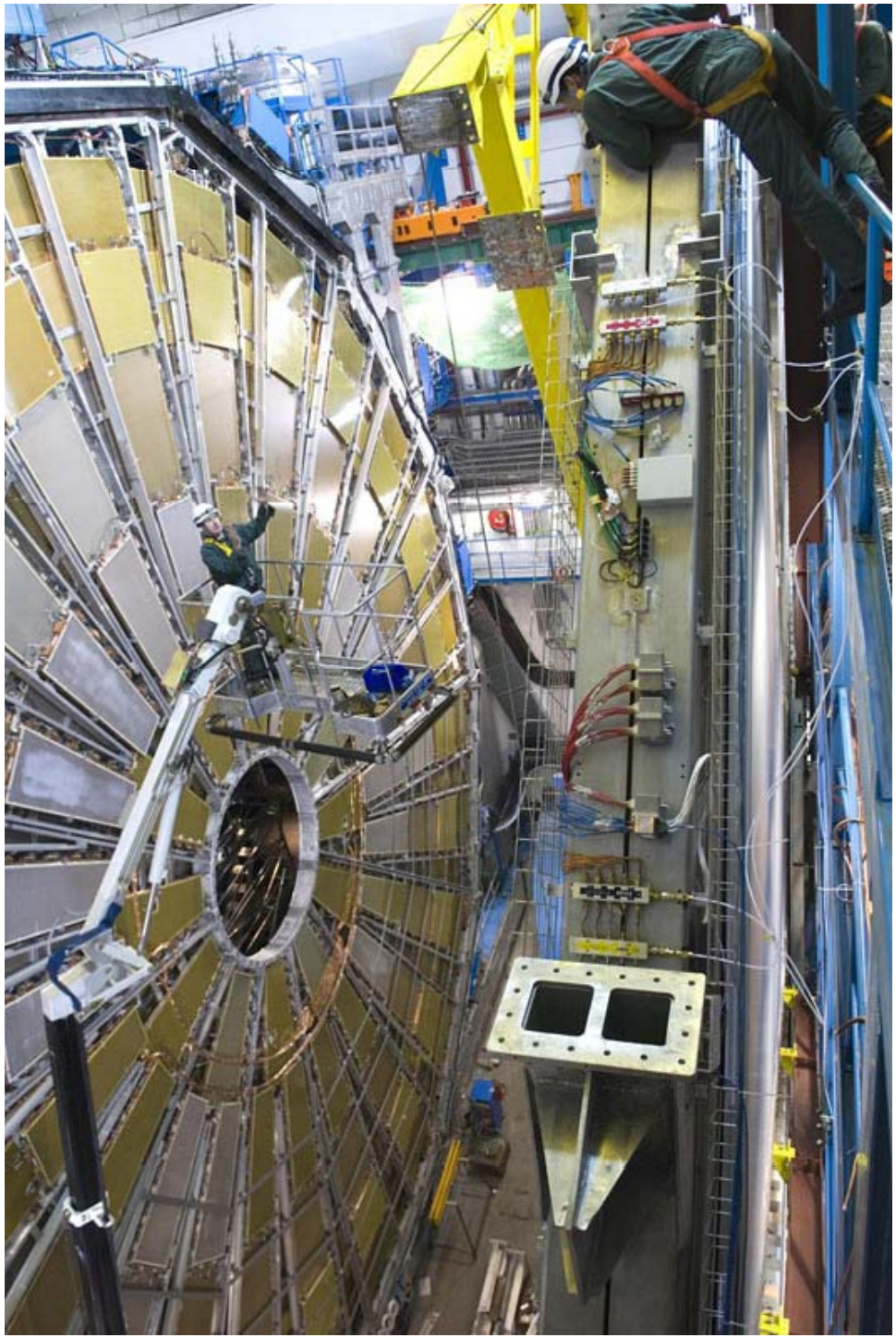

Trigger News

Outline:

- Introduction & release plans
- Progress in menus for $10^{31}cm^{-2}s^{-1}$
- Workshop on trigger menus
- Summary and plans

Ricardo Gonçalo (RHUL)
Higgs WG meeting – 28th August, 2007

Introduction & Release Plans

- Progress towards initial menu continuing
  - Information on trigger rates plus overlaps growing: http://www.hep.physics.mcgill.ca/people/dufourma/public/trigger_rates/rel_13/J0.xml
  - See last TAPM open meeting: http://indico.cern.ch/conferenceDisplay.py?confId=15682

- Latest release plans (& trigger objectives):
  - Production cache 13.0.20.2 without trigger due to last-minute bug
  - Production cache 13.0.20.3 this week with trigger
  - Release 13.0.25 aimed at **M4** cosmics run: being debugged
  - Release 13.0.30 aimed at Final Dress-Rehersal (**FDR**)
    - Realistic menu for 10^{31} maybe rough guess at 10^{32}
    - Much more complete and optimised than 12.0.7

Rates and overlaps for $L=10^{31}$ cm^{-2}s^{-1}

- See Marc-Andre Dufour's talk in last TAPM open meeting
- Rates estimated in 80k events from the J0 dijet sample
- 1 event ~ 2 Hz (…only rough numbers)
- Already some indication of what signatures will be prescaled

L1		L2		EF	
TE	Rate (Hz)	TE	Rate (Hz)	TE	Rate (Hz)
EM01	2620	L2_e10	1290	EF_e10	1290
L1_EM5	27200	L2_e25i	2	EF_e25i	2
L1_EM25	160	L2_e60	0	EF_e60	0
L1_EM25I	70	L2_2e15i	0	EF_2e15i	0
L1_EM60	7	L2_g10	1560	EF_g10	1560
L1_2EM15	88	L2_g60	0	EF_g60	0
L1_2EM15I	7	L2_2g20i	0	EF_2g20i	0

L1			L2		EF	
TE	Rate (Hz)		TE	Rate (Hz)	TE	Rate (Hz)
L1_MU06	342	227	mu6I_L2	193	mu6I_EF	180
L1_MU08	228		mu6_L2	112	mu6_EF	107
L1_MU10	173	112	mu20i_L2	0	mu20i_EF	0
L1_MU11	57	28				
L1_MU20	18	14				
L1_MU40	2	8				
L1_2MU06	4	3				
L1_2MU08	2					
L1_2MU10	2	1				
L1_2MU11	0					
L1_2MU20	0	~0				
L1_2MU40	0	~0				

Unprescaled signatures in green

12.0.6 rates in blue

L1		L2		EF	
TE	Rate (Hz)	TE	Rate (Hz)	TE	Rate (Hz)
L1_TAU5	14900	tauNoCut_L2	14800	tauNoCut_EF	14500
L1_TAU6	8640	tau10_L2	2850	tau10_EF	2430
L1_TAU9I	2440	tau10i_L2	2540	tau10i_EF	997
L1_TAU11I	1260	tau15_L2	2440	tau15_EF	850
L1_TAU16I	401	tau15i_L2	2150	tau15i_EF	296
L1_TAU21	230	tau20i_L2	693	tau20i_EF	147
L1_TAU21I	202	tau25i_L2	263	tau25i_EF	61
L1_TAU35	53	tau35i_L2	61	tau35i_EF	22

Note:

L1 rate ~45-75kHz

L2 rate ~1000Hz

EF rate ~200Hz

L1			L2		EF	
TE	Rate (Hz)		TE	Rate (Hz)	TE	Rate (Hz)
L1_XE12	46400	121095	L2_xe12	46300	EF_xe12	19200
L1_XE20	9060	10862	L2_xe20	9050	EF_xe20	1260
L1_XE24	3720	2851	L2_xe24	3710	EF_xe24	346
L1_XE32	640	333	L2_xe32	640	EF_xe32	48
L1_XE36	235	168	L2_xe36	232	EF_xe36	20
L1_XE44	57	36	L2_xe44	50	EF_xe44	2
L1_XE52	11	10	L2_xe52	9	EF_xe52	2
L1_XE72	2	1	L2_xe72	2	EF_xe72	0
L1_TE100	175000	428165	L2_te100	175000	EF_te100	26000
L1_TE200	12700	9030	L2_te200	12700	EF_te200	3340
L1_TE304	1210	95	L2_te304	1210	EF_te304	710
L1_TE380	370	10	L2_te380	370	EF_te380	208

L1			L2		EF	
TE	Rate (Hz)		TE	Rate (Hz)	TE	Rate (Hz)
L1_J4	149000		jet4_L2	68200	jet4_EF	27800
L1_J10	42900	45276	jet10_L2	11000	jet10_EF	8490
L1_J18	2510	3881	jet18_L2	1360	jet18_EF	1210
L1_J23	1040	3234	jet23_L2	861	jet23_EF	752
L1_J35	278	539	jet35_L2	274	jet35_EF	228
L1_J42	149	270	jet42_L2	145	jet42_EF	121
L1_J70	20	27	jet70_L2	20	jet70_EF	18
L1_J100	11	9	jet100_L2	11	jet100_EF	9
L1_3J10	3270	4719				
L1_3J18	175	520				
L1_4J10	1200	2015				
L1_4J18	75	135				
L1_4J23	31	17				

L1 Signatures Overlap = N(Sx + Sy) / N(Sy)

Signature Sy / Sx	L1_EM5	EM01	L1_2EM15	L1_2EM15I	L1_EM25	L1_EM25I	L1_EM60	L1_MU06	L1_MU08	L1_MU10	L1_MU11	L1_MU
L1_EM5	1.00000	0.09620	0.00322	0.00024	0.00588	0.00258	0.00024	0.00580	0.00419	0.00338	0.00161	0.0005
EM01	1.00000	1.00000	0.03347	0.00251	0.06109	0.02678	0.00251	0.02008	0.01590	0.01423	0.00837	0.0041
L1_2EM15	1.00000	1.00000	1.00000	0.07500	0.60000	0.20000	0.05000	0.10000	0.10000	0.07500	0.07500	0.0750
L1_2EM15I	1.00000	1.00000	1.00000	1.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.0000
L1_EM25	1.00000	1.00000	0.32877	0.00000	1.00000	0.43836	0.04110	0.09589	0.08219	0.06849	0.05479	0.0274
L1_EM25I	1.00000	1.00000	0.25000	0.00000	1.00000	1.00000	0.03125	0.06250	0.06250	0.06250	0.03125	0.0312
L1_EM60	1.00000	1.00000	0.66667	0.00000	1.00000	0.33333	1.00000	0.33333	0.33333	0.33333	0.33333	0.3333
L1_MU06	0.46154	0.15385	0.02564	0.00000	0.04487	0.01282	0.00641	1.00000	0.66667	0.50641	0.16667	0.0512
L1_MU08	0.50000	0.18269	0.03846	0.00000	0.05769	0.01923	0.00962	1.00000	1.00000	0.75962	0.25000	0.0769
L1_MU10	0.53165	0.21519	0.03797	0.00000	0.06329	0.02532	0.01266	1.00000	1.00000	1.00000	0.32911	0.1012
L1_MU11	0.76923	0.38462	0.11538	0.00000	0.15385	0.03846	0.03846	1.00000	1.00000	1.00000	1.00000	0.3076
L1_MU20	0.87500	0.62500	0.37500	0.00000	0.25000	0.12500	0.12500	1.00000	1.00000	1.00000	1.00000	1.0000
L1_MU40	1.00000	1.00000	1.00000	0.00000	1.00000	0.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.0000
L1_2MU06	0.50000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000	1.00000	0.5000
L1_2MU08	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000	1.00000	0.0000
L1_2MU10	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.00000	1.00000	1.00000	1.00000	0.0000
L1_2MU11	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L1_2MU20	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
L1_2MU40	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Things missing

- Some things not shown here (being worked on)
- B-jets:
  - Will be there from the start?
  - No numbers yet
- B-physics:
  - No numbers shown in M-A's talk
- Forward jets:
  - Will be there from the start?
  - Needed for VBF invisible Higgs, maybe useful to other VBF channels
  - No numbers yet, but may need to be only in (exclusive) combined signatures
- Combined signatures (γ+jet, e+ETmiss, etc):
  - No numbers yet

Menus Workshop (Pre-announcement)

- Trigger Menu mini-workshop in September 24-25 at CERN (will be announced soon at Phys. Coord.)

- Define strategy for setting the menu and assigning bandwidth
  - Find needs from each detector and physics groups
    - What is necessary for calibration and alignment
    - What triggers are missing
  - What to do if trigger has higher rate than expected
    - Prescale? Raise thresholds?
  - What triggers must always be unprescaled?
  - Establish procedure for adding new triggers
  - What are the early priorities? (Commissioning needs - see backup slide)
  - Each existing trigger must have a justification and known clients

Summary and outlook

- Information on trigger rates is becoming available: allows an idea of what the prescale factors will be (already) for initial running
- Mini workshop on trigger menus to be held at CERN on 24-25 September
- Please send me your input:
  - I'd like to review the Higgs WG needs/ideas in the next meeting (17 Sep)

Backup

Commissioning

- Commission Level 1
  - Get the timing right, so that all detectors are looking at same event (cosmics+test runs)
  - Bootstrap:
    - random accepts $\rightarrow$ min.bias $\rightarrow$ selection
    - Means collecting a lot of random accepts and min. bias in the beginning to find out the min.bias efficiency, etc
- Commission the HLT
  - Run the HLT in flagging mode for some time and validate offline
- Certify at each step that we're getting meaningful results
  - Prescaled, loose triggers for each selection trigger