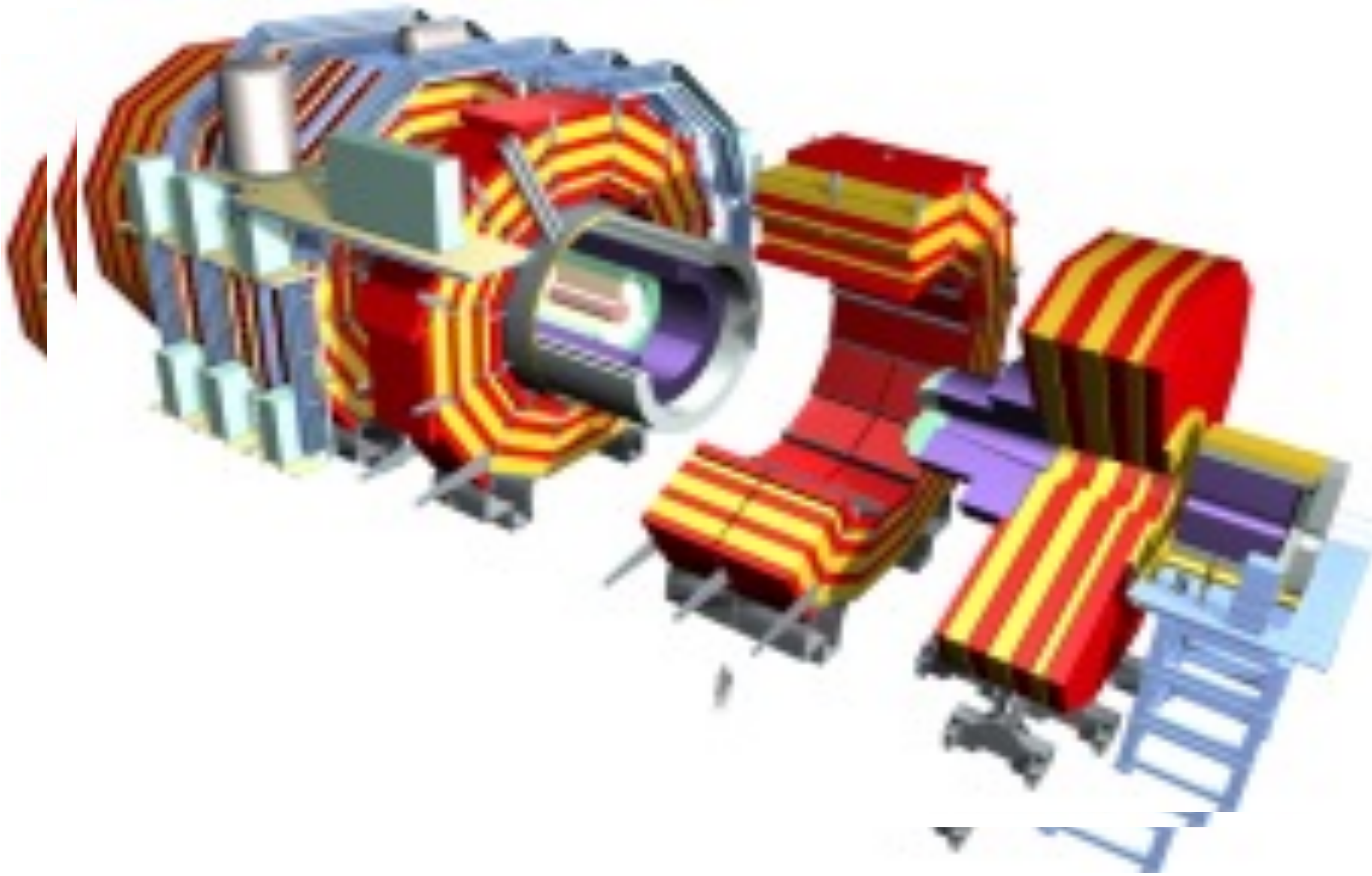
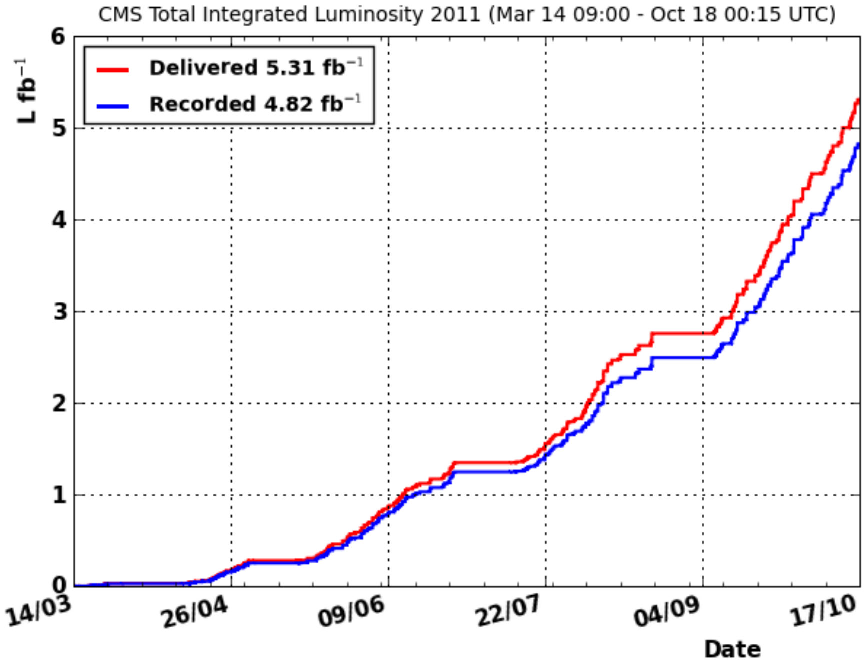
Status Report of CMS

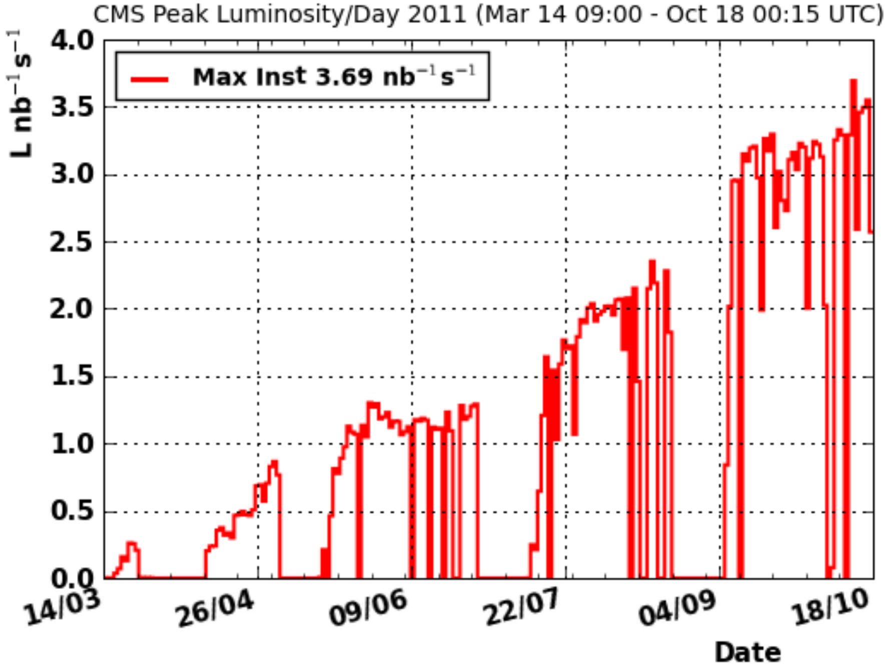


Guido Tonelli
CERN/INFN&University of Pisa

LHC/CMS operations pp@√s=7TeV 2011

5.31fb^{-1} delivered by LHC and **4.82fb^{-1}** recorded by CMS. Overall data taking efficiency **91%. (>100pb^{-1} lost on August 2-3 due to a single cooling incident).**



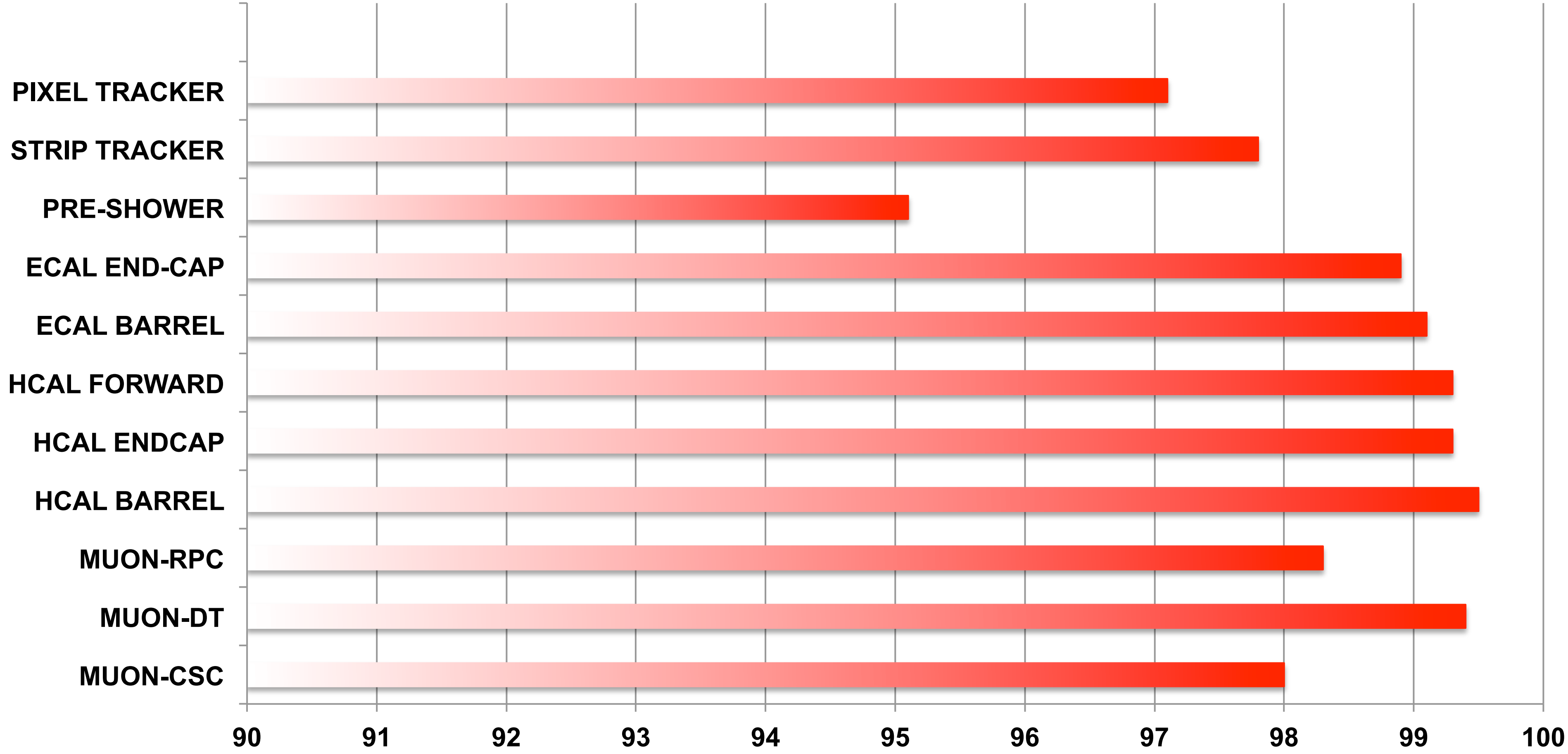


>400pb^{-1}/week delivered regularly . Max. inst. luminosity $\mathcal{L}$ = 3.69x10^{33}cm^{-2}s^{-1}

Certification for physics: 85-90% for all systems perfect; 90-95% for muon based analyses. Analyses reported here: most at 1.1 fb^{-1} (a few at 1.7fb^{-1})

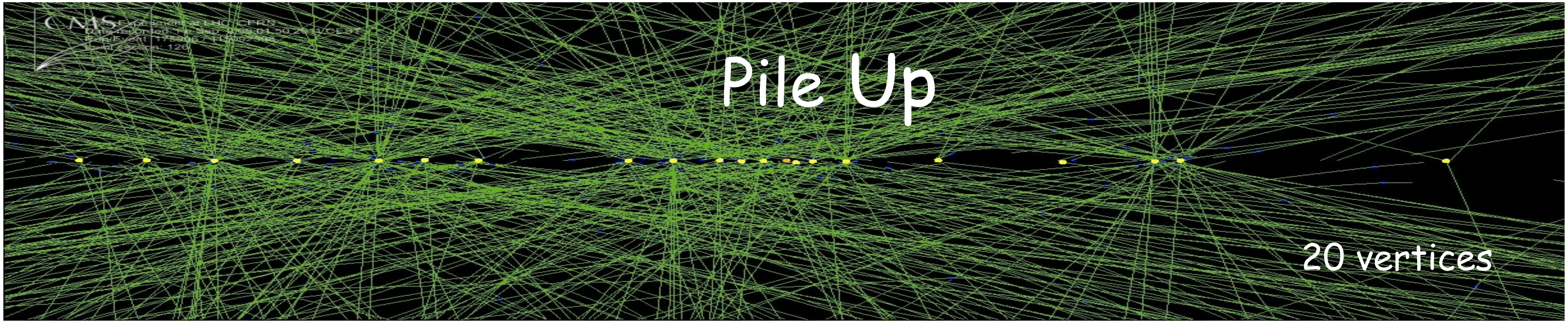
Luminosity uncertainty is 4.5%.

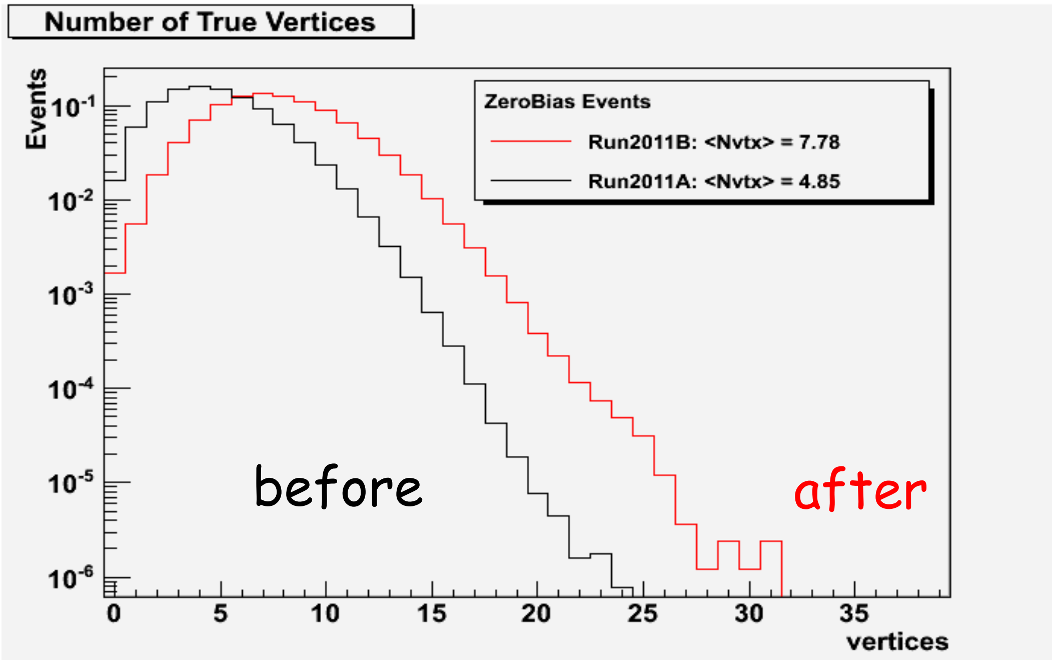
Sub-detectors operational status



	MUON-CSC	MUON-DT	MUON-RPC	HCAL BARREL	HCAL ENDCAP	HCAL FORWARD	ECAL BARREL	ECAL END-CAP	PRE-SHOWER	STRIP TRACKER	PIXEL TRACKER	
Series1	98	99.4	98.3	99.5	99.3	99.3	99.1	98.9	95.1	97.8	97.1	

Pile Up





Averaged over fills.
$N_{rec} \sim 0.7 \times N_{pu}$

- The number of reconstructed vertices after the August Technical Stop increased by factor 1.5 (β^*=1.5m → 1m)
  - Fills start with ~15 pile-up interactions
  - Vertex reconstruction still quite linear with luminosity
- Total inelastic cross section also has been measured from pile-up
  - σ_{inel}(pp)= 68.0 ± 2.0 (Syst) ± 2.4 (Lum) ± 4 (Extrap.) mb.

DAQ and L1 Trigger

Typical operating conditions: ~500 kB event size, ~10k HLT CPU-cores

- **At start of fill: Lumi ~3.3x10^33,**
- **Level-1 rate ~80 kHz, ~90% HLT CPU usage, 2-3% dead time, 400 Hz recording**

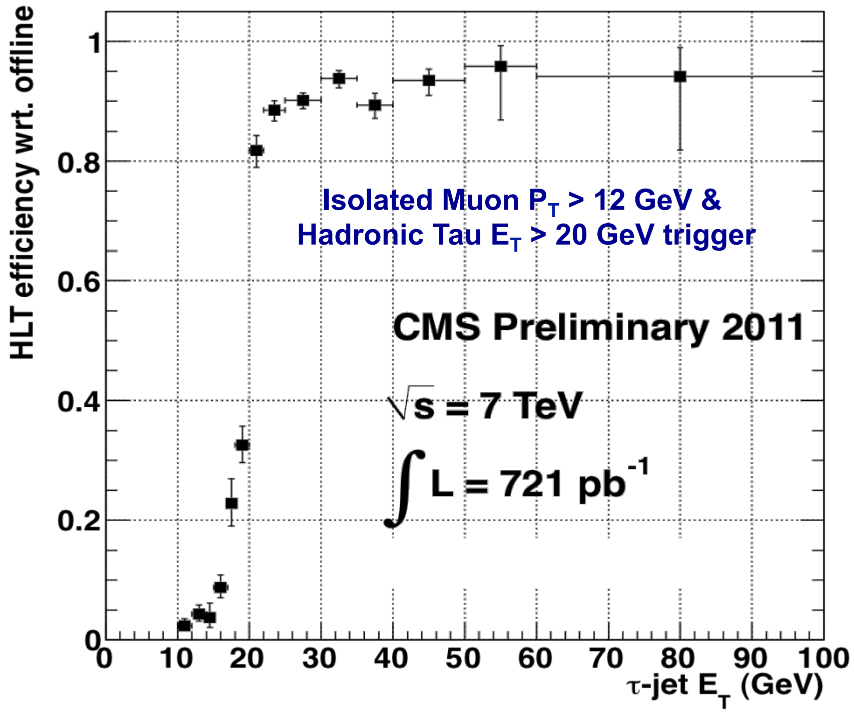
Higher Level Triggers

- Trigger menus kept up with large increase in luminosity from 5E32 → 5E33
  - New techniques deployed to reduce rate increases with pileup for jet triggers
- Overall budget kept to <400 Hz on average at target luminosity for each menu
  - Typically done by raising thresholds & tightening (quality) criteria
  - Use of specialized cross-triggers
  - CPU controlled by closely watching slow paths, prescaling paths, optimizing algorithms
    - CPU use increases with pile-up non-linearly with luminosity
- A number of improvements have been made as well
  - Use of Particle Flow & Iterative tracking
  - Optimization of tracking & particle flow CPU performance
  - Improved filters on ECAL & HCAL noise
  -
- New triggers introduced dedicated to high-priority analyses

HLT Performance

- **Deployed menus to cope with luminosity >5E33.**
- Increased complexity of trigger algorithms
  - Over 200 multi-object triggers including tau and b-jet triggers, in addition to single object triggers for electrons, photons, muons, jets, total energy, & missing transverse energy (400 total paths)

TAU + MUON



The HLT is performing very well in the high luminosity environment.

Computing

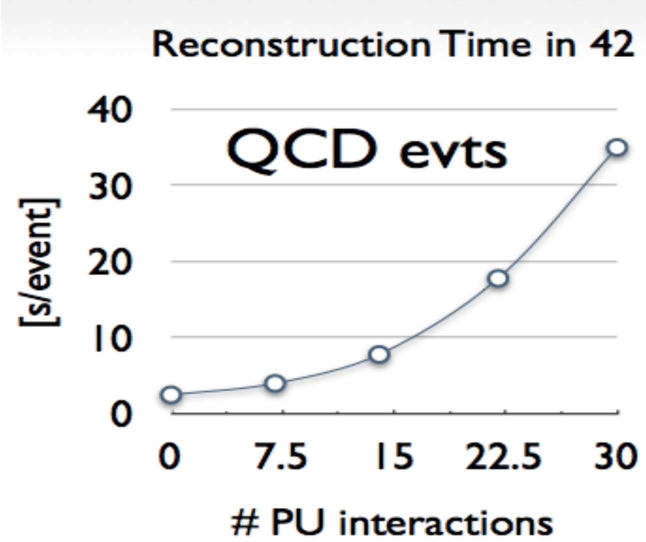
Increasing pile-up makes the computing problem more challenging

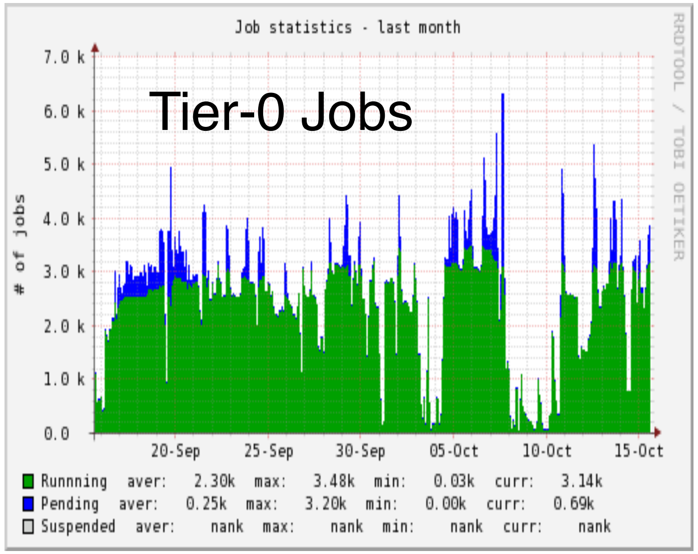
- CMS decided to stay with a slower version of the code to maintain consistency for analysis

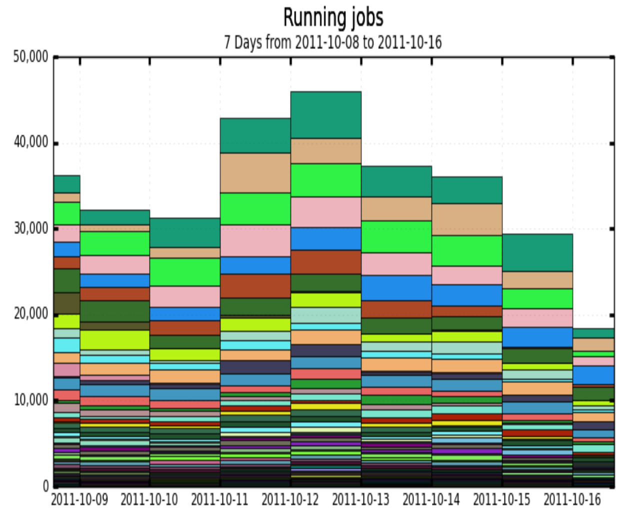
- Large scale data and simulation reprocessing campaigns throughout the fall

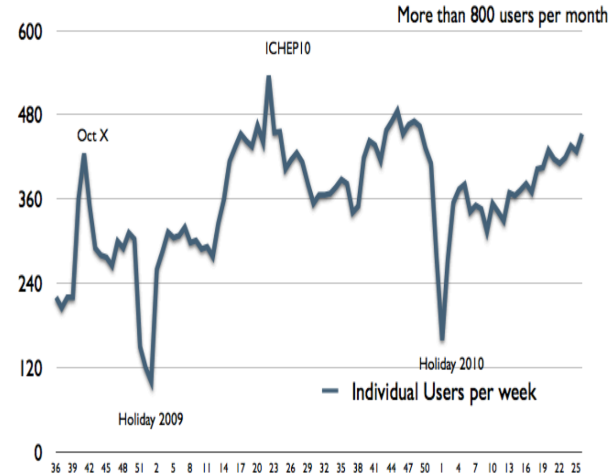
- Running jobs exceeding 40k at T2s

- Individual analysis users by week continue to increase.





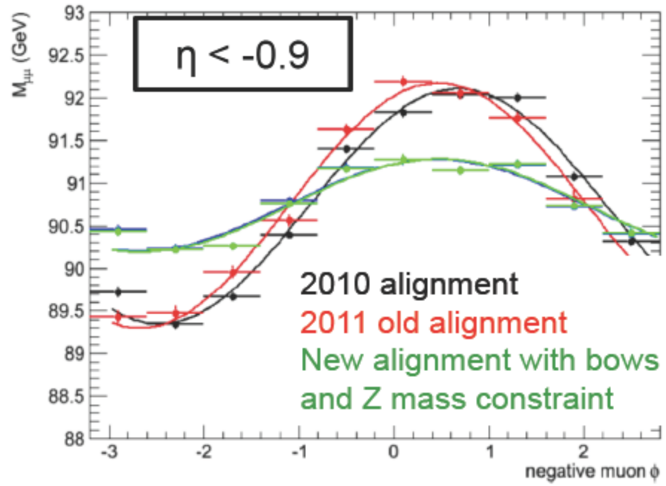




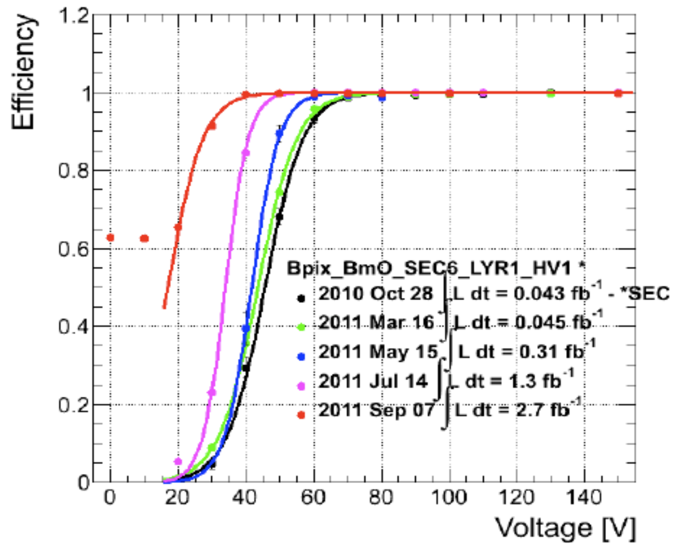
Tracker

- The Tracker operates with excellent reliability and performance.
- Fraction of live channels: 97.8 Strip Tracker; 97.1 Pixel Tracker.
- Improved TK Alignment
  - Now includes kinks and bows in the sensor modules, Z-mass constraint, and tracking of movements of BPIX half-barrels.
- Radiation damage growing in importance
  - Sensor leakage current increasing throughout Tracker.
  - Effective doping changing in the pixel detectors.
  - SEU in pixel system. (~1-2/fill)

Improvement in Tracker alignment

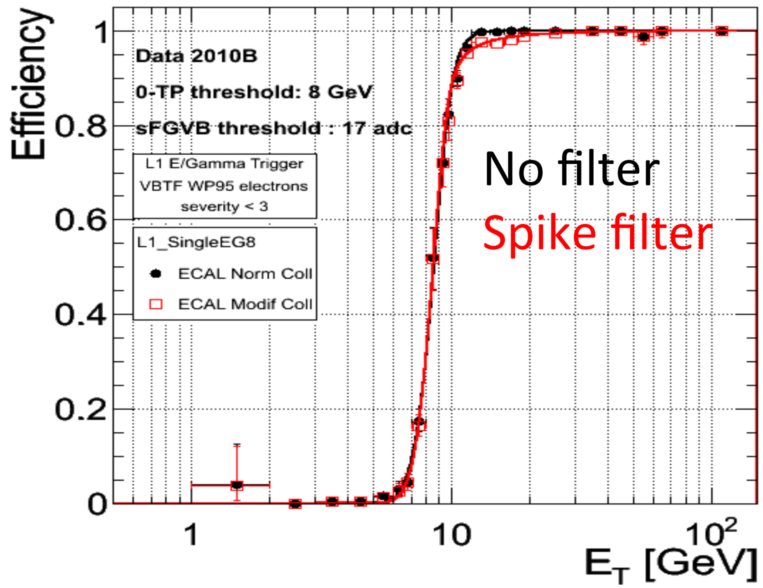


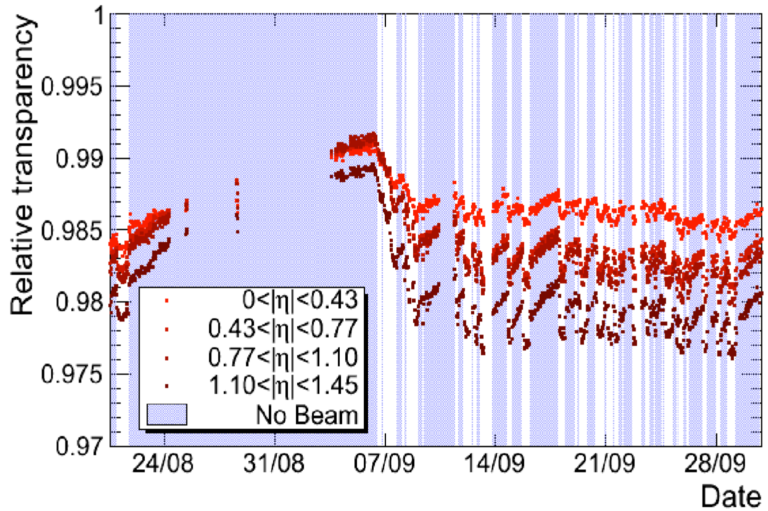
BPIX: effect of depletion voltage shift



ECAL

- Smooth running
  - Fraction of alive channels ~99% in ECAL barrel and endcaps, ~95% in the preshower
- L1 protection of ECAL anomalous signal active
  - L1 rate under control
  - Efficiency to high energy EM object unaffected
- ECAL response stability and uniformity:
  - Transparency losses in ECAL crystals observed at the expected level
  - Dynamic calibration via laser monitoring data activated
  - Residual instabilities of the monitoring system impact the constant term in the ECAL energy resolution, which is still not at the desired level
  - Work is ongoing to improve the correction methods and the laser system itself.



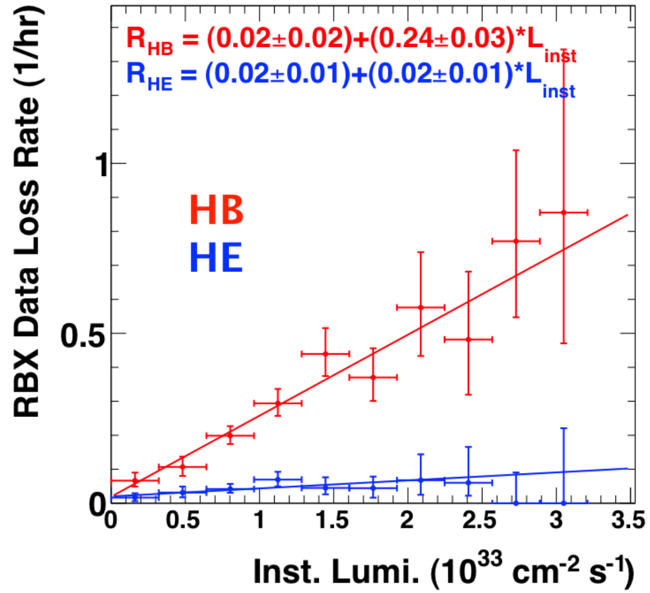


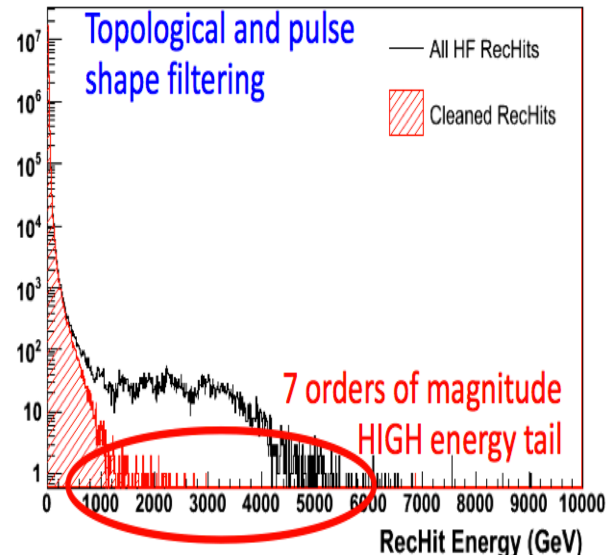
HCAL

- Smooth running
  - Efficient operation. Fraction of alive channels >99%

- Two resent issues have successful work-arounds
  1. Occasional loss of data from single-RBX due to beam-induced signal in reset signal opt-isolation
     - Rate Scales with luminosity
     - For 2011-2012: Auto-detector + recover limits fraction of data effected to ~1% (tagged "bad" for HCAL)
     - Long term: Easy solution requires access in LS1
  2. A loss of phase-lock in two specific locations (10-deg slice in HB-plus and another in HE-minus)
     - Reconstruction time window increased to include BX-1 for affected channels. Small effect on noise rejection

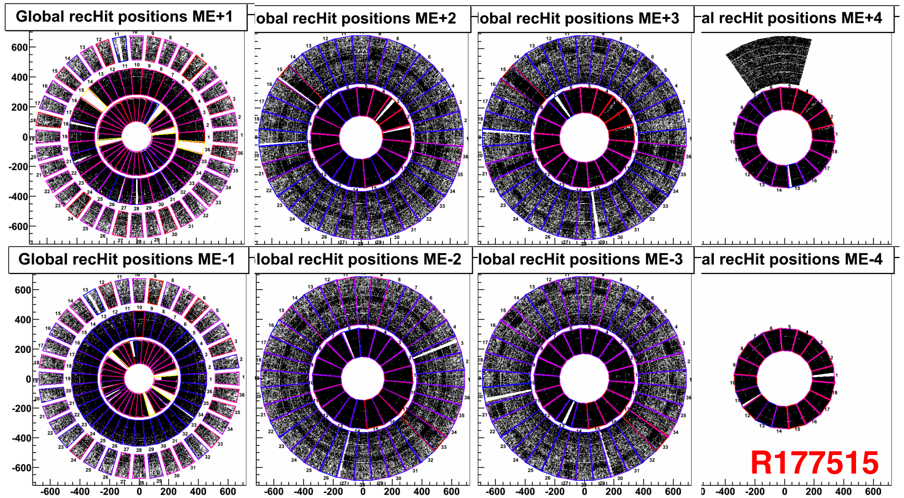
- For 2011 noise filters optimized for 50ns operation
  - Filters using isolation and pulse shape/timing are very effective in removing noise hits without loss of physics
  - A loose version runs in HLT to allow inclusion of HF with reduced trigger rate





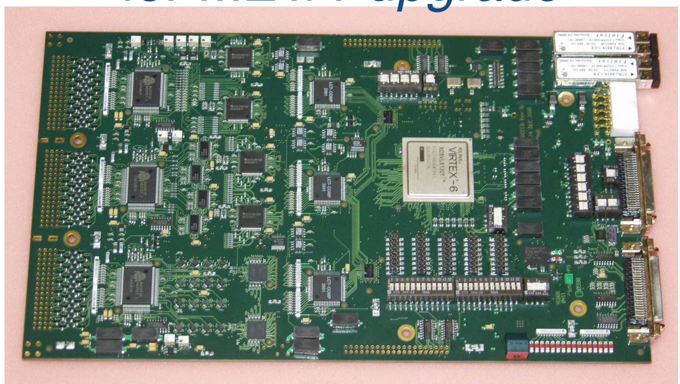
CSC

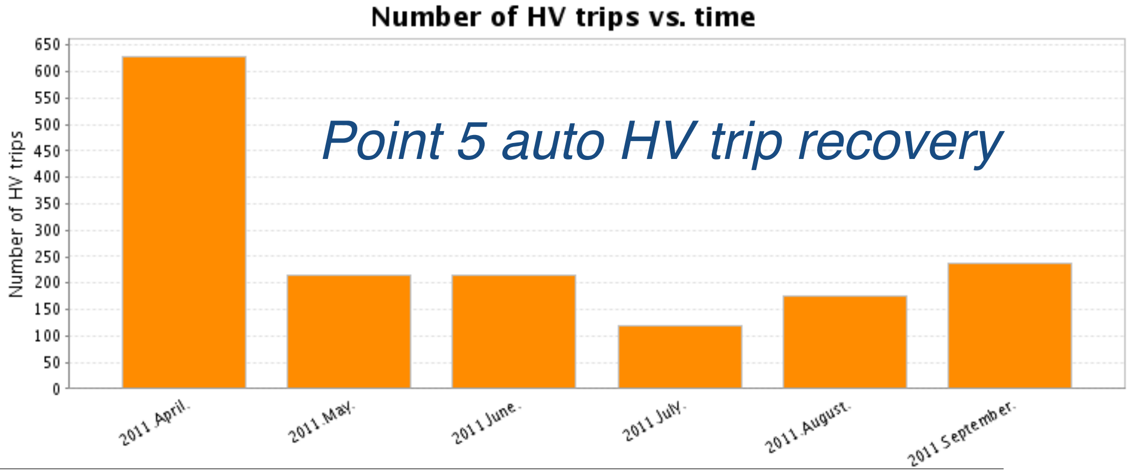
CSC occupancy: 98.0% live (stable)



Muon upgrade chamber #2

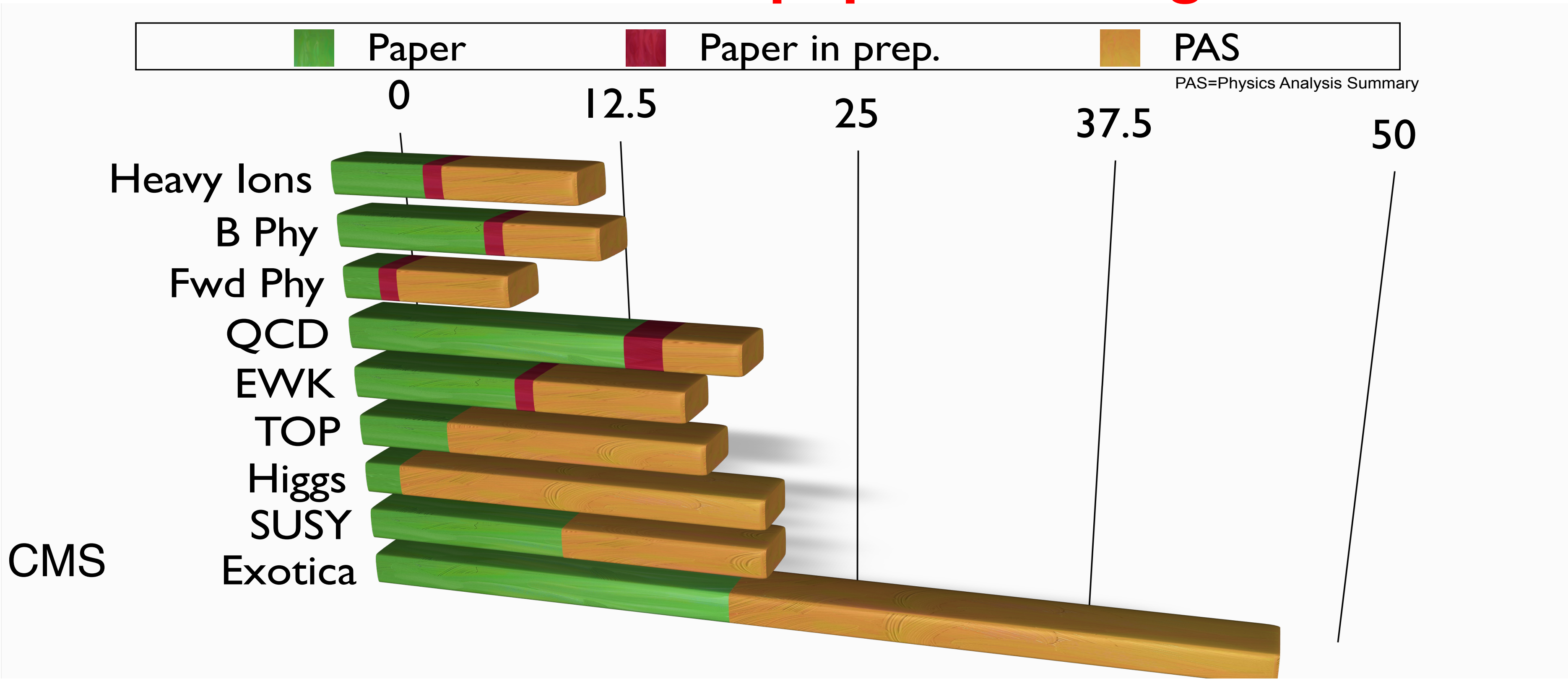
Prototype FADC board for ME1/1 upgrade





CMS Publications

CMS reached 100 papers on August 3rd



Today 109 papers+ 6 close to be submitted.

86 papers on physics analyses

24 performance papers on cosmic data

5 performance papers on collision data

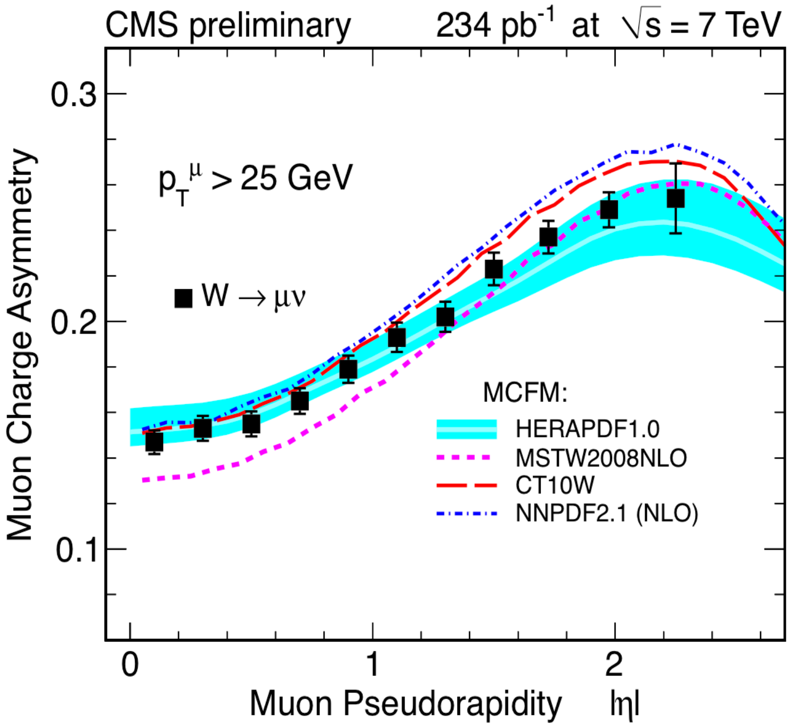
+ 106 Physics Analyses Summaries

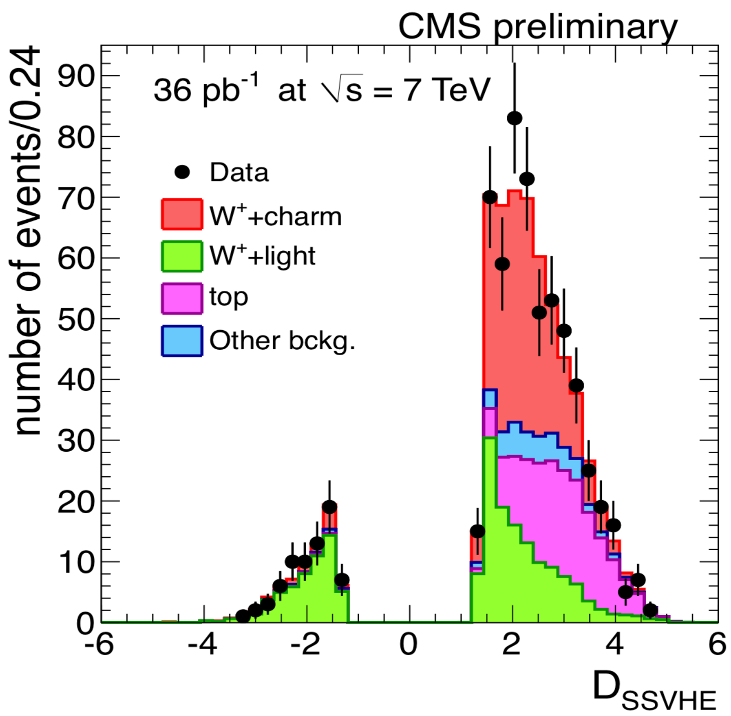
+ ~700 Conference Notes on physics results

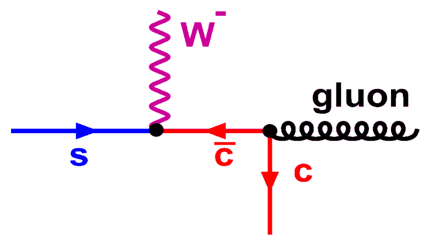
Electroweak: access to proton PDFs

- $W \rightarrow \mu\nu$ charge asymmetry vs. η_μ

W+charm (strange content)







$R^{\pm}_c = \sigma(W^+c)/\sigma(W^-c) = 0.92 \pm 0.19(\text{stat.}) \pm 0.04(\text{syst.})$

$R_c = \sigma(Wc)/\sigma(W\text{+jets}) = 0.143 \pm 0.015(\text{stat.}) \pm 0.024(\text{syst.})$

NLO predictions:

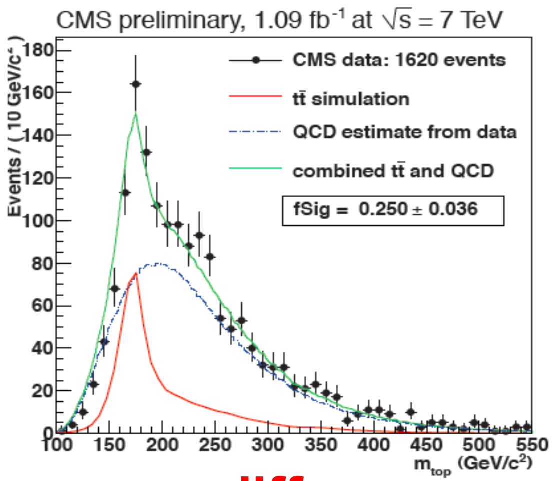
$R^{\pm}_c = 0.91 \pm 0.04$ $R_c = 0.13 \pm 0.02$

Secondary vertex decay length discriminator

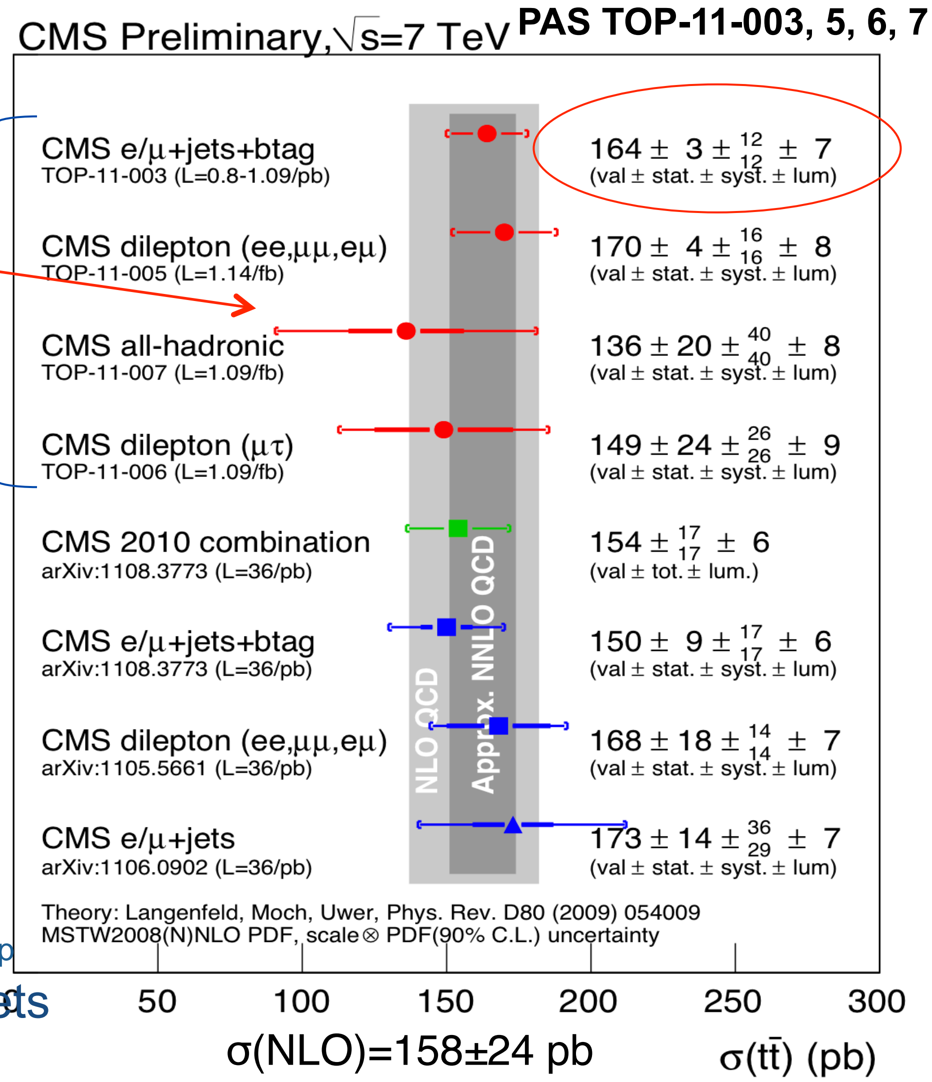
PAS EWK-11-005, 013

t-tbar cross section and mass difference

- **Lepton+jets+b-tag**
  - **CMS most precise to-date !**
- **All-hadronic channel**
  - kinematic fit for m_{top}
  - QCD shape from anti-b-tag data



2011



- **t-tbar mass difference**
  - kinematic fit to the hadronically decaying m_{top}
  - Ideogram method applied separately to μ^++jets
  - And to μ^- +jets
  - **Δm (t-tbar)= -1.20±1.21(stat)±0.47(syst)GeV**

Best in the world!

Di-bosons: WW, WZ, ZZ.

With 2011 data updated measurement of the W^+W^- cross section and first measurements of the WZ, ZZ production cross sections at 7TeV.

$\sigma(pp \rightarrow W^+W^- + X) = 55.3 \pm 3.3(stat.) \pm 6.9 (syst.) \pm 3.3 (lumi.)$ pb.

$\sigma(NLO)=43\pm2$pb

$\sigma(pp \rightarrow WZ + X) = 17.0 \pm 2.4(stat.) \pm 1.1 (syst.) \pm 1.0 (lumi.)$ pb.

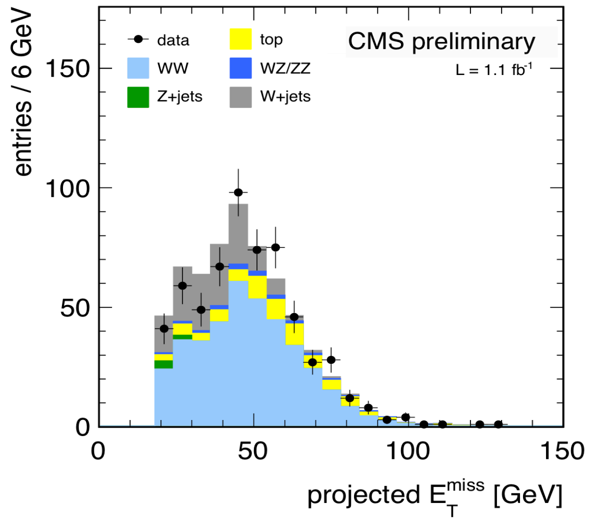
$\sigma(NLO)=19.8\pm0.1$pb

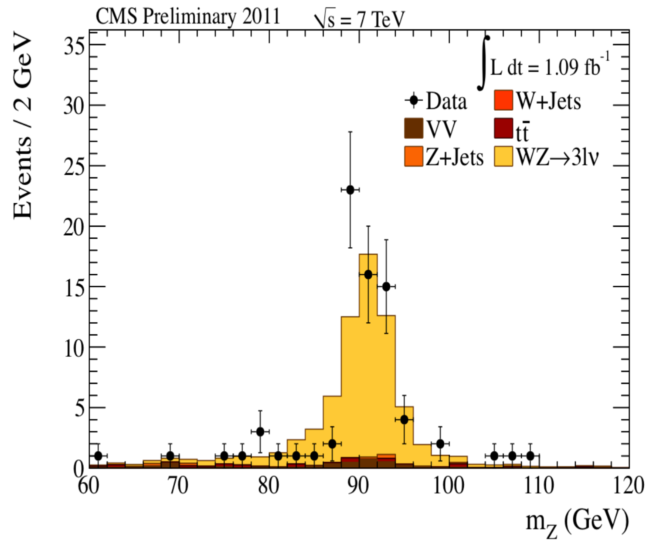
$\sigma(pp \rightarrow ZZ + X) = 3.8 +1.5(stat.) \pm 0.2 (syst.) \pm 0.2 (lumi.)$ pb.

$\sigma(NLO)=6.4\pm0.6$pb

All measured values are consistent with the standard model predictions.

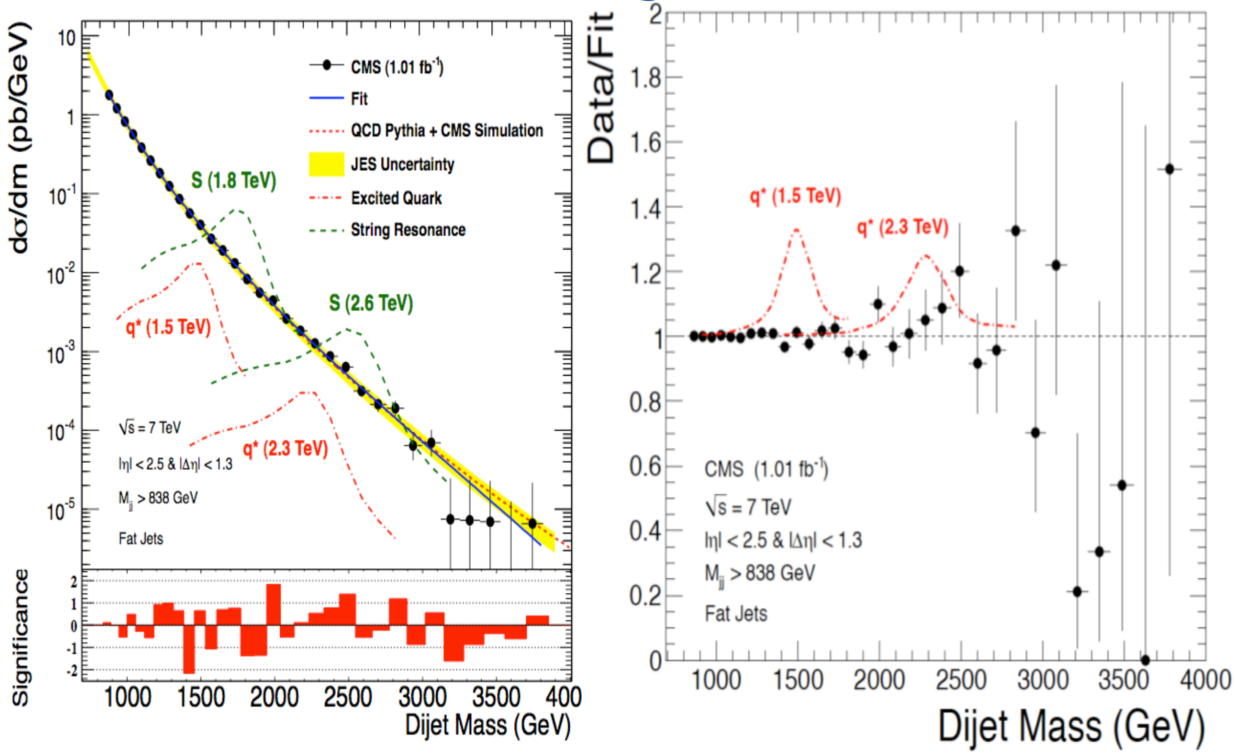
Data driven methods are used to understand the background.





CMS PAS EWK-11-010

Search for di-jet resonances



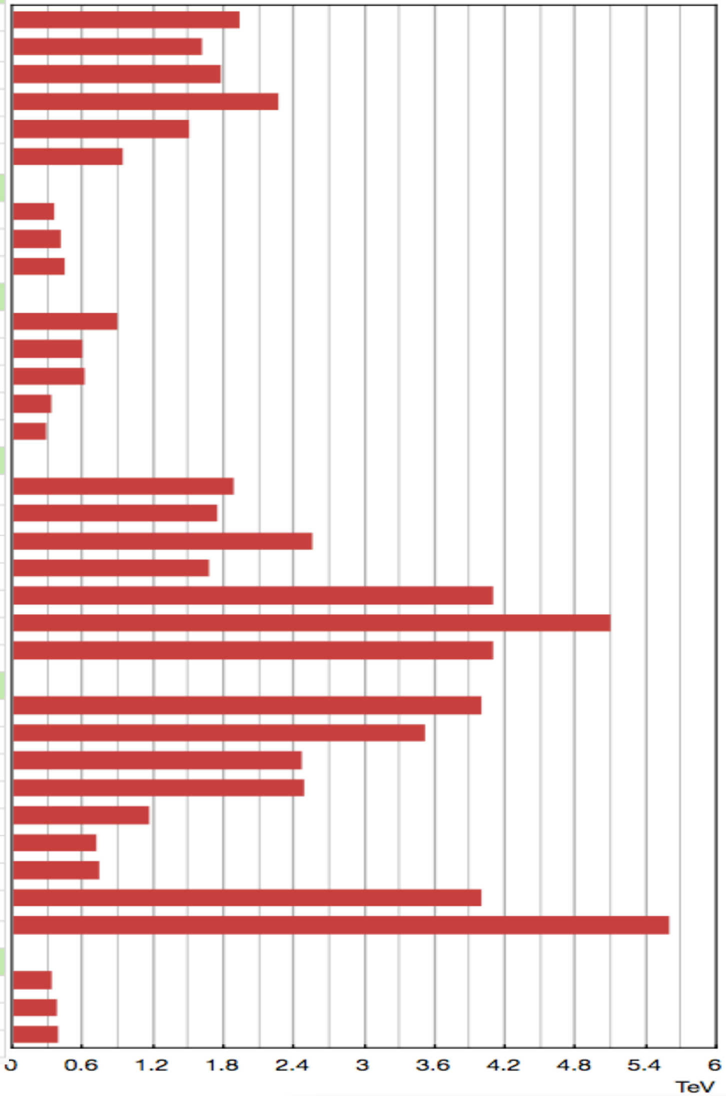
The data can be used to exclude at 95%CL new particles predicted in several models:
excited quarks with M(q∗)<2.49TeV,
string resonances with mass M(S)<4.00TeV et al.

arXiv: submit/0288036 [hep-ex]CERN-PH-EP/2011-119 2011/07/24 *Submitted to Physics Letters B*

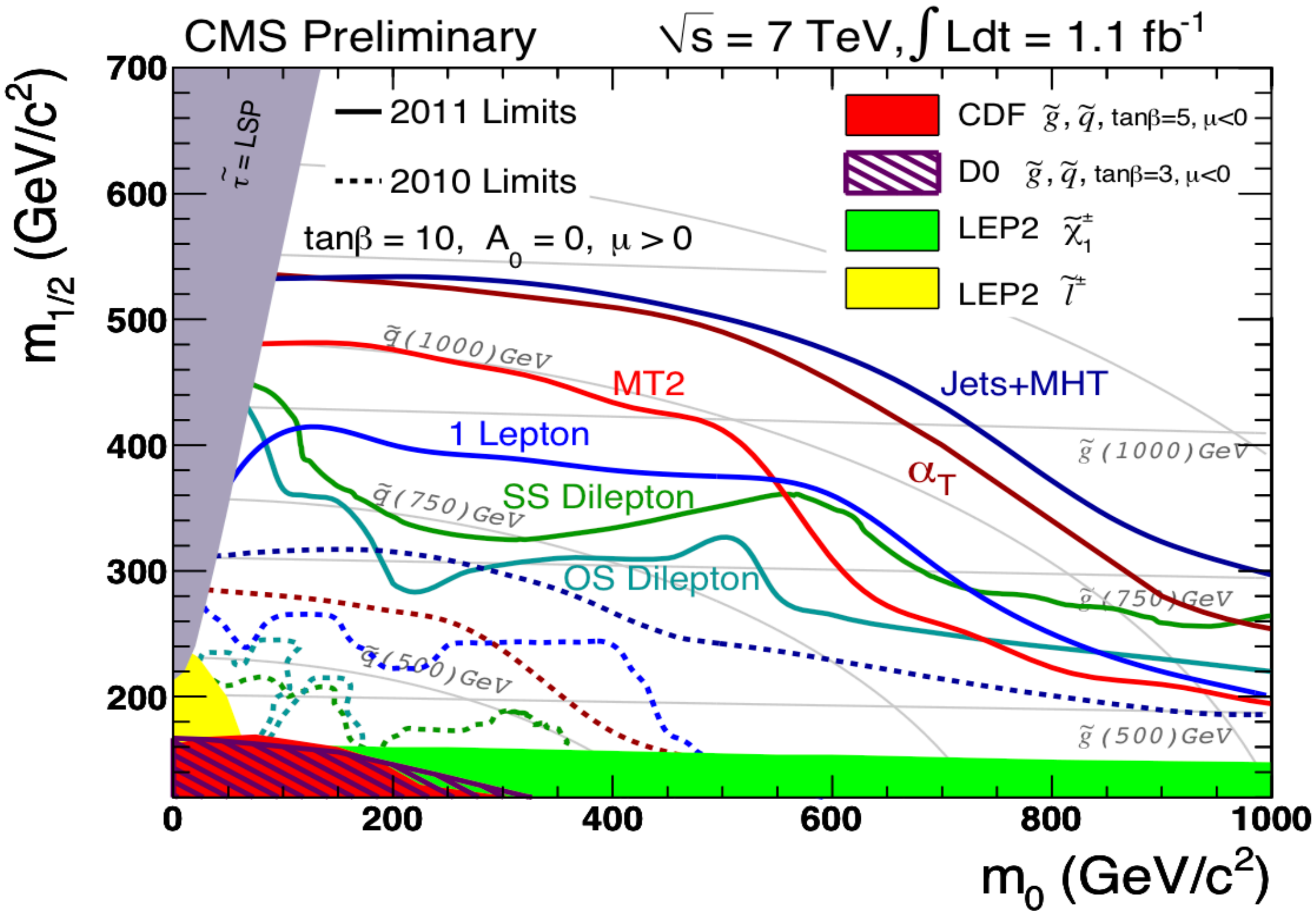
24 July 2011: first paper on 2011 data

Summary of the searches in EXO

	Limits in TeV	
	Heavy Bosons	
Z'_{SSM} ll	1.94	2011
Z'_{Ψ} ll	1.62	2011
G_{KK} ll k/M = 0.1	1.78	2011
W' lν	2.27	2011
W' dijet	1.51	2011
G_{KK} γγ k/M = 0.1 (2010)	0.945	2010
	4th Generation	
$M_{b'}$, b' ⇒ tW (2010)	0.361	2010
$M_{t'}$, t' ⇒ tZ (100%)	0.417	2011
$M_{t'}$, t' ⇒ bW (100%), l+jets	0.45	2011
	Heavy Stable Particles	
M_{gluino}, HSCP	0.899	2011
M_{gluino}, Stopped Gluino	0.601	2011
M_{stop}, HSCP	0.620	2011
M_{stop}, Stopped Gluino	0.337	2011
M_{stau}, HSCP	0.293	2011
	Large Extra Dimensions	
M_s, γγ, GRW (2010)	1.89	2010
M_s, μμ, GRW (2010)	1.75	2010
M_D, monojet, n_{ED} = 2 (2010)	2.56	2010
M_D, monojet, n_{ED} = 6 (2010)	1.68	2010
M_{BH}, rotating, M_D=3.5 TeV, n_{ED} = 2	4.1	2011
M_{BH}, non-rot, M_D=1.5 TeV, n_{ED} = 6	5.1	2011
String Ball M, M_D=2.1, M_s=1.7, g_s=0.4	4.1	2011
	Compositeness and Contact Interactions	
String Resonances	4.0	2011
E_6 diquarks	3.52	2011
Axigluon/Coloron	2.47	2011
q* , dijet	2.49	2011
q* , boosted Z	1.17	2010
e*, Λ = 2 TeV	0.720	2010
μ*, Λ = 2 TeV	0.745	2010
C.I. Λ , dijet mass (3 pb^{-1})	4.0	2010
C.I. Λ , Χ analysis	5.6	2010
	LeptoQuark	
LQ1, β=0.5 (2010)	0.340	2010
LQ1, β=1.0 (2010)	0.384	2010
LQ2, β=1.0 (2010)	0.394	2010



SUSY: new limits on CMSSM

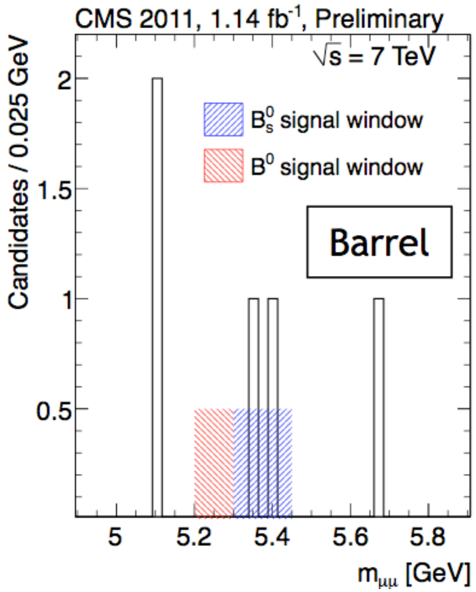


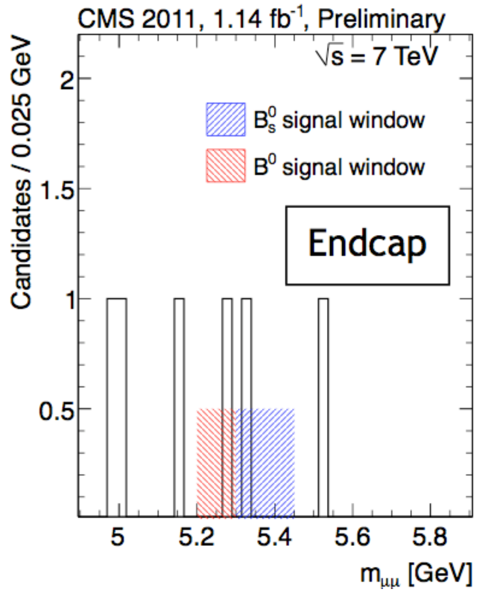
Within the constrained MSSM models we have crossed the border of excluding gluinos and squarks up to 1TeV and beyond. The air is getting thin for constrained SUSY. More conclusive results for the winter conferences.

$B_s \rightarrow \mu^+\mu^-$

Indirect sensitivity to new physics (MSSM:BR∝(tanβ)^6 → sensitivity to extended Higgs boson sectors → additional constraints on parameter region).

$B_s \rightarrow \mu^+\mu^- = (3.2\pm0.2)\times10^{-9}$; $B_d \rightarrow \mu^+\mu^- = (1.0 \pm0.1)\times10^{-10}$





Events observed in the unblinded windows consistent with background plus SM expectations.

$B_s \rightarrow \mu^+\mu^- < 1.9\times10^{-8}$ (95% CL)

$B_d \rightarrow \mu^+\mu^- < 4.6\times10^{-9}$ (95% CL)

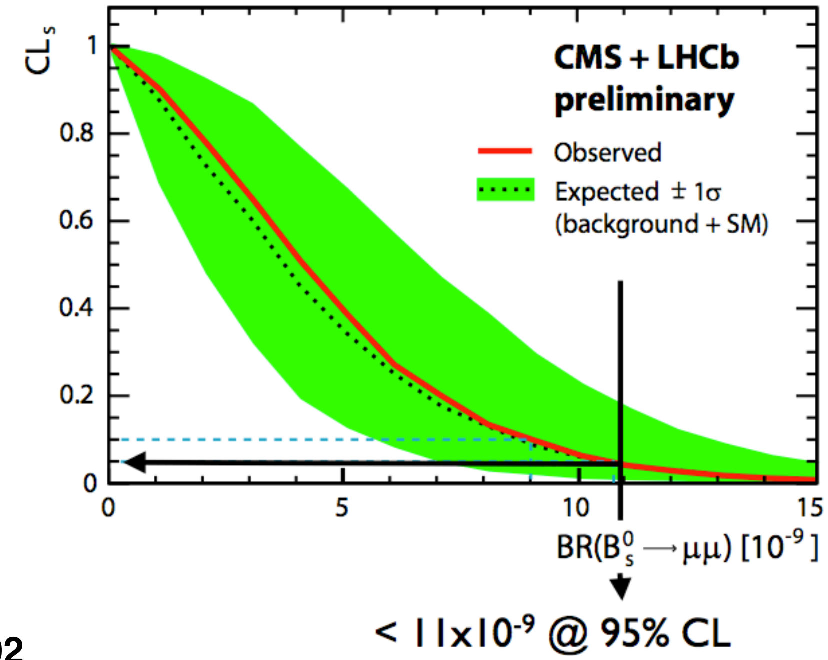
CMS PAS-BPH-11-002

LHCb BR limit

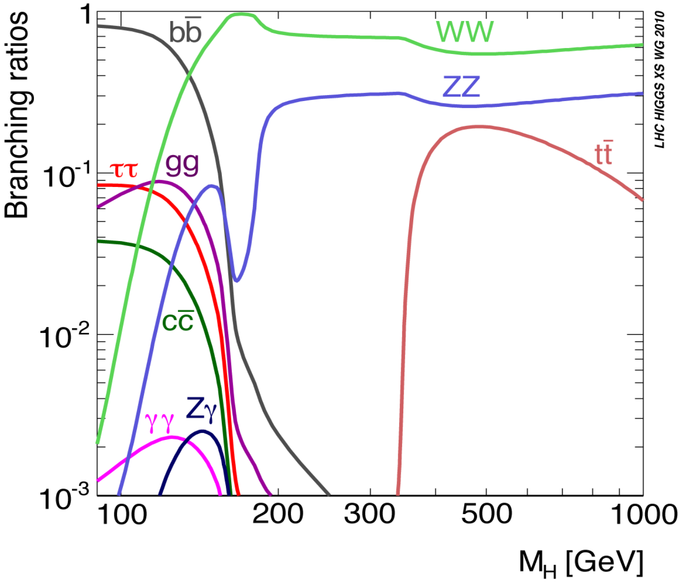
$B_s \rightarrow \mu^+\mu^- < 1.5\times10^{-8}$

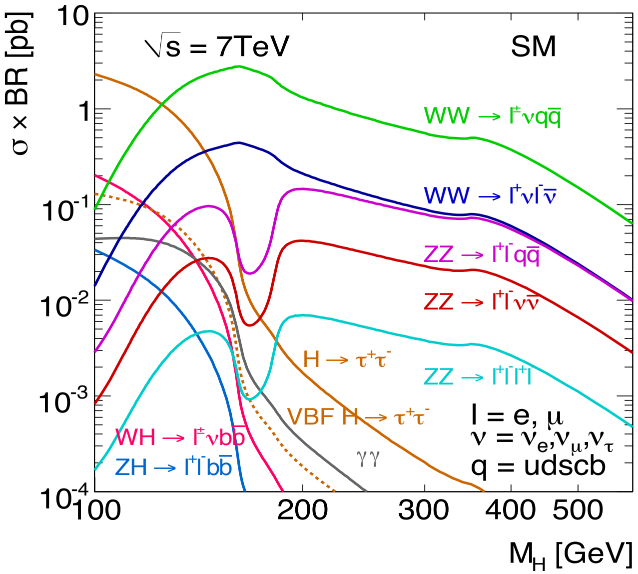
Combination of LHCb+CMS:

$B_s \rightarrow \mu^+\mu^- < 1.08\times10^{-8}$



SM Higgs Decay Modes Vs Mass





Events expected to be produced with L=1 fb^{-1}

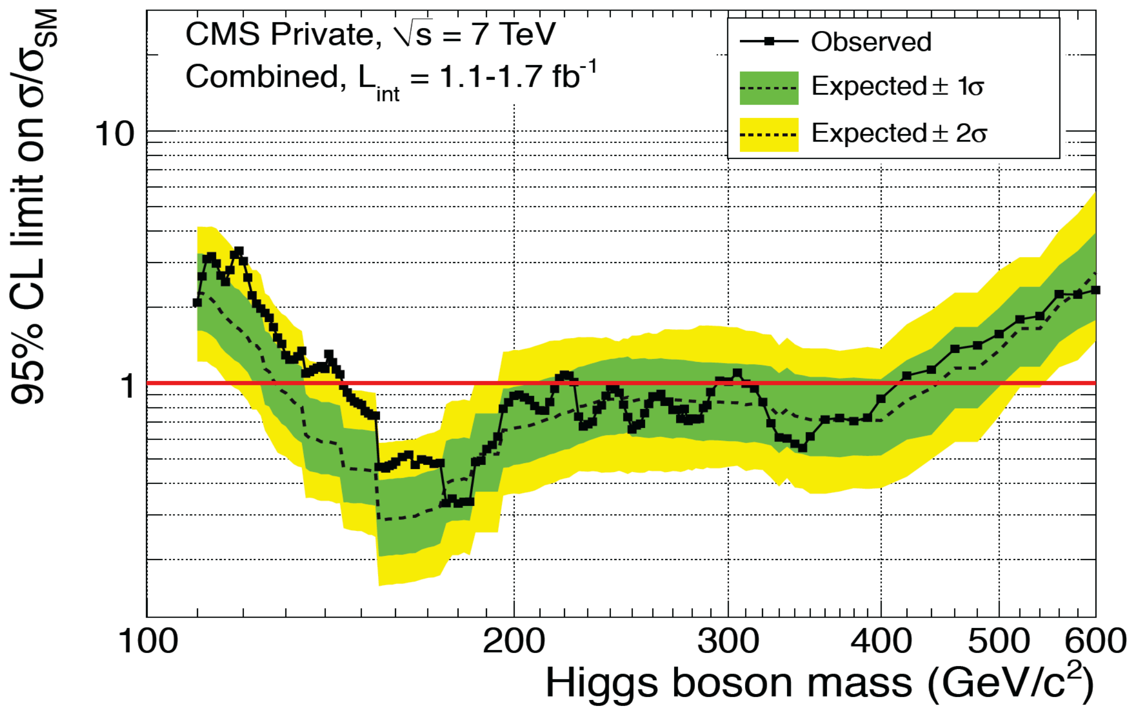
m_H, GeV	WW→lνlν	ZZ→4l	γγ
120	127	1.5	43
150	390	4.6	16
300	89	3.8	0.04

Mode	Mass Range	Data Used (fb^{-1})	CMS Document
H → γγ	110-150	1.7	HIG-11-021
H → bb	110-135	1.1	HIG-11-012
H → ττ	110-140	1.1	HIG-11-009
H →WW →2l 2ν	110-600	1.5	HIG-11-014
H → ZZ →4l	110-600	1.7	HIG-11-015
H → ZZ →2l2τ	180-600	1.1	HIG-11-013
H → ZZ →2l2j	226-600	1.6	HIG-11-017
H → ZZ →2l2ν	250-600	1.5	HIG-11-016

The Search for the SM Higgs Boson

With 5fb^{-1} and the combination of the two major LHC experiments the discovery reach is almost everywhere in the range from 114 to 600GeV.

Alternatively, we could start ruling out the SM Higgs.

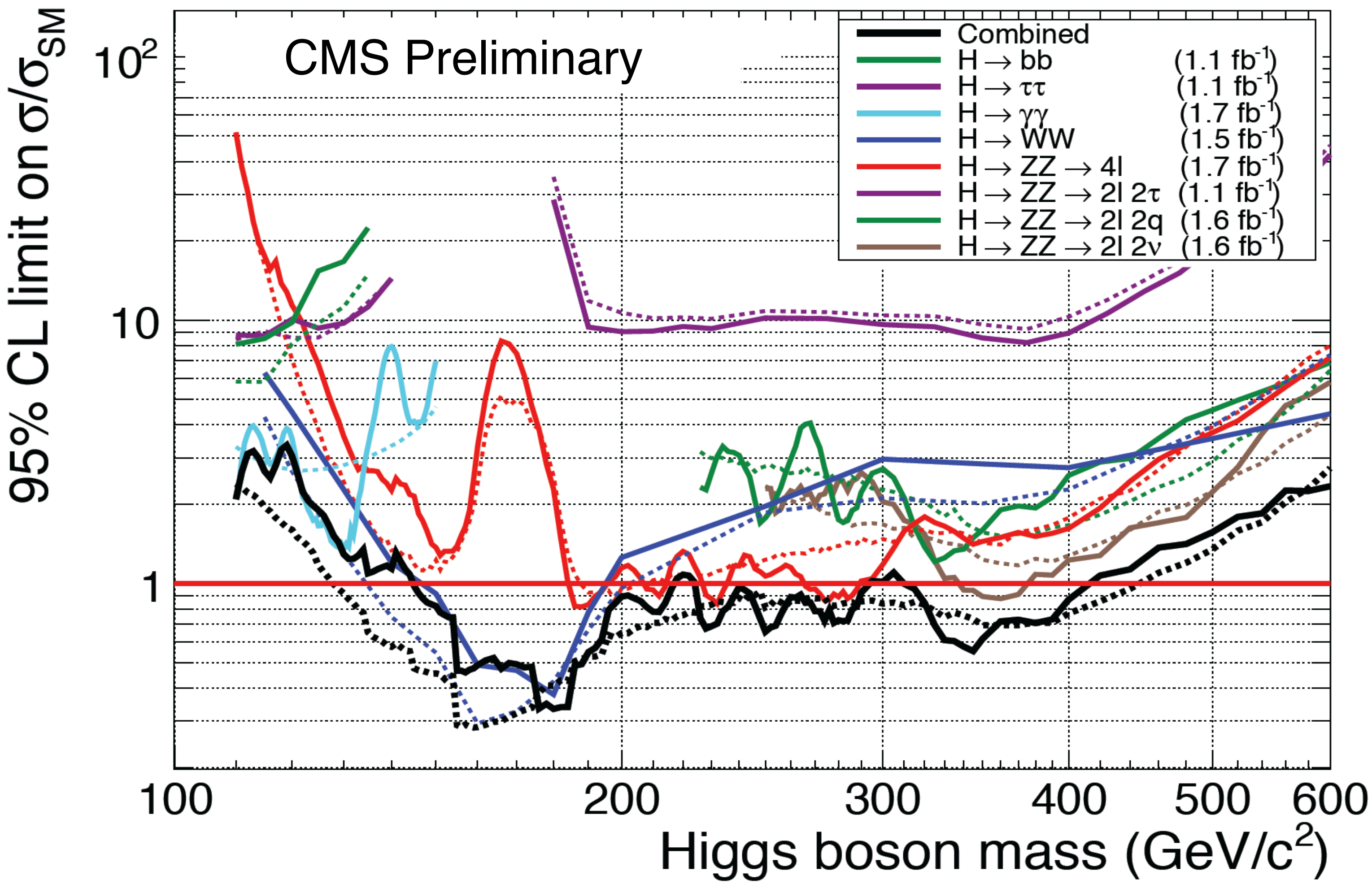


PAS HIG-11-022

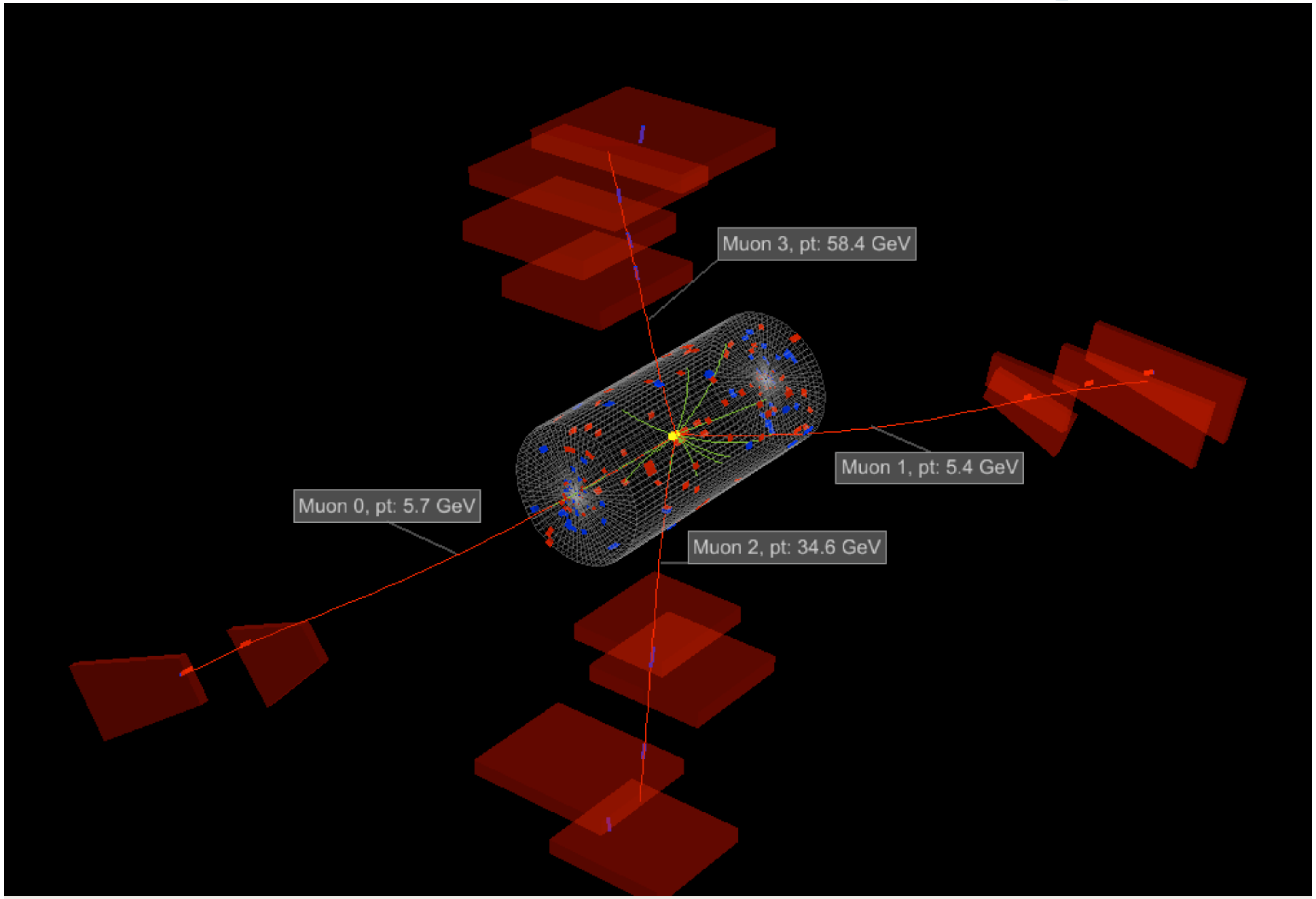
SM Higgs Search Prospects (Mass in GeV)			
ATLAS + CMS	95% CL exclusion	3 σ sensitivity	5 σ sensitivity
1 fb^{-1}	120 - 530	135 - 475	152 - 175
2 fb^{-1}	114 - 585	120 - 545	140 - 200
5 fb^{-1}	114 - 600	114 - 600	128 - 482
10 fb^{-1}	114 - 600	114 - 600	117 - 535

The Challenge.

Solid line = Observed limit ; Dashed line = Median Expected

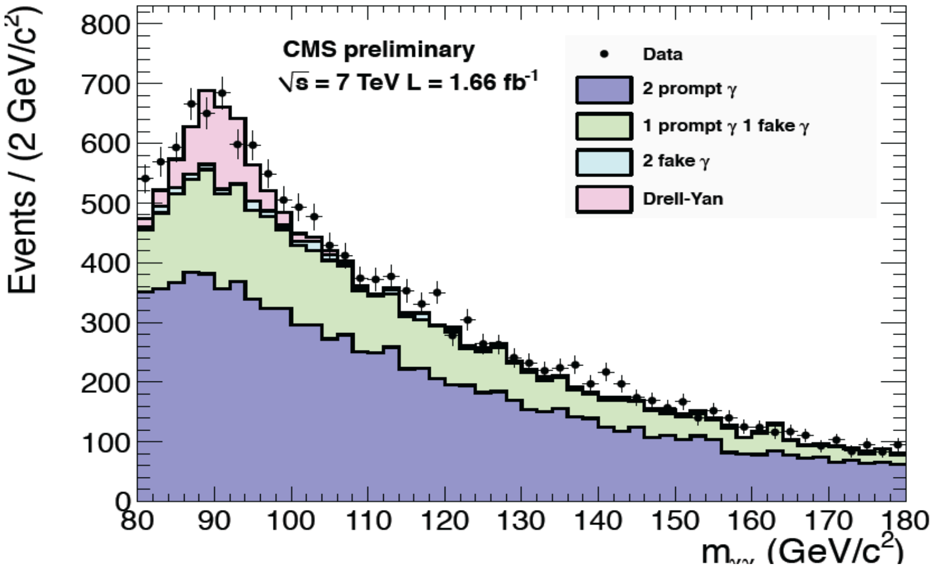


Low mass: H→ZZ→4leptons

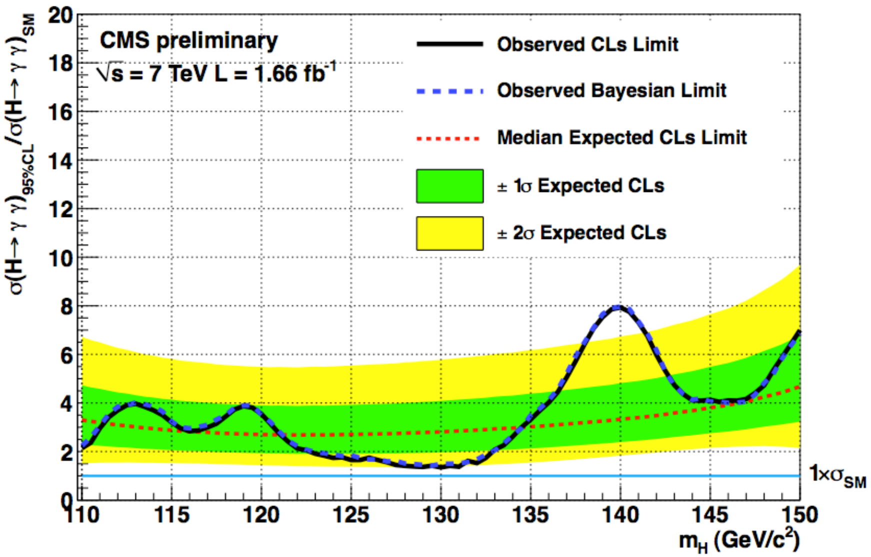


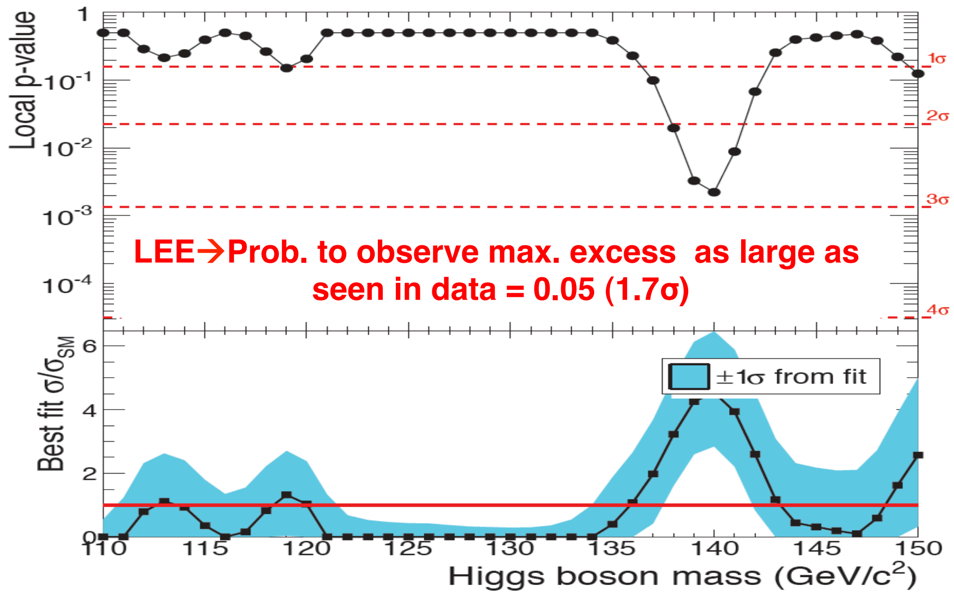
Challenge to go as low as possible in p_t and keep the highest possible geometrical acceptance

Low mass: H→ γγ



- **Low sensitivity, high resolution** (1-2 GeV today).
- Tiny and narrow signal on a smoothly falling background.
- **Challenge to look for the best possible resolution. Huge effort ongoing.**





Running in 2012

- Very likely 50ns. Issues for 25ns under study. Possibility to reduce further the β^*.
- **Possibility to increase the energy: 8TeV** (benefit everywhere: 10-15% in the low mass Higgs; x3, x5 in looking for high mass resonances.)
- **Important to know the overhead in terms of additional tests needed for the machine or in the commissioning time needed to get back to production for physics.**
- We are ready to face the additional challenges: higher pile-up conditions and/or higher energy (new MC production needed, new measurements of major SM processes etc)
- Computing resources requested for next year seem to be OK in 1st approximation.
- **There will be a meeting of the experiments with CERN Directorate at the end of November in preparation for the discussion at Chamonix 2012.**

2012 M&O-A Budget Request

Preliminary Budget Request for 2012 at the April RRB: **16,733MCHF**

Revised Budget Request for 2012 October RRB: **15,035 MCHF**

Huge effort to reduce the requests and to smoothen the profile.

Re-profiling the DAQ investments; expenditures for the long shutdown incorporated in the estimates for 2013 and 2014.

	kCHF
Description	**2012 Budget**
A.1. Detector related costs	3,956
A.2. Secretariat	297
A.3. Communications	370
A.4. On-line computing	3,798
A.5. Test beams, calibration facilities	96
A.6. Laboratory operations	919
A.7. General services	1,835
A.9. Core Computing Infrastructure & Services	1,964
Maintenance & Operations Total	13,235
A.8. Electricity	1,800
Grand Total	**15,035**

Revised M&O-A Budget Profile

Description	Ref.	Details	Type	2011	2012	2013	2014	2015
General services	A.7.01	Cooling & ventilation	O	326	326	326	326	326
			C	269	269	269	269	269
	A.7.03	Power distribution system	C	60	60	60	60	60
	A.7.04	Heavy transport	O	296	237	332	296	237
			C	60	60	60	60	60
	A.7.05	Cranes	C	57	35	287	193	35
	A.7.06	Cars	C	41	30	49	42	30
	A.7.08	Survey	O	94	152	152	152	152
			C	5	5	5	5	5
	A.7.09	Storage space	C	50	50	50	50	50
	A.7.10	Common desktop infrastructure	C	40	40	40	40	40
	A.7.11	Reviewing & engineering	O	350	350	396	379	350
	A.7.12	Outreach	O	52	52	52	52	52
			C	170	170	170	170	170
General services Total				**1,870**	**1,835**	**2,247**	**2,093**	**1,835**
Core Computing Infrastructure & S	A.9.01	Central computing environment	O	562	562	562	562	562
	A.9.02	Software process service	O	317	317	317	317	317
	A.9.03	User support	O	208	208	208	208	208
	A.9.04	Central production operations	O	806	806	806	806	806
	A.9.05	Hardware	C	70	70	70	70	70
Core Computing Infrastructure & Services Total				**1,964**	**1,964**	**1,964**	**1,964**	**1,964**
Maintenance & Operations Total				**12,553**	**13,235**	**13,956**	**13,766**	**13,080**
Electricity				1,800	1,800	1,650	1,750	1,800
Power Total				1,800	1,800	1,650	1,750	1,800
Grand Total				**14,353**	**15,035**	**15,606**	**15,516**	**14,880**

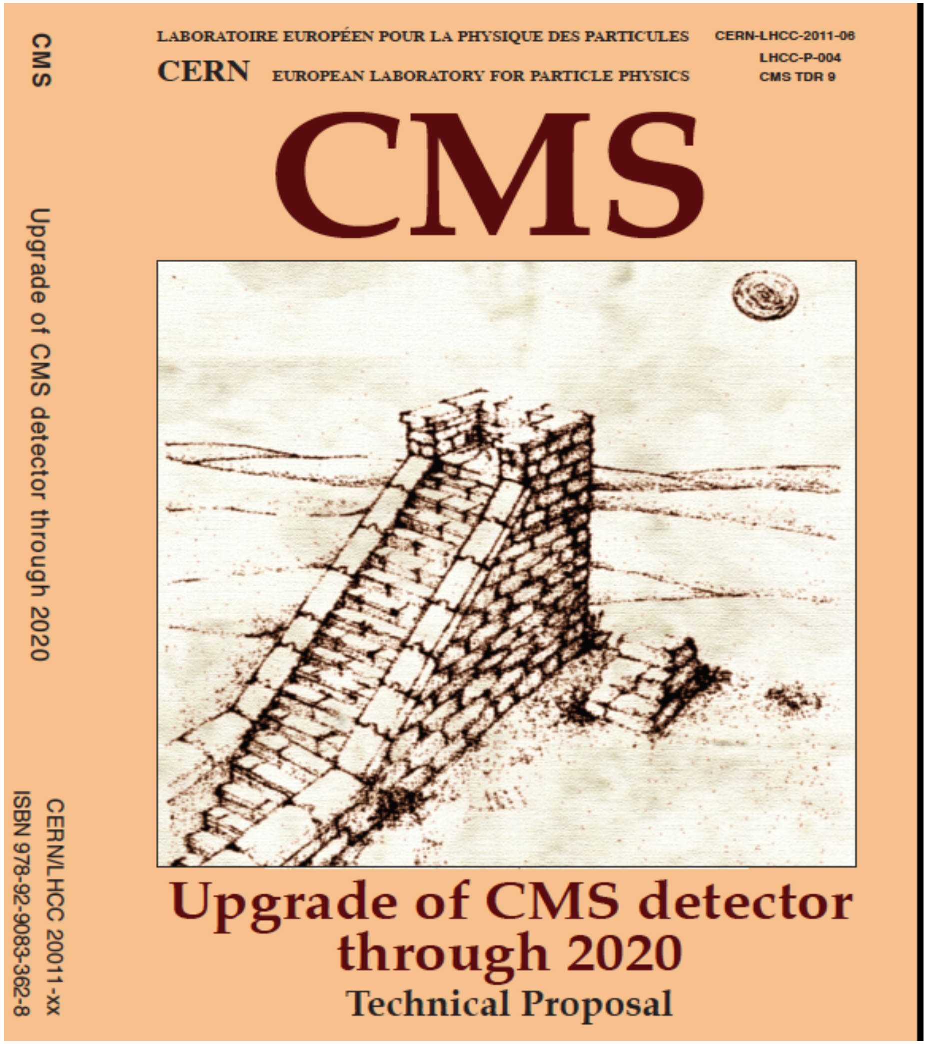
O=Operation, manpower intensive
C=Consumables

Upgrades summary

- **Technical Proposal for Phase 1 Upgrade accepted by LHCC and document is now public.**

- Technical Design reports being prepared for Pixels, HCAL, Trigger.

- Detailed scheduling of installation and commissioning depends on the timing of the Long Shutdowns
  - Plans for the first shutdown are clear
  - November workshop at Fermilab will work on putting together detailed schedule across systems
  - Overall schedule aiming to complete the upgraded detector components relatively early (2016)
  - Maintain possible flexibility in installation



CMS Upgrade plan

Shutdown	System	Action	Result	Physics
LS 1 2013-2014	Muon (ME4_2,ME1_1)	RPC and CSC (Complex YE4 installation) New electronics	Improved μ trigger and reconstruction (1.1<|η|<1.8, 2.1<|η|<2.4)	W acceptance WH, $H^{\pm} \to \tau\nu$
LS 1 2013-2014	Hadron Outer	Replace HPDs with SiPMs to reduce noise	Single μ trigger Tails of very high p_T jets	Muons from τ $Z/H \to \tau\tau \to \mu X$
LS 1 2013-2014	Hadron Forward	Install new PMT to reduce window hits	Forward jet tagging Improves MET	Vector-boson fusion H
LS 1 2013-2014	Beam Pipe	Install new beam pipe	Easier pixel installation	b-tagging
LS 2 2017 or 18	New Pixel system	Low mass 4 Layers, 3 Disks with new ROC	Reduces dead time Improves b-tag.	$H \to bb$, SUSY decay chains
LS 2 2017 or 18	HCAL Barrel and Endcap μTCA trigger	Replace HPDs with SiPMs for longitudinal segmentation New electronics	Reduces pileup effects Improves MET Improves τ, e, γ clustering and isolation	SUSY $H \to \tau\tau$ $H \to ZZ \to ll\tau\tau$
LS 3 >2020	TRACKER New Trigger Endcap Calo.	Replace tracker Replace trigger	Maintain performance at high SLHC Lumi	Guided by early discoveries

Muon System Factory at 904

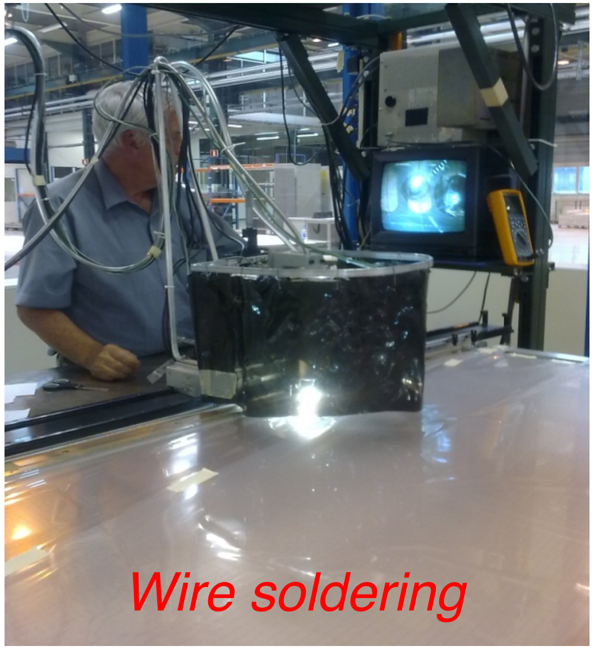
Factory for Muon CSC and RPCs in Building 904 at Prevessin

Assembly and installation trial test of one 10 degree sector of the RPC Muon system

CSC Factory for ME4/2 chambers at B904.

All procedures for production are operational.
3 prototype chambers
- 1st finished, now HV training
- 2nd being assembled

Full production when additional panels will arrive.
Pt-5 compatible test stand being put together.



Pixel Detector Upgrade

Pixel Upgrade installation becomes ***insensitive* to various shut down scenarios beyond LS1 if we manage to perform the following steps in LS1**:

a)remove old beam pipe and insert new pipe with inner diameter 43.4mm

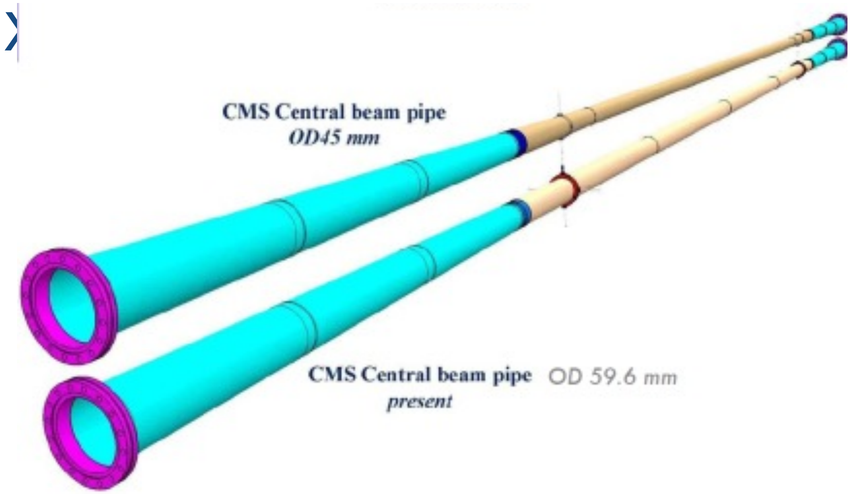
→ gain operational experience with existing well understood pixel detector and potentially new background situations.

b) install in parallel to existing pixel cooling plant a new CO_2 cooling plant in CMS cavern with all controls installed and tested. Old cooling plant stays operational until switch over at installation time.

→ gain operational experience with second cooling plant at cooling lab with cooling loop copies or final detector of BPIX

From the minutes of LMC 104:

DECISION: Approval of invitation to tender for new CMS beam pipe.



The Upgrade Money Matrix

- Numbers in the table are **"targets" or "proposals"** that are the starting point for discussions with the funding agencies.

- **The actual numbers vary from**
  - **firm commitments based on approved funding**
  - **proposals incorporated into national plans but not yet funded**
  - **hopes for funding that are still at an early stage of discussion**

- **CMS understands that each Funding Agency has its own process and timetable for reaching a final decision on the upgrade**

- The costs are in a CERN metric that includes material costs and contracted labor without contingency and are in Swiss francs

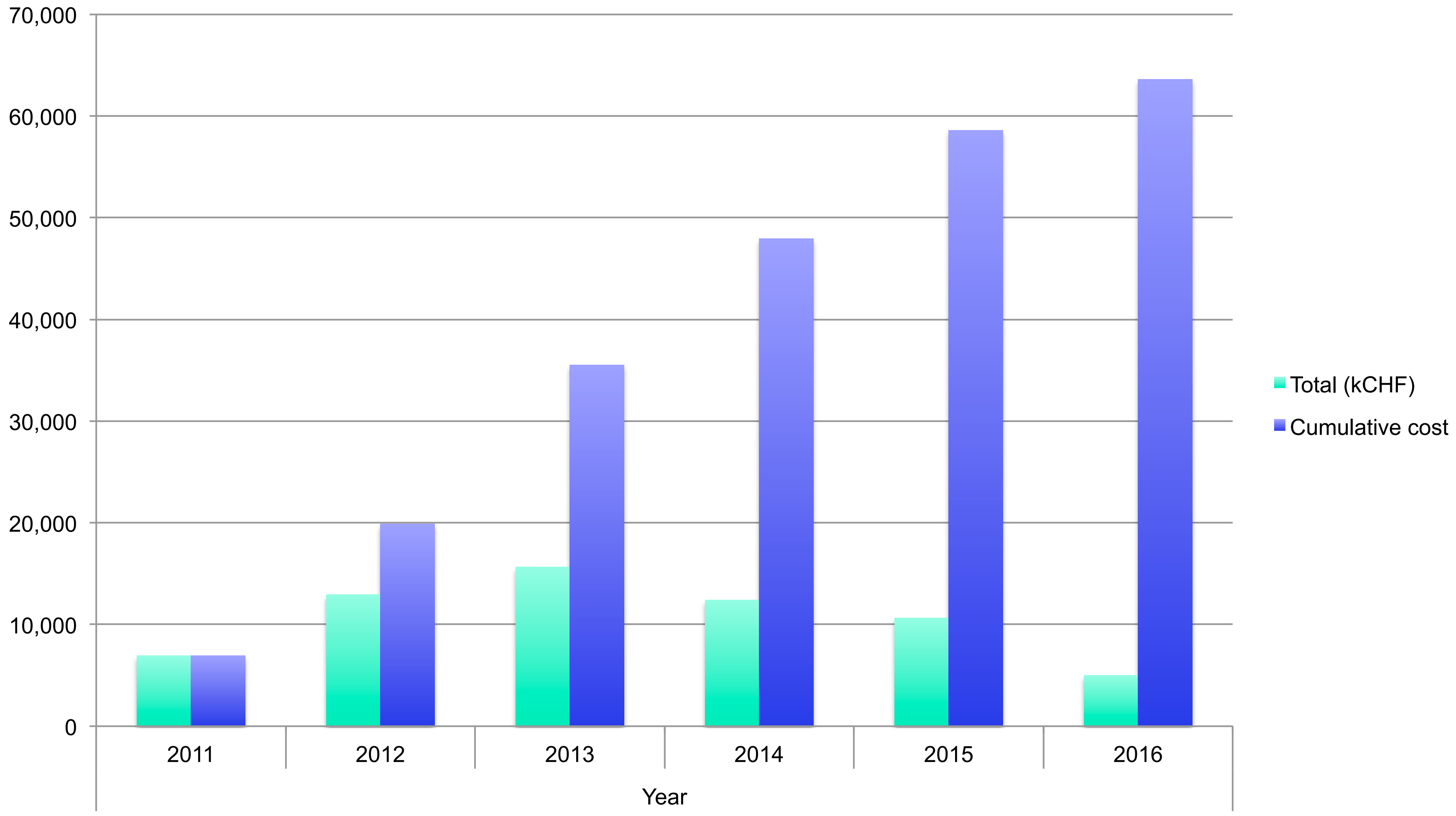
- The entries reflect the stated national interest in the various upgrade projects and the rough proportion of the financial commitment relative to the whole upgrade

Preliminary Money Matrix

14.10.2011

			Subdetector-specific Upgrades						Detector-wide items											
									Beam/DAQ/Trigger			Common Fund (CF) Items								
Institute FA	PhD #	PhD %	Pixel Tracker	HCAL	HF - Phototubes	Muon CSC	Muon DT	Muon RPC	Beam Instrumentation	DAQ	Trigger	Magnet power and cryo	Infrastructure	Test Beam Facilities Upgrade	Safety systems upgrade	Electronics Integration	Engineering Integration	Total expected (projects)	Common Fund (CF)	Total Upgrade Due (incl. CF)
			17,350,000	**5,817,000**	**1,990,000**	**5,570,000**	**2,200,000**	**4,220,000**	**1,540,000**	**6,700,000**	**4,600,000**	**1,330,000**	**6,315,000**	**610,000**	**964,000**	**1,575,000**	**3,666,000**			
Common Fund												592,797	2,814,673	271,885	429,667	701,997	1,633,981		**6,445,000**	
Austria	22	1.6%	68,846								1,200,000							1,268,846	102,154	1,021,494
Belgium-FNRS	16	1.2%						236,000										236,000	74,294	742,905
Belgium-FWO	16	1.2%						270,000										270,000	74,294	742,905
Brazil	17	1.2%																0	78,937	789,336
Bulgaria	8	0.6%																0	37,147	371,452
CERN	80	5.8%	3,000,000					500,000	500,000	3,500,000			1,500,000		500,000		1,000,000	10,500,000	371,470	3,714,524
China	10	0.7%				200,000		500,000										700,000	46,434	464,316
Colombia	3	0.2%						10,000										10,000	13,930	139,295
Croatia	7	0.5%								200,000								200,000	32,504	325,021
Cyprus	5	0.4%																0	23,217	232,158
Egypt	3	0.2%						150,000										150,000	13,930	139,295
Estonia	4	0.3%					167,153											167,153	18,573	185,726
Finland	14	1.0%	420,000					130,000						35,000				585,000	65,007	650,042
France-CEA	15	1.1%																0	69,651	696,473
France-IN2P3	53	3.8%	600,000							350,000	600,000			100,000		100,000		1,750,000	246,099	2,460,872
Germany-BMBF	62	4.5%	1,600,000				612,000											2,212,000	287,889	2,878,756
Germany-DESY	39	2.8%	1,200,000	XXXXXXX														1,200,000	181,091	1,810,831
Greece	15	1.1%								XXXXXX	XXXXXXX							0	69,651	696,473
Hungary	10	0.7%		XXXXXXX			XXXXXX											0	46,434	464,316
India	29	2.1%		495,000				720,000										1,215,000	134,658	1,346,515
Iran	6	0.4%																0	27,860	278,589
Ireland		0.0%									XXXXXXX							0	0	0
Italy	173	12.5%	1,400,000				1,000,000	350,000										2,750,000	803,303	8,032,659
Korea	21	1.5%						400,000										400,000	97,511	975,063
Mexico	11	0.8%																0	51,077	510,747
New Zealand	2	0.1%																0	9,287	92,863
Pakistan	2	0.1%						345,000					800,000					1,145,000	9,287	92,863
Poland	15	1.1%																0	69,651	696,473
Portugal	7	0.5%									500,000							500,000	32,504	325,021
RDMS - DMS	21	1.5%		400,000		500,000												900,000	97,511	975,063
RDMS - Russia	61	4.4%		1,400,000		1,300,000												2,700,000	283,246	2,832,325
Serbia	3	0.2%																0	13,930	139,295
Spain	49	3.5%					264,000											264,000	227,525	2,275,146
Switzerland (ETHZ,PSI,UNIV)*	38	2.7%	3,800,000															3,800,000	176,448	1,764,398
Taipei	15	1.1%	1,000,000															1,000,000	69,651	696,473
Turkey	18	1.3%		XXXXXXX	100,000													100,000	83,581	835,768
United Kingdom	56	4.0%	500,000							250,000	1,500,000		126,000			126,000		2,502,000	260,029	2,600,167
USA (DOE-HEP, NSF)	440	31.7%	4,500,000	5,817,000	2,000,000	5,570,000				700,000	3,000,000							21,587,000	2,046,032	20,459,365
USA (DOE-NP)	22	1.6%																0	102,302	1,022,968
Grand Total	**1388**	**100.0%**	**18,088,846**	**8,112,000**	**2,100,000**	**7,570,000**	**2,043,153**	**3,611,000**	**500,000**	**5,000,000**	**6,800,000**	**592,797**	**5,240,673**	**406,885**	**929,667**	**927,997**	**2,633,981**	**58,111,999**	**6,445,000**	**64,447,000**

Preliminary Spending Profile



Conclusion

- CMS continues to be in good operating conditions and is coping well with the challenge of instantaneous luminosity higher than $3x10^{33} cm^{-2} s^{-1}$.

- Plenty of new physics results have been presented to the Summer Conferences and continue to be produced. No evidence for BSM physics so far.

- New exclusion limits for the SM Higgs have been produced. With the data we are collecting we must be ready to discover the SM Higgs boson or to start excluding it in the full mass range.

- Detailed plans for 2012 running are in preparation: so far planned resources seem to be able to cope with the new challenges. We have revised (reduced) the M&O-A request for 2012. A new long term planning incorporating the LS1 and DAQ investments has been prepared and we expect to have a ~ flat profile.

- We are making progress in the Upgrade and a preliminary version of the relative Money Matrix for the sharing of the costs has been presented together with a draft spending profile.

CMS is deeply grateful to all funding Agencies for their invaluable support.