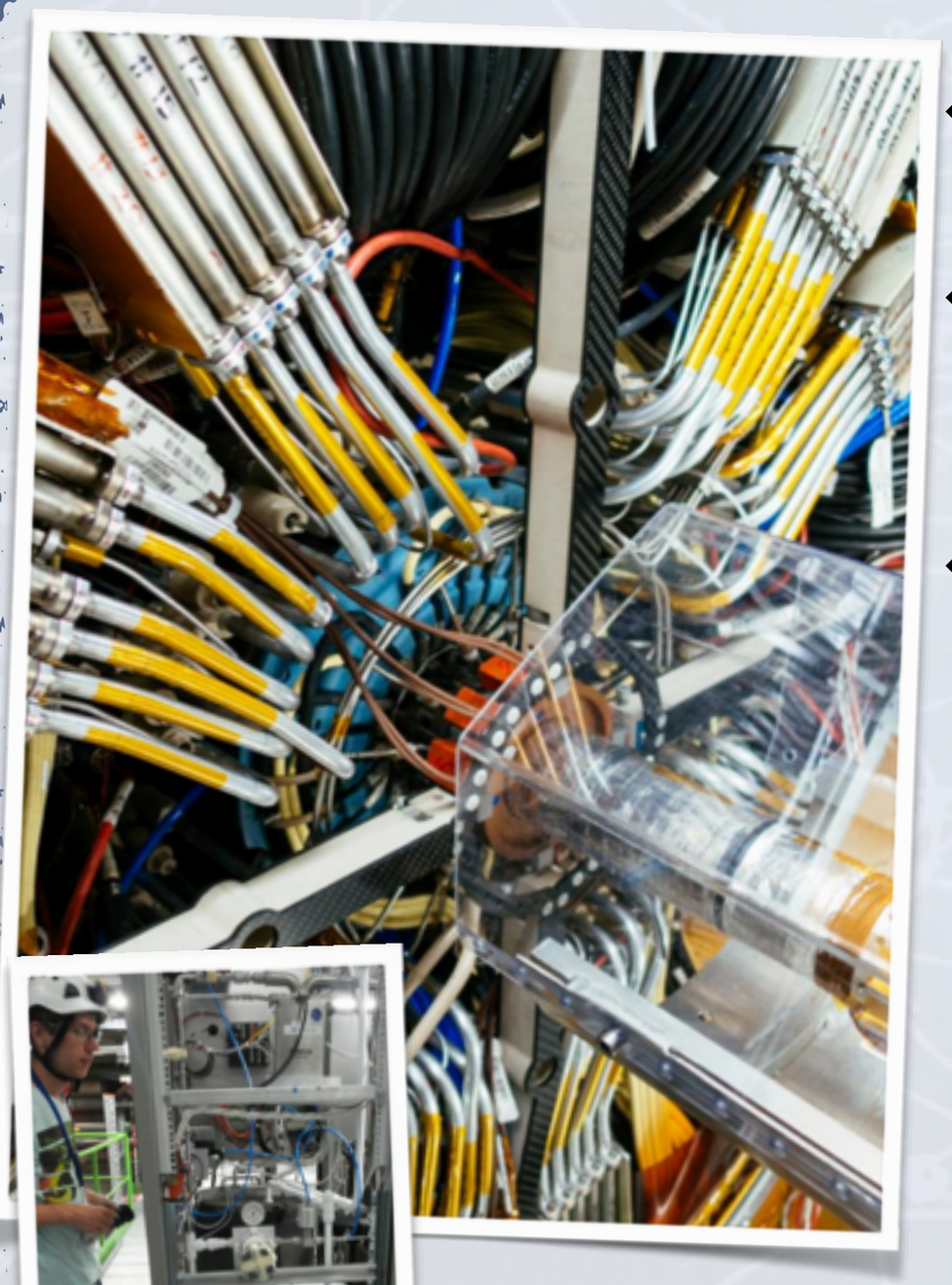


- Most significant improvements in efficiency: B-Layer (L0) & Outer Layer (L2)
- B-Layer dead module from 6.3% to 1.4%
- Layer 2 dead modules from 7% to 1.9%

- First test runs during June and July with detector cooled to verify functionality of all staves and modules
- Total: 1711 of 1744 functional, i.e. 98%



Insertable B-Layer CONNECTION



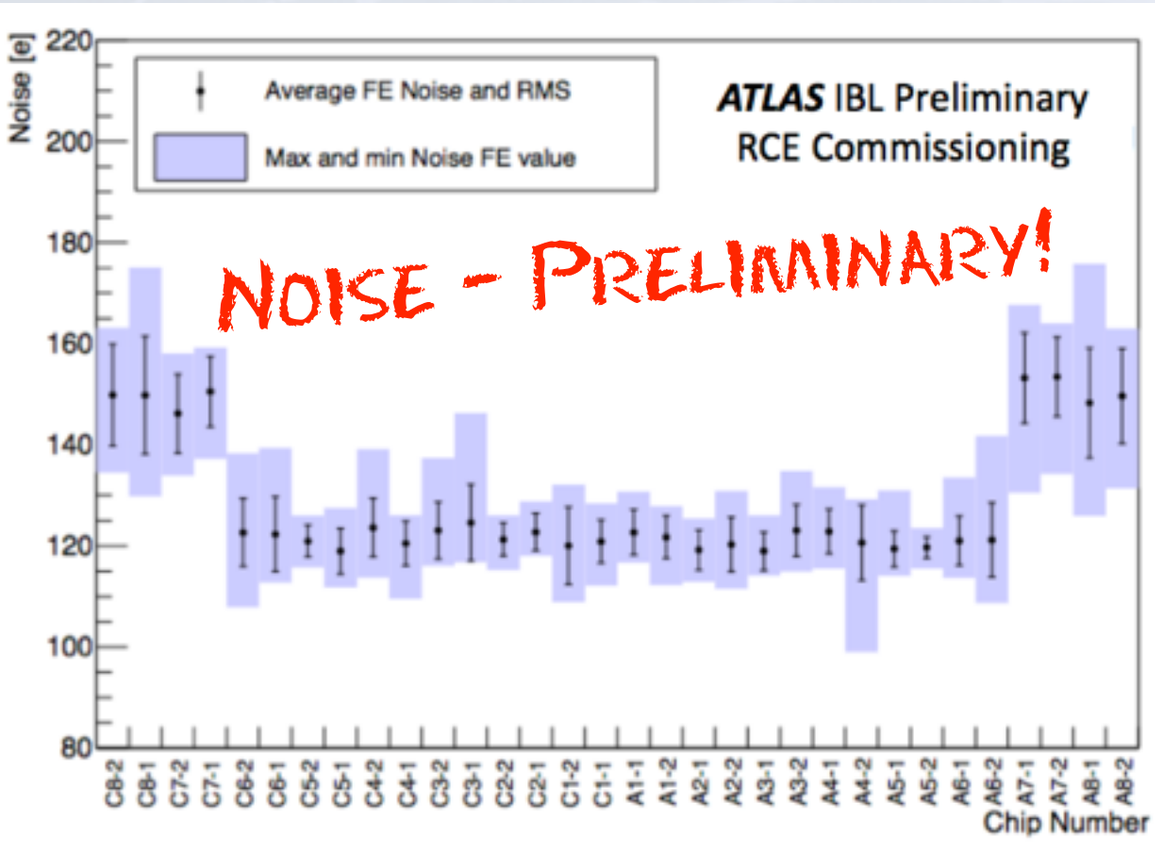
BEAM PIPE BAKEOUT SOON

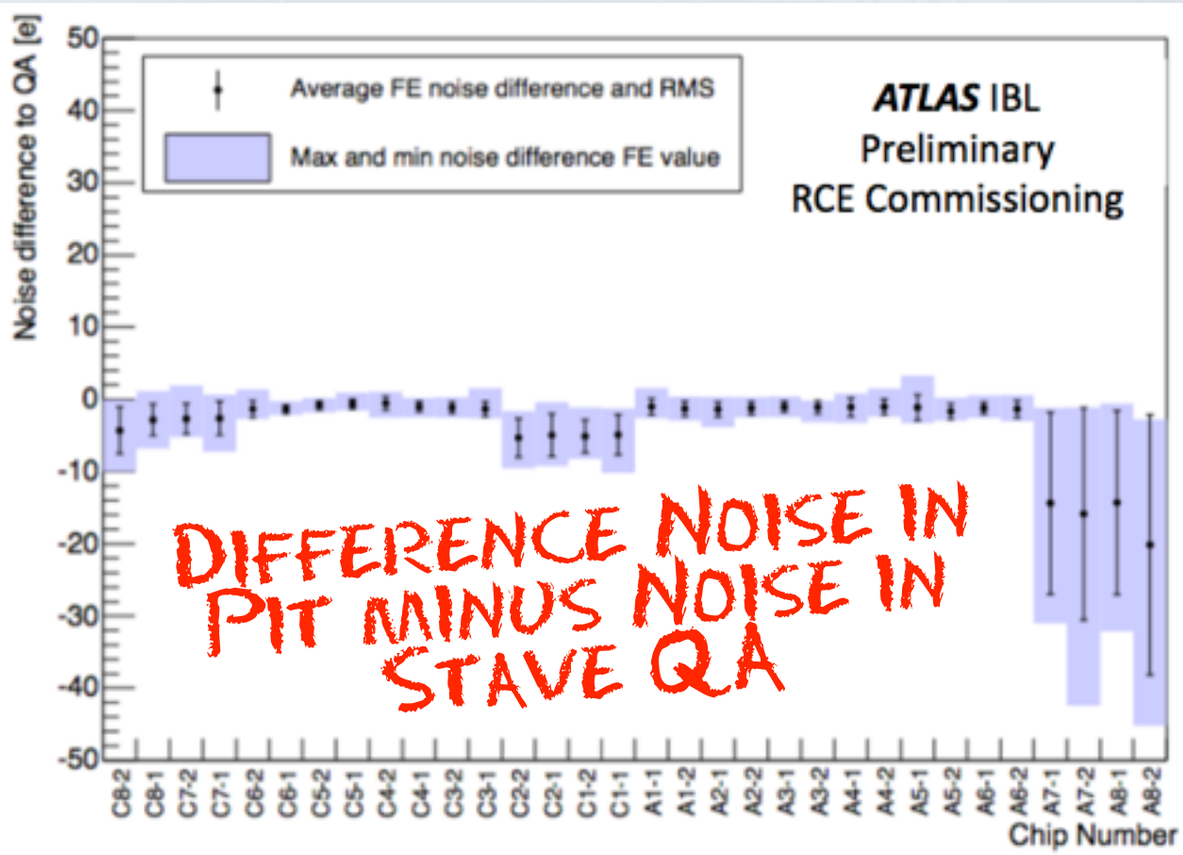
- IBL was ready and installed before last LHCC
- End of June the IBL is connected to power, readout and cooling - ready to start first tests
- Analog and digital performance re-measured in final configuration in pit
- Cooling operated very stable at -35°C coolant temperature set point with about -25°C module temperature at full power consumption
- Tested manual and automatic (simulated cooling plant failure) switching between cooling plants - excellent results & only ~1°C short temperature increase observed

Insertable B-Layer

Performance in the Pit

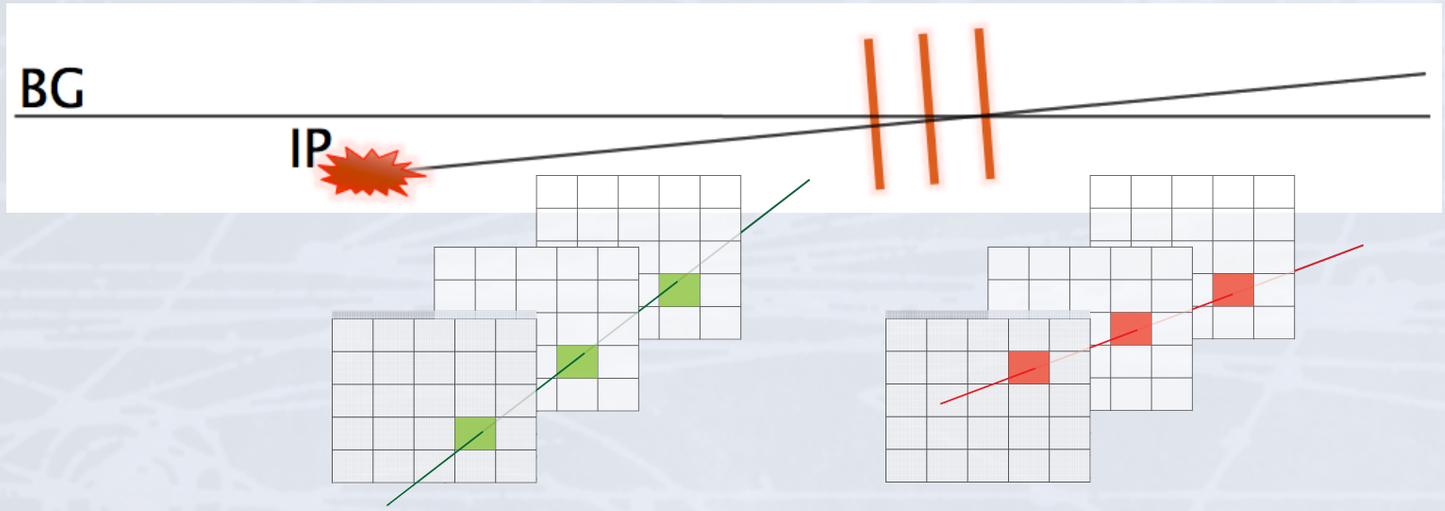
- 100% of IBL chips are functional, the detector operated very stable at room temperature and -5°C coolant temperature
- Preliminary comparison of stave noise & threshold in pit to QA





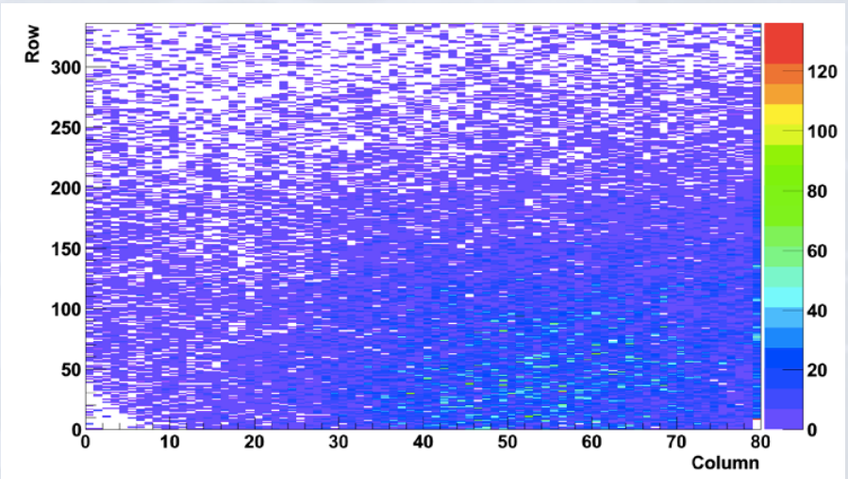
- Next steps: commissioning of the combined Pixel+IBL system, tuning of detector and integration to ATLAS data taking system (see M5)

Diamond Beam Monitor DBM

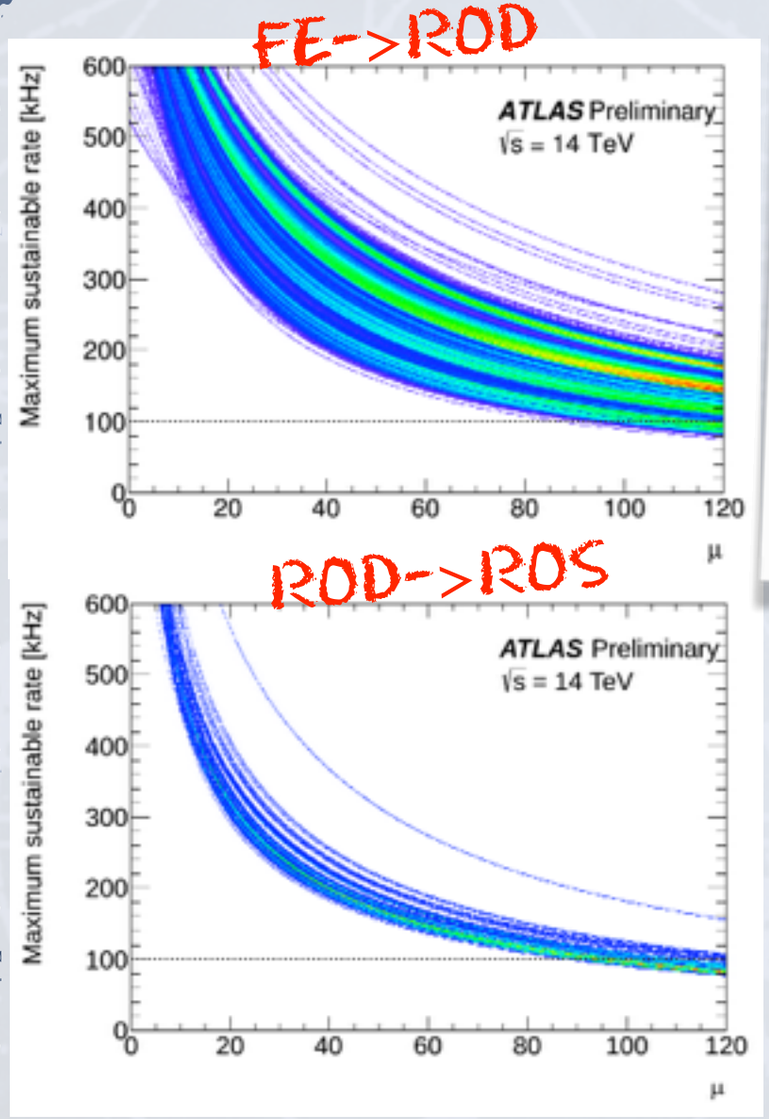


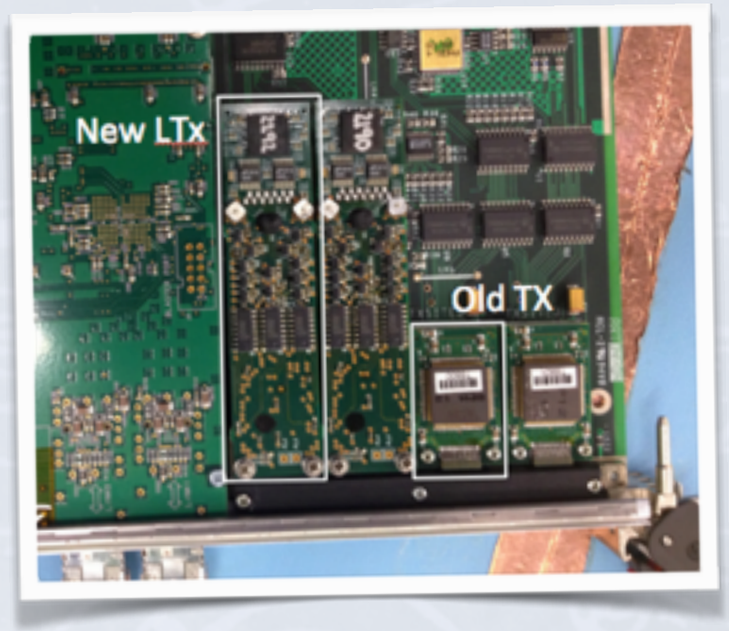
- Monitors luminosity for bunches which Atlas does not trigger on - therefore readout is “special” - reading to TDAQ with normal L1A triggers as well
- All 8 telescopes (24 modules) functional
  - Source tests on surface
  - dig. & ana. scanning chips after cabling
  - Next: Hitbus chip & diamond HV curves
- Commissioning as part of the IBL detector

- Installed in Pixel det.
- Powered and readout through IBL system
- Integrated in Athena geometry & offline



Semiconductor Tracker SCT





- Run1 Operation & Performance: JINST 9 (2014) P08009

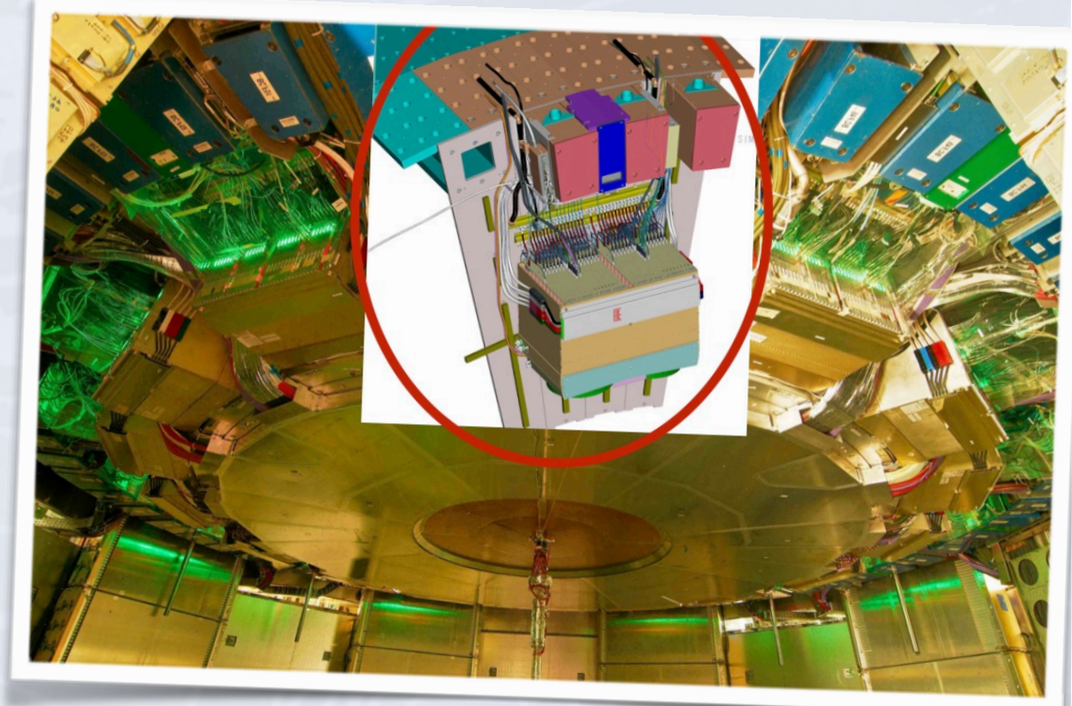
- Expansion of DAQ (higher pileup & trigger rate) with 90->128 Slinks & data compression allows 100kHz @ μ~87 for run 2 (25ns 14TeV)
- DQ & Data taking efficiency: firmware fix of ROD busy problem & improved SEU-invoked desynchronisation recovery procedure
- New commercial off-det. optical transmitters (small death rate & 10% power drop in 2012)

Transition Radiation Tracker TRT

- 100 kHz running needed push on front-end and readout limits:
  - reduced readout (23 bit instead of 27 bit words per event)
  - validity gate (time window) to reduce occupancy
  - updated readout driver clock-speed
  - runs at 104 kHz with 2% occupancy
  - Upgrade of front-end power supplies (gold-plated connectors to minimise voltage fluctuation) finished for detector
- Consolidation of ROD/TTC boards
- HV PS updated, recently observed voltage jumps of 150V split seconds after beam dumps, risk of discharge? under investigation
- gas leaks by O_3 - develops PEEK pipe cracks in stressed areas
  - all accessible leaks (30%) were fixed - tube insertion technique
  - studied 3%->2% O_2 stable region - reduces ozone 15-20%
  - remote gas regulation to reduce Xe
  - studied using Ar (not effecting tracking) for detector parts less critical for particle identification - Ar configuration chosen to minimise physics effect - under validation
  - alternative gas mixtures, e.g. based on Kr under study
  - working out a default and fall-back operational strategy for 2014

Liquid Argon Calorimeter LAR

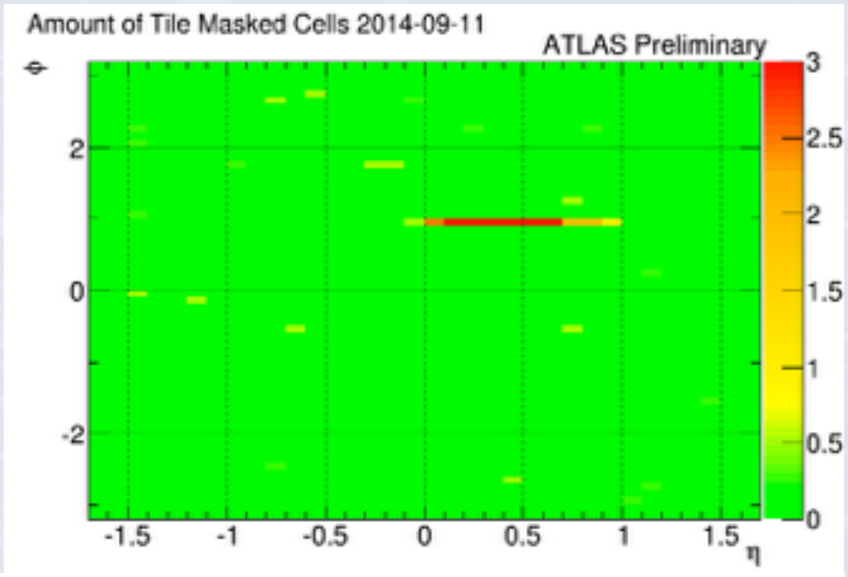
- Repaired ~25 Front-End boards and other board in the FE crates
- Some readout fibre replaced and some additional spares installed -> additional installation with new routing in LS2
- New design LV Power Supplies installed last year & operated for a few months
  - Improvement of power-bus connectors on all PS in Jan.
  - Immediate failure on one unit during switching ON in Feb.
  - Failure traced down to ceramic SMD capacitors that developed micro cracks
  - Apr.-Jun. all ceramic SMD capacitors exchanged, since then all power supplies working well on the detector
- SW: High level trigger marking of noise bursts
- Phase I Upgrade Demonstrator installed in 1 FE crate. Transparent for current L1Calo performance

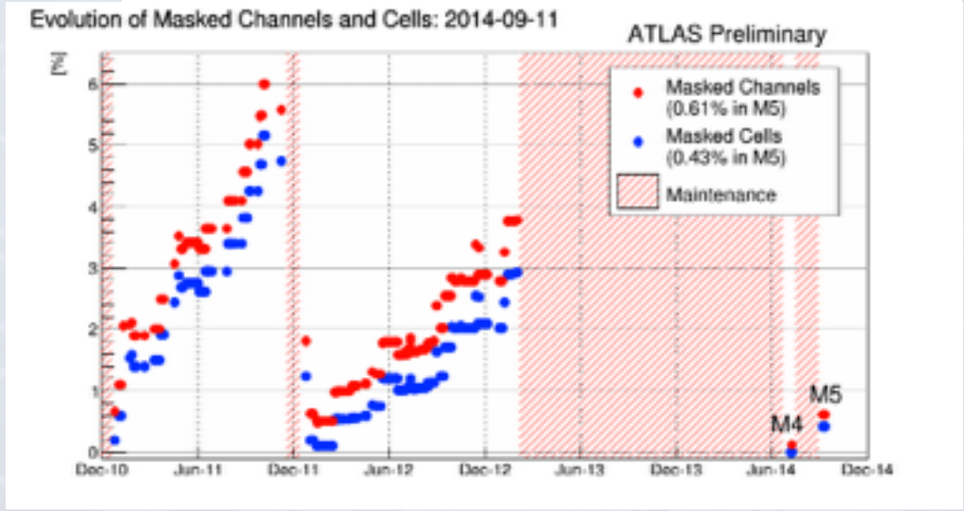


Hadronic Tile Calorimeter

Electronics & Power Supplies

- LS1 FE electronics and LVPS campaign to overcome ~3-5% dead cells and several regions of $\Delta\eta \times \Delta\varphi = 0.7 \times 0.1$
  - Low Voltage Power Supply failures
  - FE power or data transmission issues
  - Frequent transient LV trips(~0.6 /pb^{-1}) affecting trigger, timing, ROL disabling
- All FE supplies replaced with new & more robust ones, better noise characteristics (non-Gaussian behaviour fixed, correlated noise halved, stable operation, no trips)



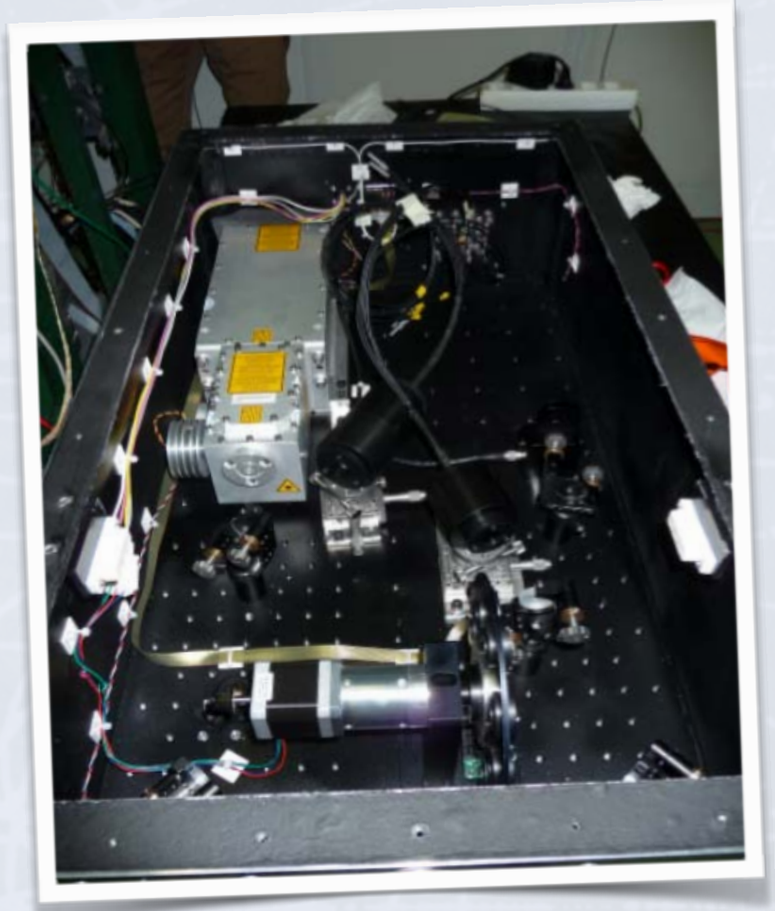


- FE electronics drawers consolidated, drastically reducing # bad channels
- Drawers tested with combined L1Calo+Tile runs - only 9 bad towers

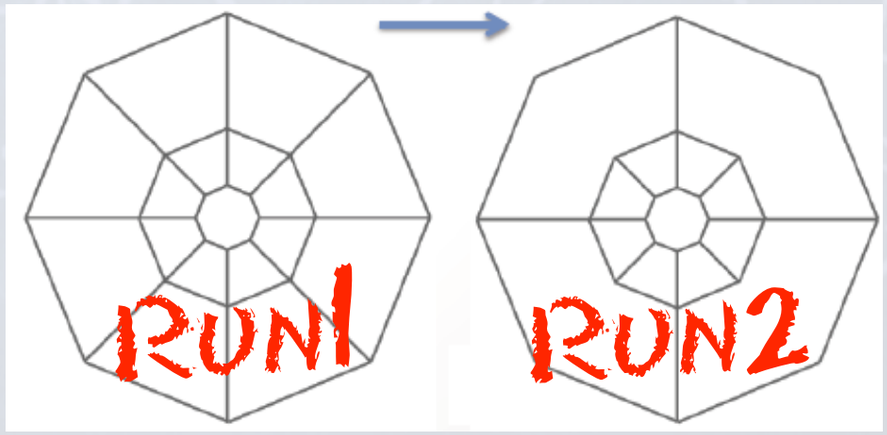
Hadronic Tile Calorimeter

Calibration & MBTS

- Calibration systems:
  - Laser: Installation of the Laser II (improved precision & operation) in Oct.
  - Cs: Consolidation of water leaks - re-gluing and reinforcing with epoxy from outside - liquid drained to storage system after test, 2 successful scans were performed in summer

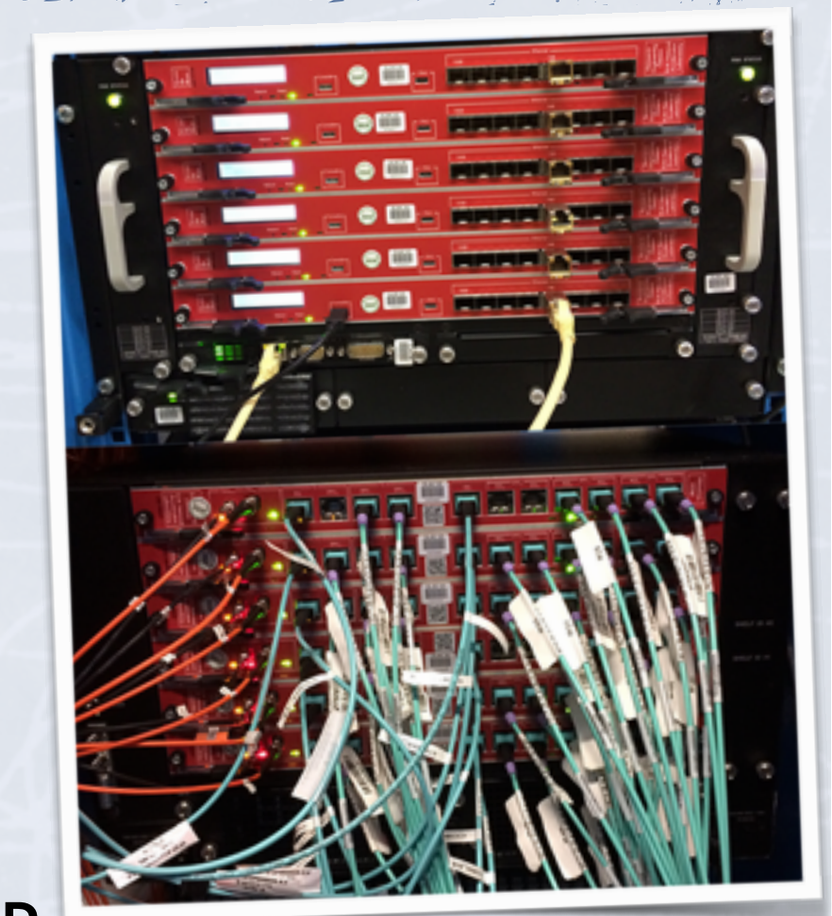


- Minimum Bias Trigger Scintillators lost half of response in Run 1 - replaced with coarser granularity for outer disks:
  - Better light uniformity, yield ~same for outer & better for inner disks, constant fraction discriminators, electrical signal reflections fixed

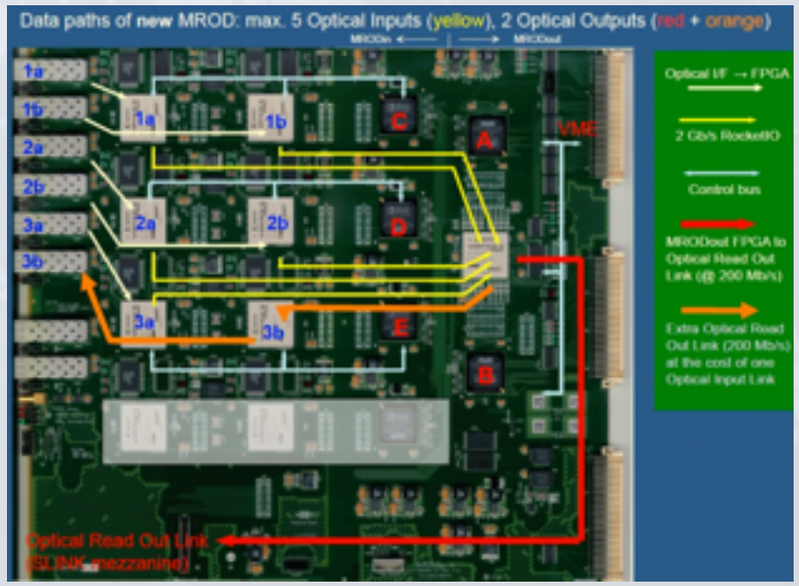


Muon Spectrometer CSC + MDT

- Four CSC chambers successful delicate repairs
  - New ROD complex electronic development finished, two test systems assembled
  - Firmware development ongoing: everything but data handling in M5 week, full readout chain expected in M6, production readiness review early October

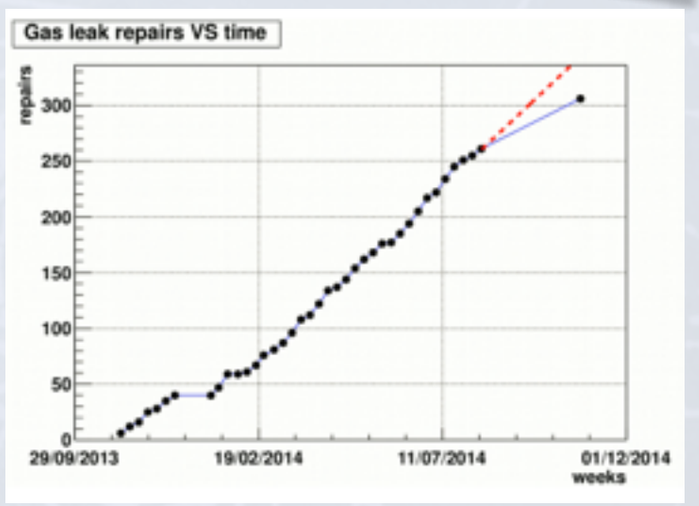


- MDT-EE chambers finished installation in 2013
  - Completing spectrometer as described in TDR
  - Doubling ROD-ROS bandwidth by firmware re-programming, 1of 6 inputs -> output
  - New firmware to prevent 12.5 ns jumps
  - Shorter readout window to reduce saturation
  - Various chamber and gas leak repairs, fixed HV/LV problems, pierced tubes, etc.

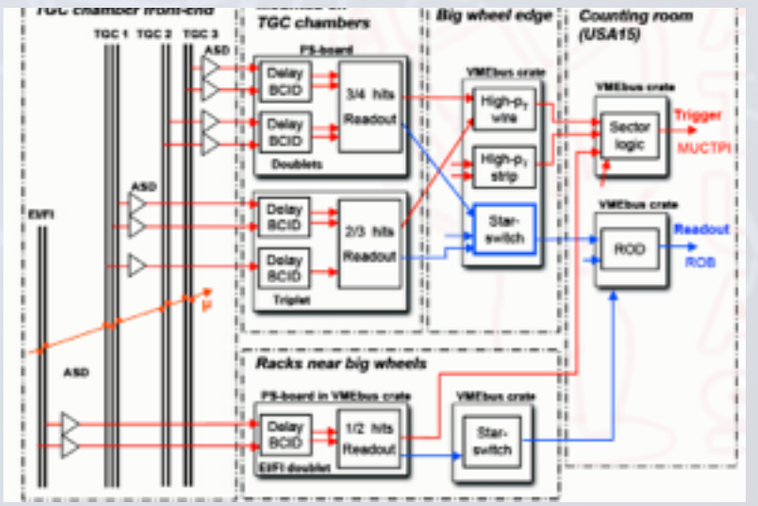


Muon Spectrometer RPC + TGC

- Steady progress in repair of cracked or broken RPC gas inlets - located 306 leaking chambers and developed procedure in 2013
  - Margin for extra repairs beyond known
  - Readout/trigger electronics for second RPC layer in feet sectors to cover holes due to feet
  - Flowmeter & gas impedance changes to come
  - Noise reduction by improved grounding

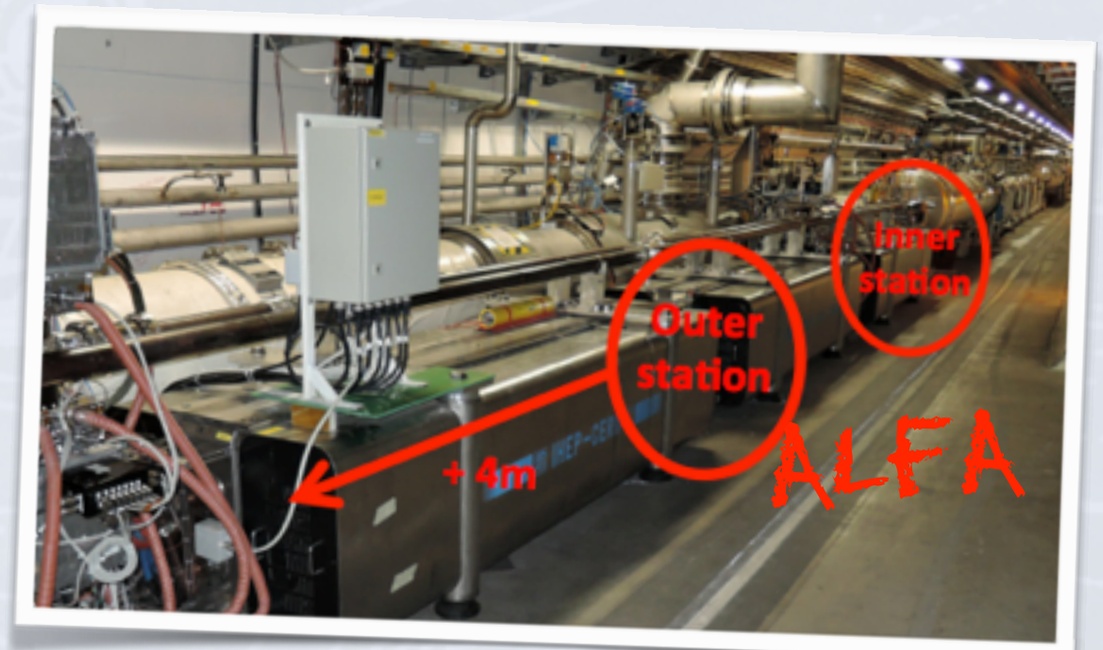


- TGC replaced few of the 29 malfunctioning (not holding HV) chambers so far - bulk work starts after End-Cap Toroid closing (September)
  - Burst stopper (# triggers in short interval)
  - Hot RoI masks (<high p_T;~ same efficiency)
  - EI/FI coincidence (timing works standalone)
  - Tile-Muon coincidence - prototype tests

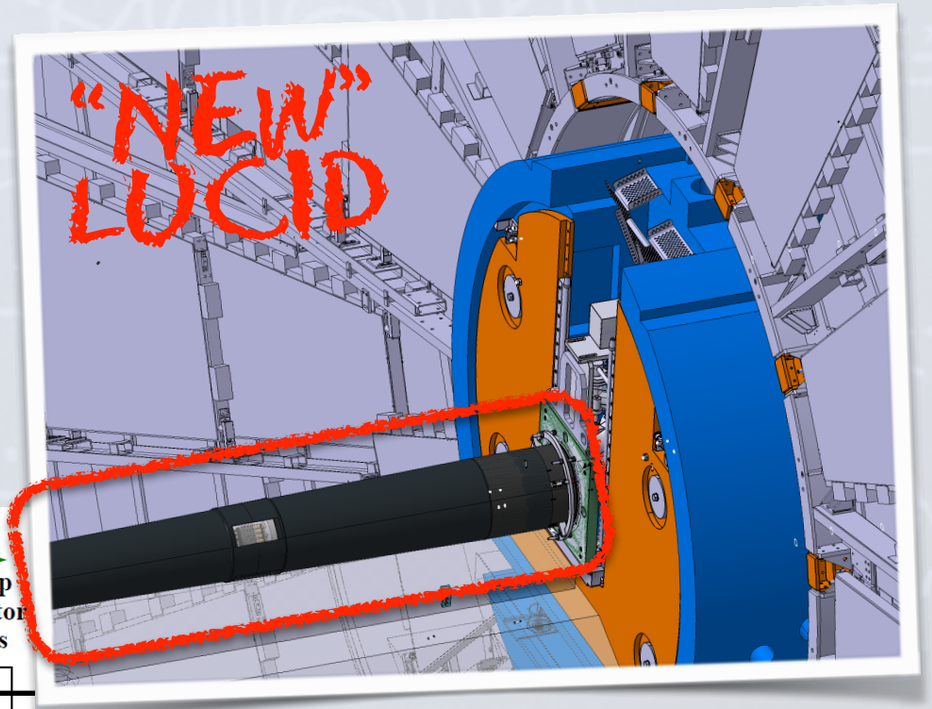


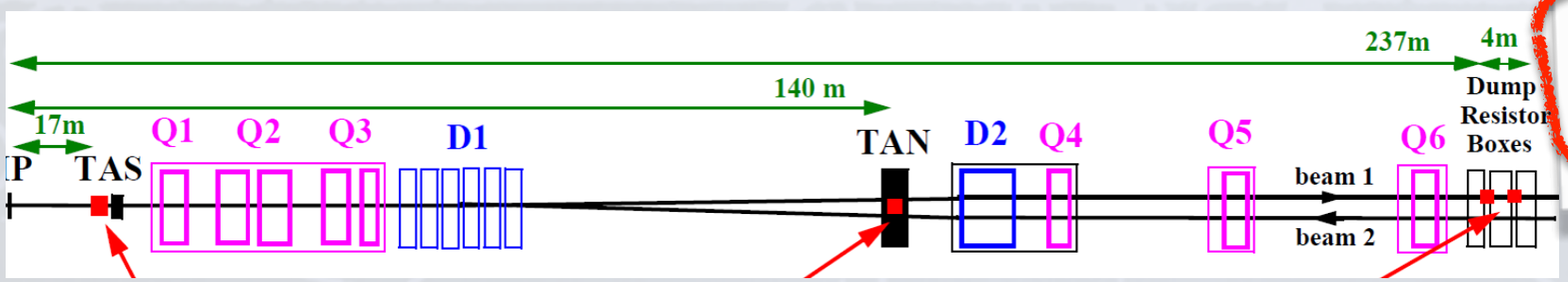
Forward Detectors ALFA ZDC & LUCID

- ALFA measures to reduce heating: Roman Pot fillers, advanced air cooling, more ferrets
- Moved outer stations by 4m to improve angular resolution by factor 2



- "New" LUCID to address saturation and PMT ageing: 16 PMTs with quartz window, 4 PMTs with quartz fibres - new electronics (25ns) count hits and **integrated pulses** + new tile laser & LED calibration system & ^{207}Bi source for 40-50 kHz calibration peak





Detector Control System DCS

Detector Control System

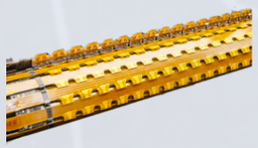
Hardware replacements:
Front-End interfaces, Servers

LS1

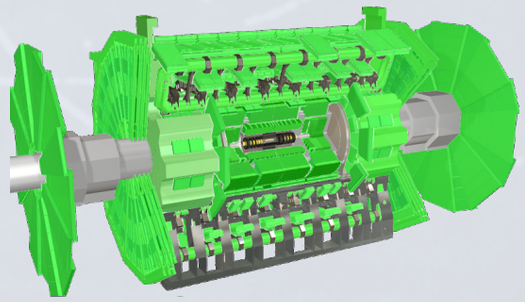
Software upgrades:
Linux migration,
SCADA maintenance, Virtualization,
New controls middleware: OPC UA

Consolidation:
Eliminating weaknesses, improving maintainability
➲ Eliminated many custom components by unification & homogenization
➲ Stable beams transition time expected to reduce significantly

Planning and operations:
DCS must remain operational during LS1!
➲ Downtime of global system minimized so far to 2 weeks



New Integrations:
Pixel Inner B-Layer,
Upgrade prototypes



AUTOMATIC BEAM TRANSITIONS

Trigger & Data Acquisition DAQ

- Almost all application level software rewritten: run control, expert system, DQ monitoring, data flow, histogram/information gathering, … to improve stability & make detector recovery easier while running
- New web based services and enhanced tools
- Refurbishments: Dataflow (ROS), Network, Processing
  - Complete refurbishment of Data and Control Network(> throughput & >enhanced redundancy)
  - HLT racks, monitoring & online machines (end 2015)
  - SFO replacements performance Run-2 needs (~1kHz)
- ROS components delivered, 110 Servers, ~200 "RobinNP", patch panel, patch cables, etc… assembly and burn-in on schedule - Installation of fibers ongoing

Trigger & Data Acquisition

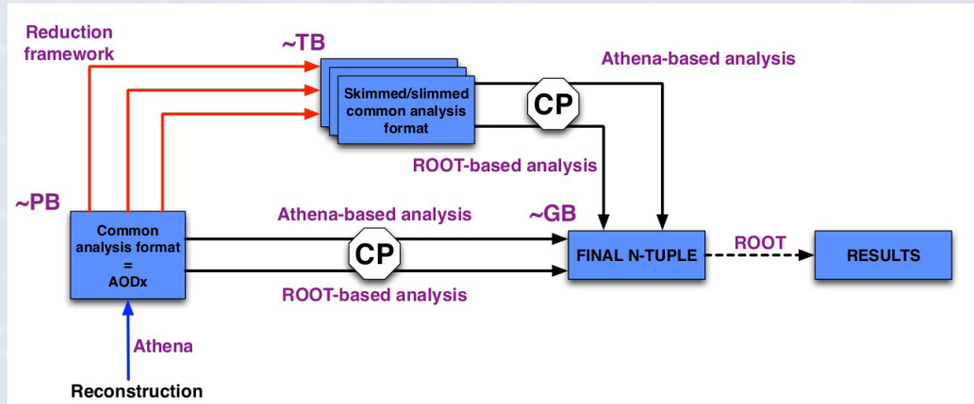
TRIGGER

- Central Trigger Processor with new firmware and boards:
  - CTPIN firmware: doubles to 320 usable triggers
  - CTPCORE board: doubles to 512 trigger items, 16 bunch groups, L1Topo integration & partioning, better monitoring
  - CTPOUT boards: better monitoring, 20->25 TTC outputs

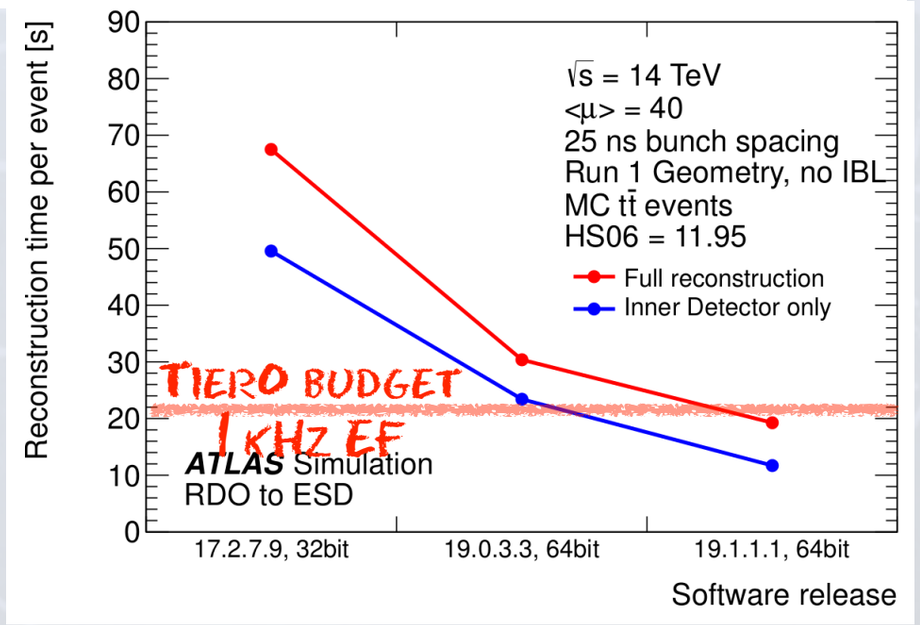
- L1Calo improvements:
  - ASICs->FPGAs (nMCMs)
    - Bunch-train dependent pedestal shift pileup correction
    - Independent LUTs : non linear calibration for jets (JEP) & adjust isolation cuts in CP
  - Rework digital processors (CP/JEP firmware & CMX)
    - Topological processing & more flexible isolation
    - Trigger objects (E & RoI info at backplane) & 160 MHz backplane
  - Kinematic & correlative algorithms to enhance trigger sensitivity of topological processor (L1Topo)

Computing, Software & Data Preparation LS1

- Factor ~3 in reconstruction speed : 2 in track seeding - 4 in tracking
  - Algorithmic improvements; cleanups; Eigen matrix library; Intel math library; switch to 64 bit; SL5SL6, …
- DC-14 releases are done (8 TeV production nearly done, 13 TeV release 19.1.1.5 last week)
- Many analysis software tutorials at CERN and worldwide (US, ATLAS-D, …) to teach people how to migrate their analysis code



- Next big step in DC-14:
  - Many deviations are implemented for the central derived data production
  - We are working on the integration with the new production system
  - Distributed computing: Rucio and ProdSys2 deployment & commissioning



Milestones Runs nM5

	M1 ✓	M2 ✓	M3 ✓	M4 ✓	M5 ✓	M6
	Feb 17–Feb 23	Mar 31-Apr 4	May19-May 23	Jul 7-Jul 11	Sep 8-Sep 12	Oct 13-Oct 17
PIX				X[1], X[2]	X[2]	
IBL				X[1]	X[2]	
SCT				X	X[2]	
TRT		X				
LAR				X		
TIL				X		
MBTS				X		
L1Calo	X[1]			X[2]	X[3]	X[4]
CSC	X[1]				X[2]	X[2]
MDT	X					
RPC		X[1]	X[1]			
TGC	X[1]					X[2]
BCM		X				
ALFA						X
LUCID						X
Lumi					X	

M7- Cosmic Run Nov 24th - Dec 7th

All detectors included. B field ON (likely second week)

[1] TDAQ integration, using events simulated at ROD
[2] test with frontend, ID endplate in, detector cold nominal

As above

As above

All information in P1 Twiki:
https://atlasop.cern.ch/twiki/bin/view/Main/Run2Preparation

M4: TILE/MBTS(a)+SCT successfully included (M4': LAr, PIX, IBL)

[1] Readout only. [2] Full legacy triggering with TIL + LAR
[3] CMX triggering both CP/JEP systems, L1Topo Readout Commissioned. [4] L1Topo Commissioned fully in trigger system. Possibly TGC trigger

[1] Old RODs, side A only [2] New ROD Commissioning

[1] TDAQ integration. HV for ~ 1 sector

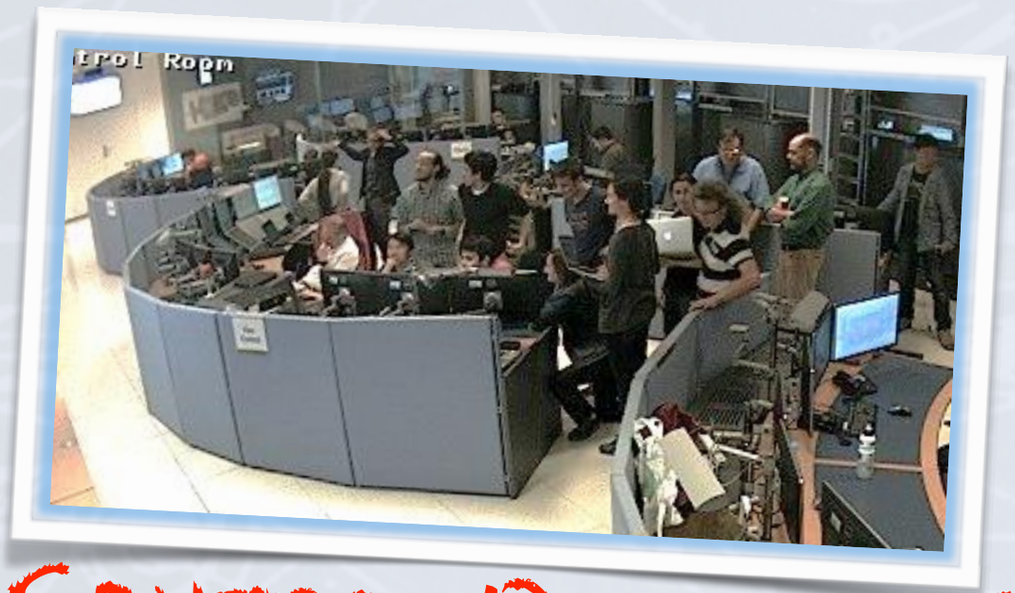
[1] no HV/gas until detector closed,[2] chamber replacements

M5: TDAQ 5.04.00 update, CONDDBR2

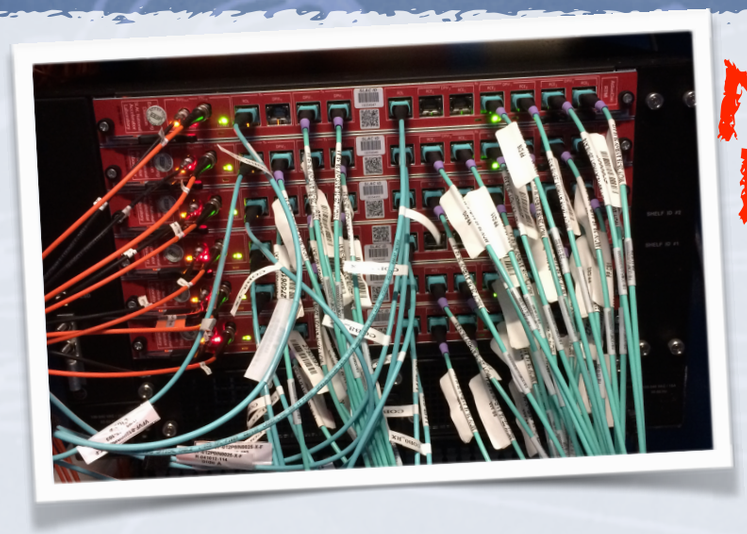
- **Possibly larger Muon trigger, 1st tests CSC ROD**
- **LAr+TIL (MBTS A+C) + Calo triggers, all ID cold**
- **ALFA in M6**

Milestones Runs

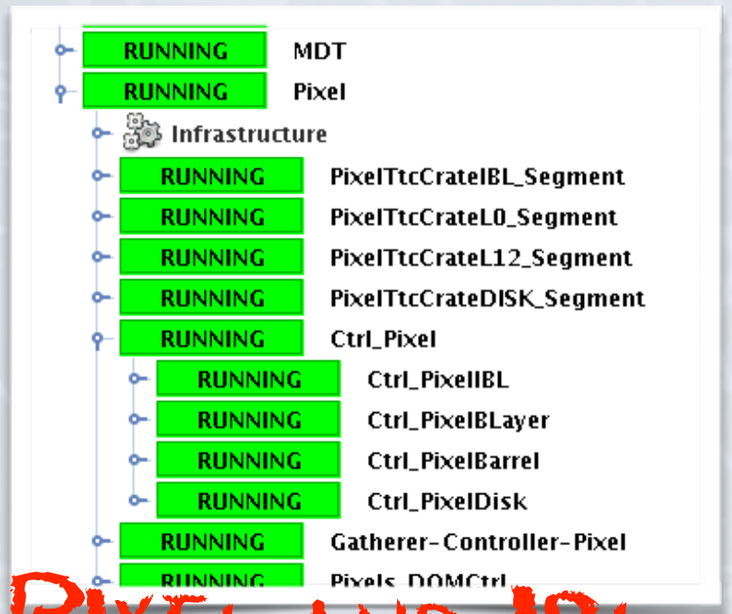
M5 Highlights



Control Room 24/5



New CSC Readout



Pixel and IBL included in ATLAS Data Acquisition

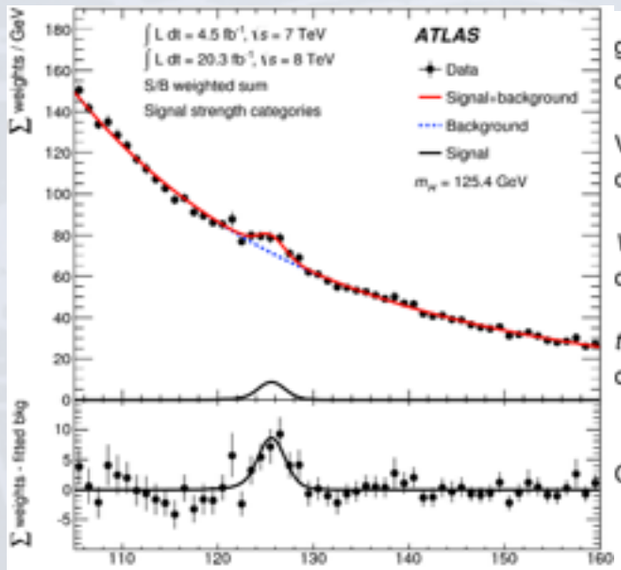
- Successful integration into ATLAS partition of:
  - CSC + nROD successfully in
  - IBL run in ATLAS partition (1ROD 1 stave)
- Combined Runs (& 100kHz tests)
  - PIX, SCT, TRT, L1Calo, LAr, TILE (MBTS), nCSC, RPC (+ trigger sectors 3-7), MDT, BCM, LUMI
  - Trigger: TRT, Muons, MBTS, Em, Jet, Tau…

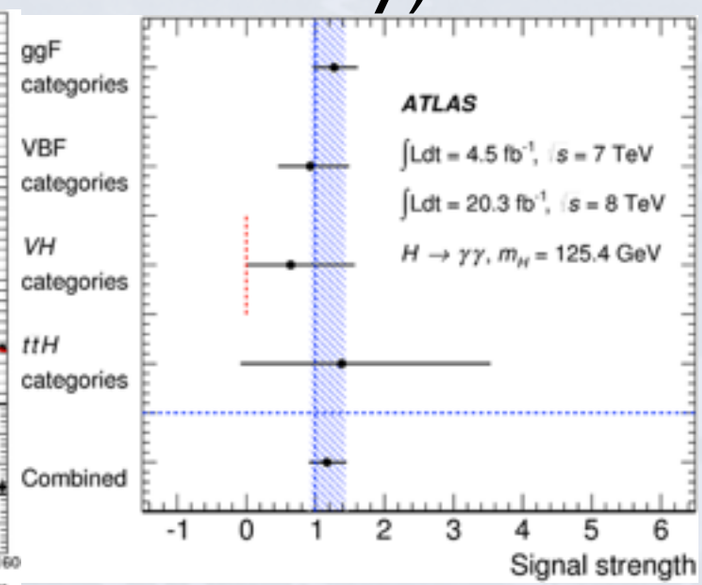
Summary

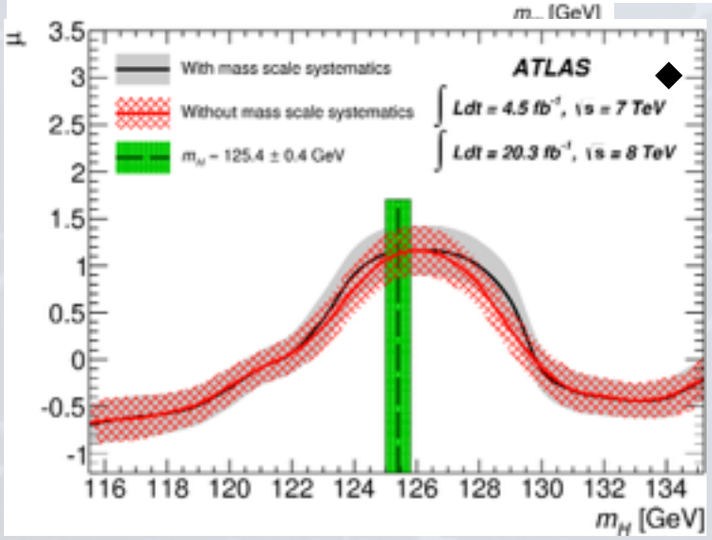
- Big flow of final run-1 papers (52 in 3 months) across all areas: measurements, searches, performance
  - including observation of a new B_c state
  - final Higgs results now being submitted, wide range of measurements include fiducial and differential cross-sections
- ATLAS is closing for physics, and recommissioning of all parts is well underway
  - Pixel live fraction >98%
  - New IBL and DBM detectors, read-out working
  - Many other improvements and consolidations in place
  - Trigger and offline work also very well advanced
  - Combined run in "M5" week very successful
- ATLAS will be ready & eager for first 13 TeV collisions!

Higgs: arXiv:1408.7084 + arXiv:1408.5191
$H \to \gamma\gamma$ + $H \to 4\ell$

- 4.5 fb^{-1} at 7 TeV & 20.3 fb^{-1} of 8 TeV
- Improved calibrations for photons, electrons and muons & analysis techniques (5 production mechanisms simultaneously)

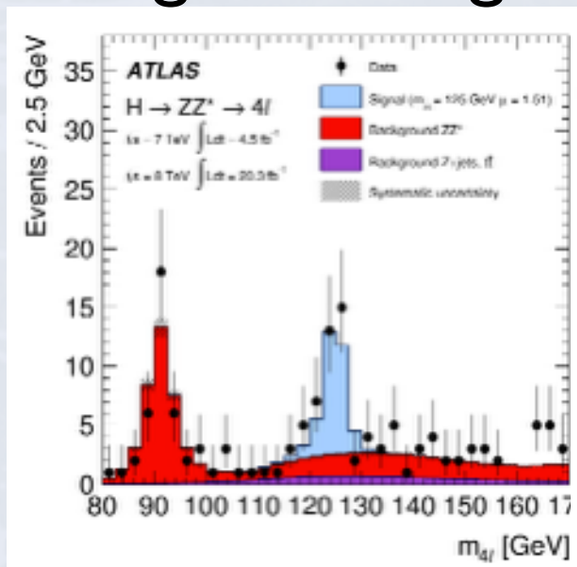


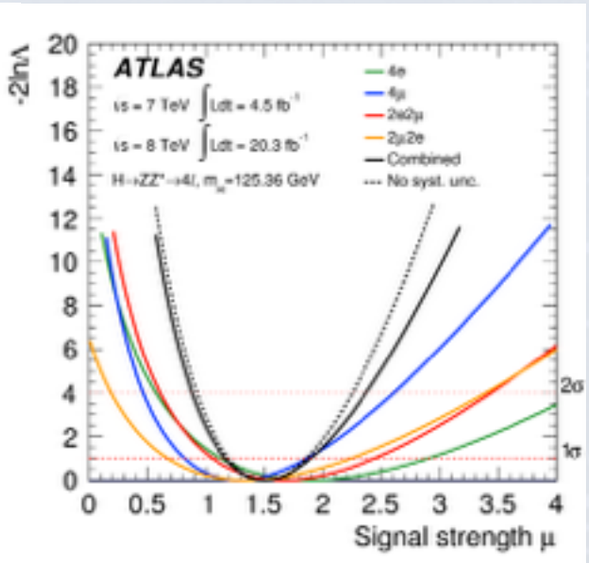


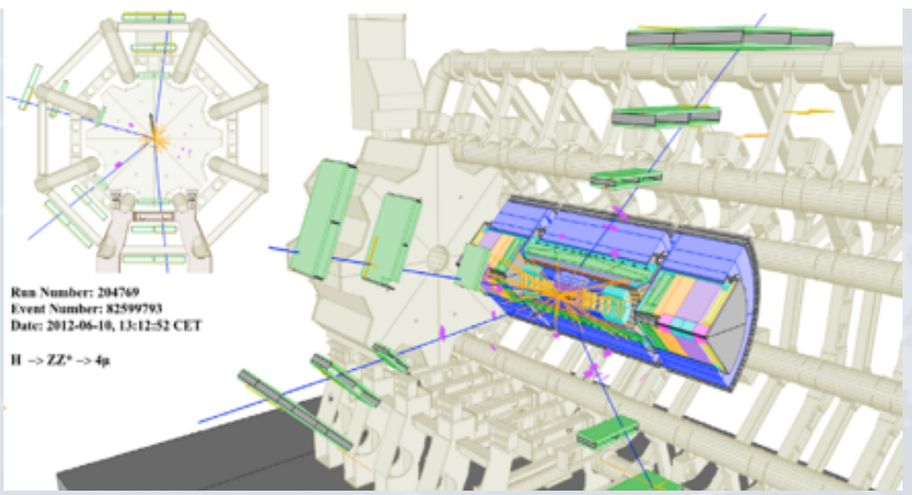


Combined: $\mu = 1.17 \pm 0.27$ for $m_H = 125.4$ GeV; SM compatibility 0.7σ

- Run I finale: $H \to ZZ^* \to \ell^+\ell^-\ell'^+\ell'^-$
- 8.1σ at $m_H = 125.36$ GeV
- Signal strength: $1.44^{+0.40}_{-0.33}$



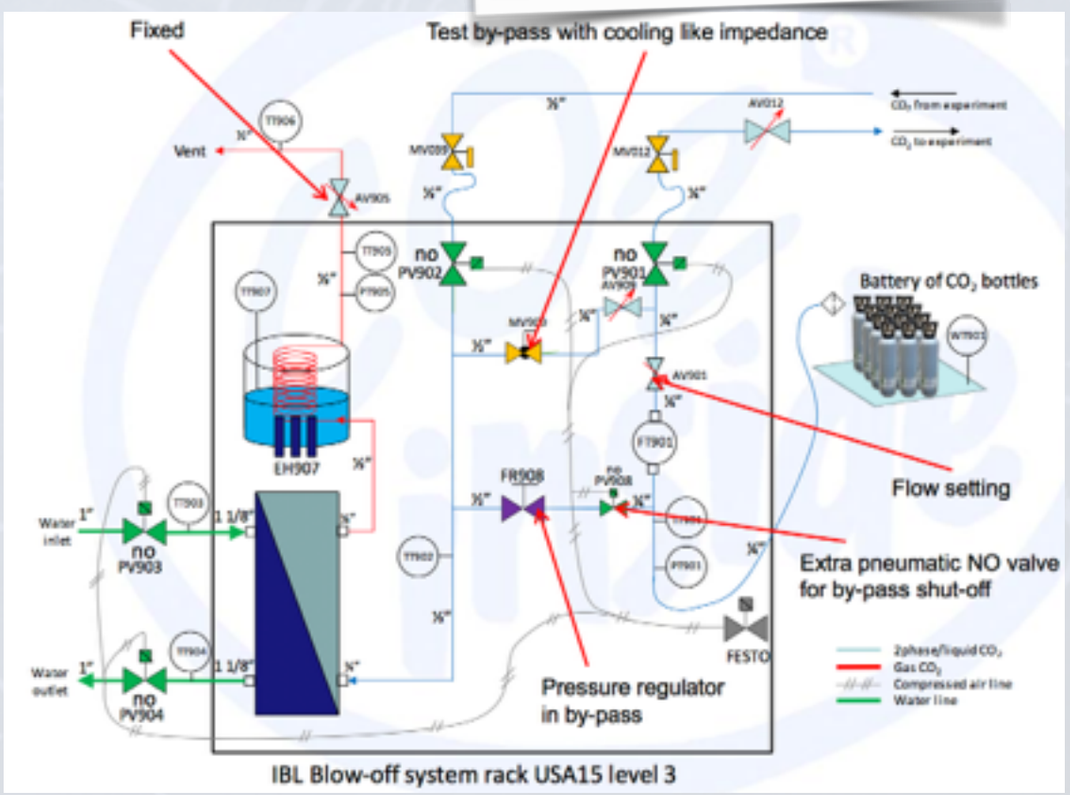




e/γ calibration: arXiv:1407.5063
muon performance: arXiv:1407.3935
Inner Detector alignment: ATLAS-CONF-2014-047

Insertable B-Layer Cooling

- Cooling operated very stable at -35°C coolant temperature setpoint with about -25°C module temperature at full power consumption
- Tested manual and automatic (simulated cooling plant failure) switching between cooling plants - excellent results & only ~1°C short temperature increase observed
- Emergency blow system (CO_2 bottles) for beam pipe bakeout tested for 4 hours, commissioned with 3 kW load and a 2h total failure of water & electricity
- Recovery procedure tested - would allows continuation of bakeout even with both cooling plant failure



IBL Blow-off system rack USA15 level 3

IBL Wirebond Corrosion

MID-WAY DURING PRODUCTION

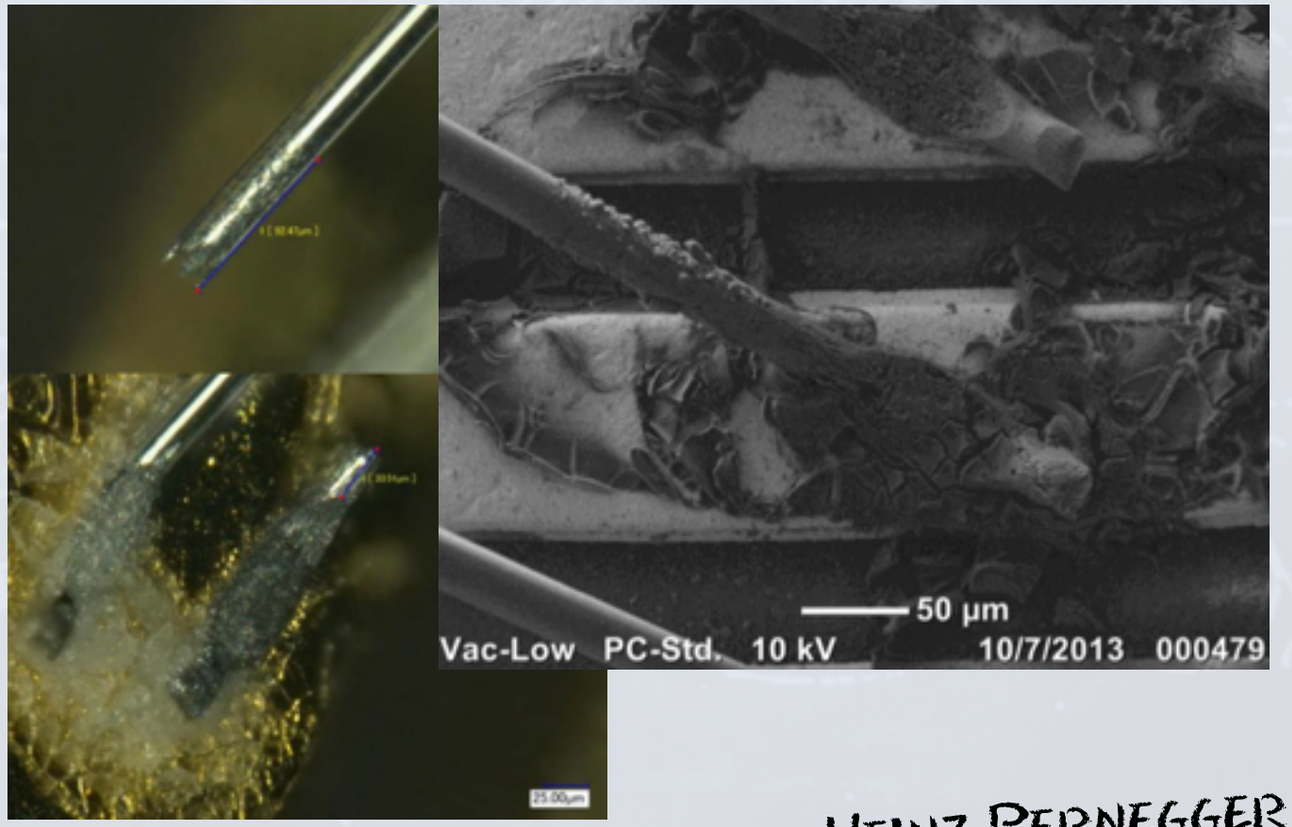
- Mid-way during production discovered corrosion of wire bonds
  - 2 staves exposed to accidental severe condensation during a test
  - Observed corroded wire bonds, detailed inspection of all staves
  - Reworked of all staves which were produced so-far (replace corroded wires and clean affected areas)

The corrosion can be reproduced even on bare cleaned flex with the drop of DI water
Flex for different vendors tested – many show similar issues
EDS/XPS/FBI analysis showed:

- Halogen (Cl or F) associated with the corrosion product (residue)
- No surface halogen contamination measured on cleaned samples

One over two techniques showed significant Fluorine into the gold layer (7nm)
Where the Cl and F could come from?
Surface migration, cover layer, gold metallisation?

- Must avoid condensation at all cost!



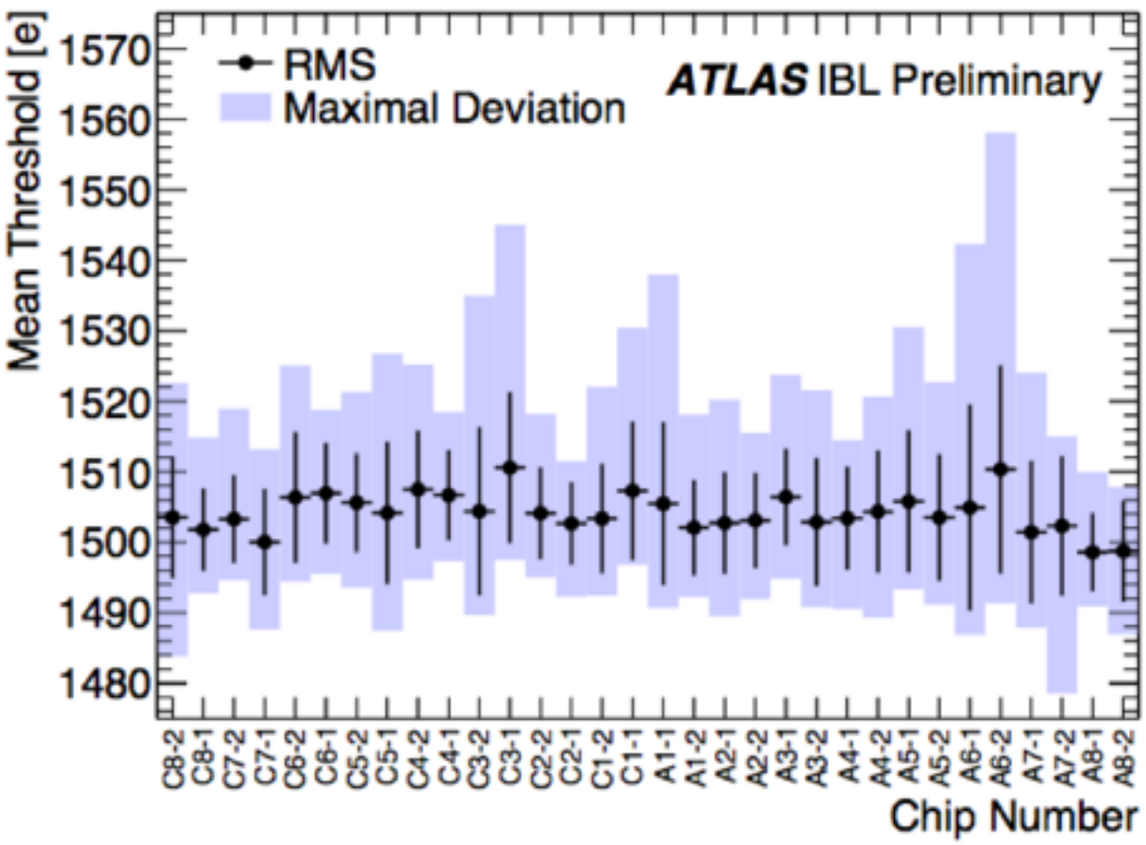
HEINZ PERNEGGER

IBL Stave Performance

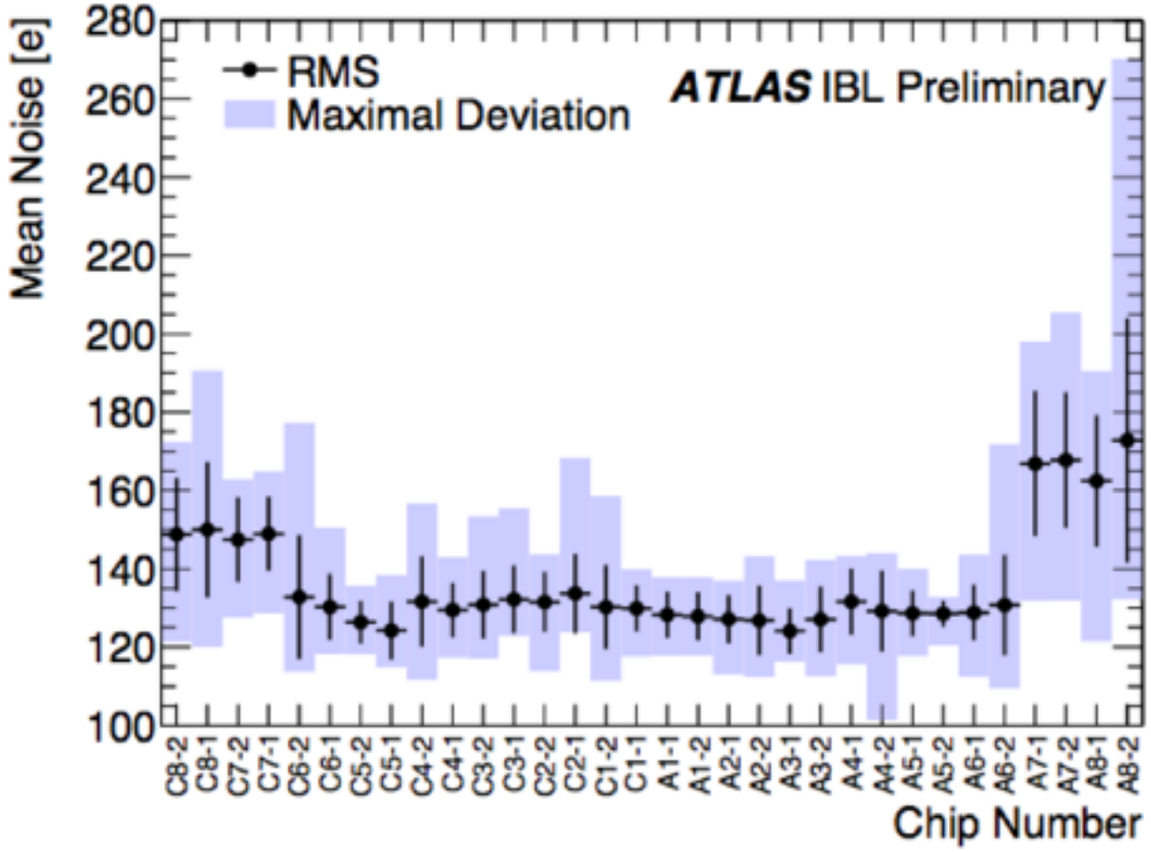
STAVE QA

- Staves operate well at 1500 e^- threshold
  - Important for operation after radiation damage!
- Noise is ~130 e^- for planar and ~150 / 170 e^- for 3D CNM/FBK modules (systematic higher setup noise on A-side)

Mean Threshold versus chip position



Mean Noise versus chip position

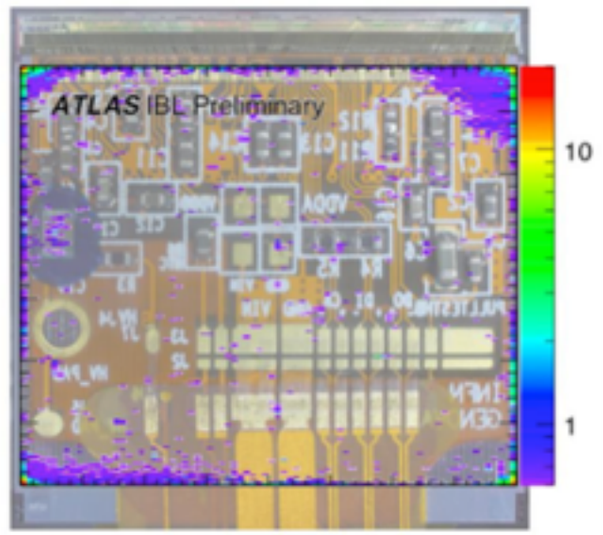


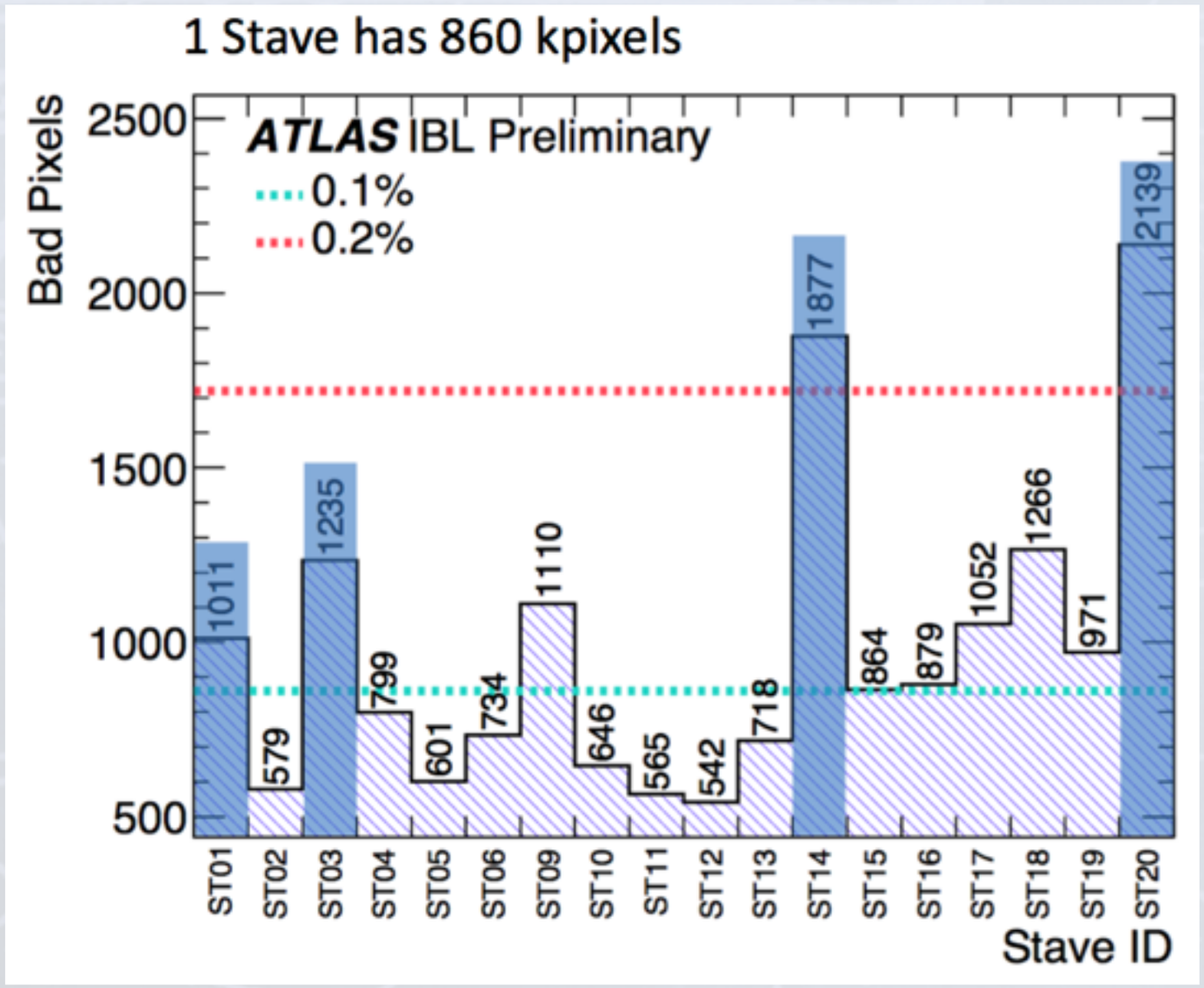
HEINZ PERNEGGER

IBL Stave Quality

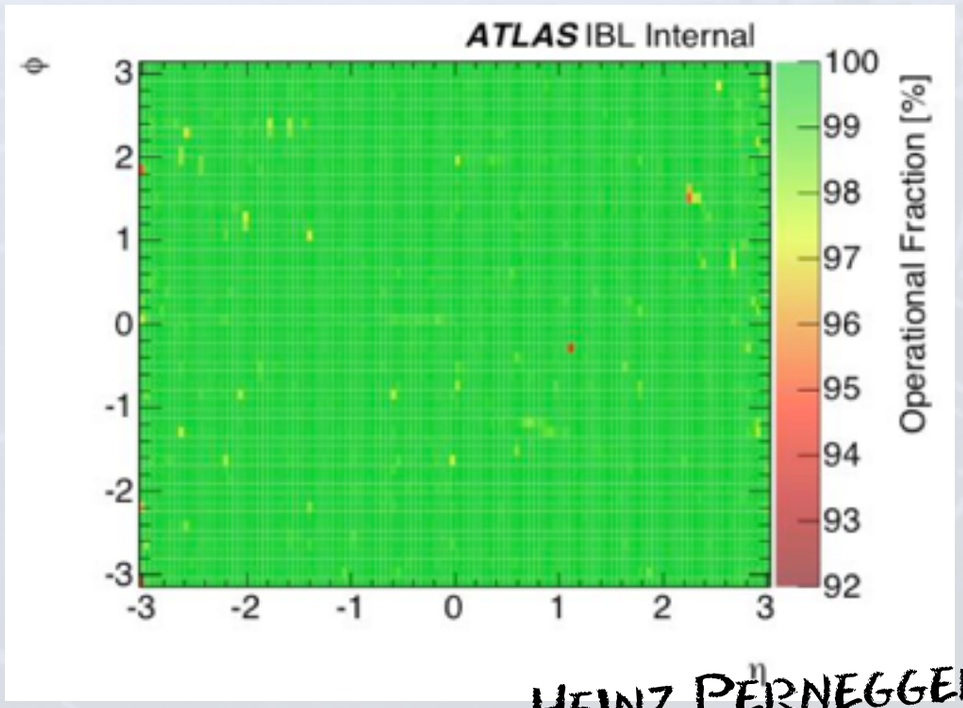
STAVE QA

- Goal: less than 1% dead pixels
- Achieved: detector has ~0.1 % dead pixels!
  - Disconnected pixels usually on sensor edges

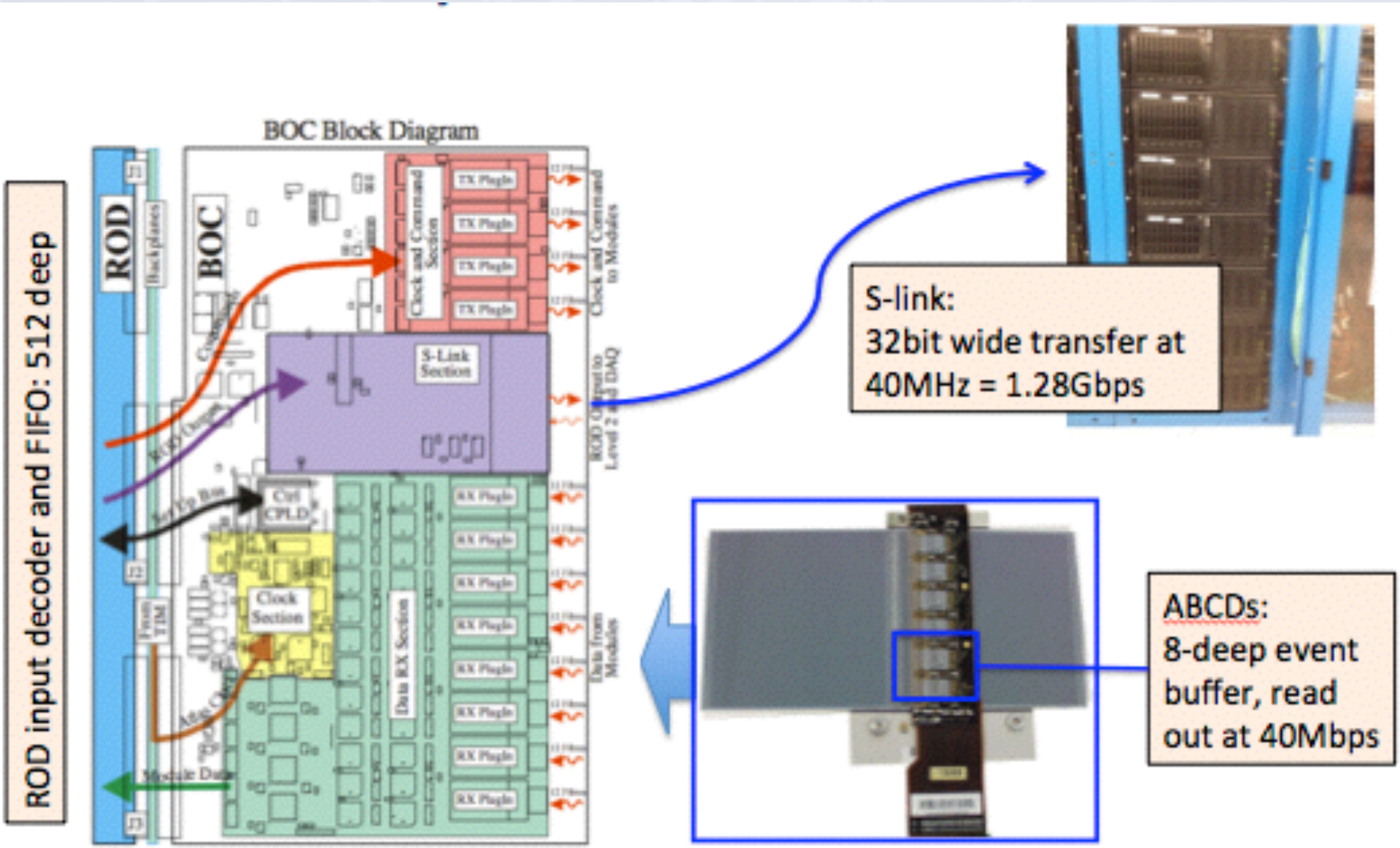




Arranged modules & staves in final IBL for uniform low η-ϕ distribution of dead pixels for η<2



HEINZ PERNEGGER



DAVE ROBINSON

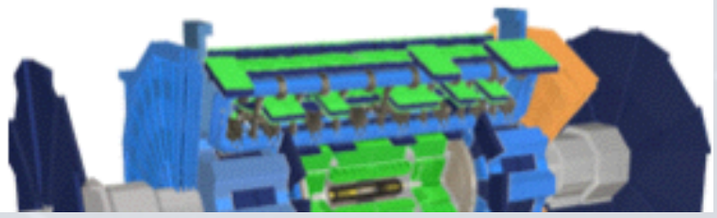
Detector Control System

LS1 work progress

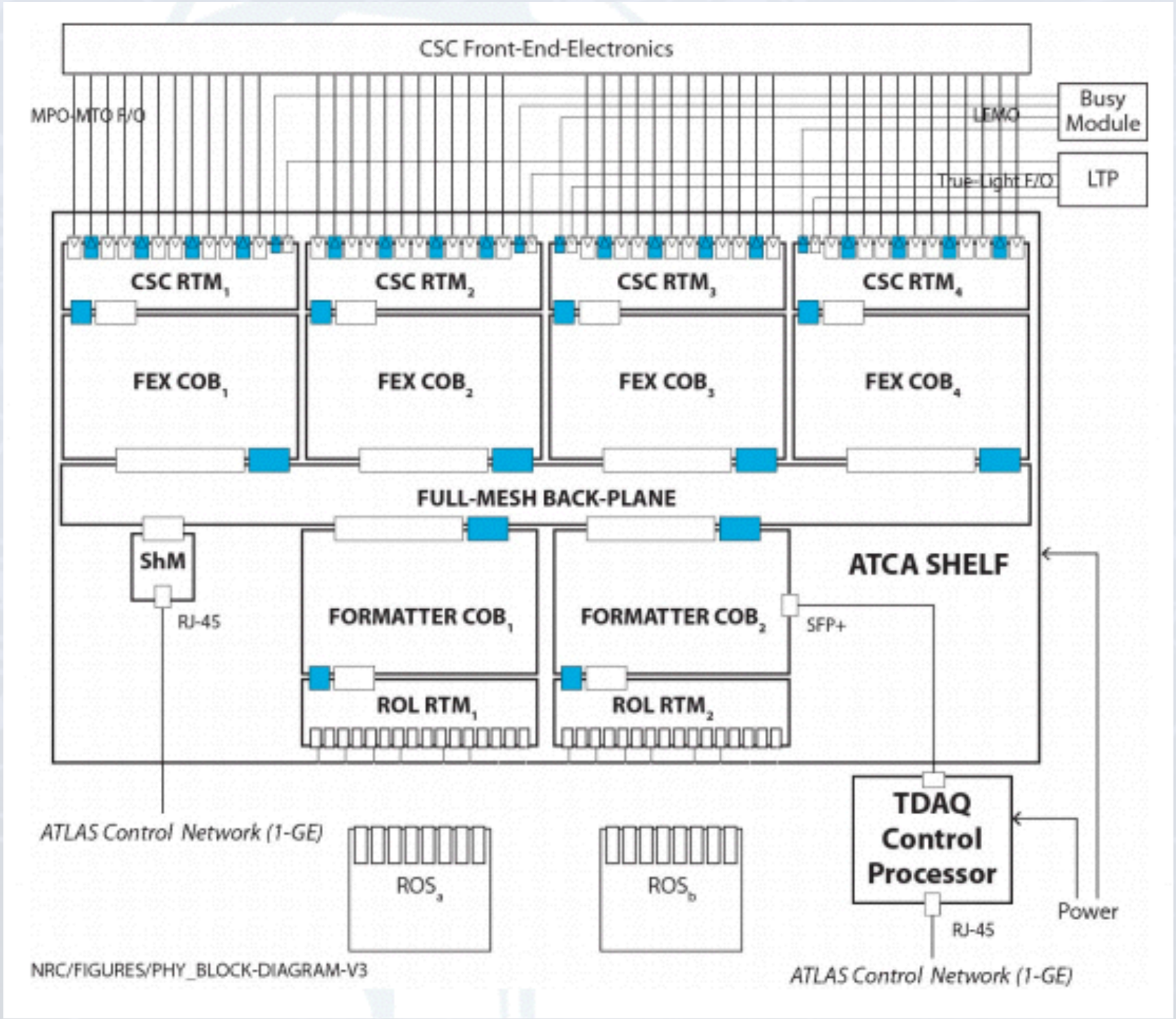
- Replacement of all DCS back-end servers (70% done), counting room rack revisions
  - Replacement of CANbus interfaces (PCI➲USB), 90% done
  - Replacement of few custom PCI interfaces
- Operating system upgrades: migration to Linux (SLC6)
  - All DCS machines under Linux, legacy OPC servers on virtual machines w Windows
  - Upgrade of standard hardware interface drivers for all components, mostly done in P1 – all on test systems

- Major SCADA software upgrade ➲ Siemens WinCC OA 3.11 (=PVSS from 3.8), only for PIX and SCT still to be done
- Back-end software reviews and consolidation, adaption to infrastructure changes/upgrades (new racks, IBL…)
- ➲ Downtime of DCS was kept to minimum so far (2 weeks), full DCS restarts due to UPS interventions exercised w/o problems

- LHC interaction: first dry run performed, Muon detector STANDBY/READY transition times expected to be improved



Muon Spectrometer CSC NEW RODs



B-Tagging Performance