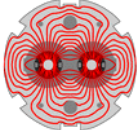


# PGC Status

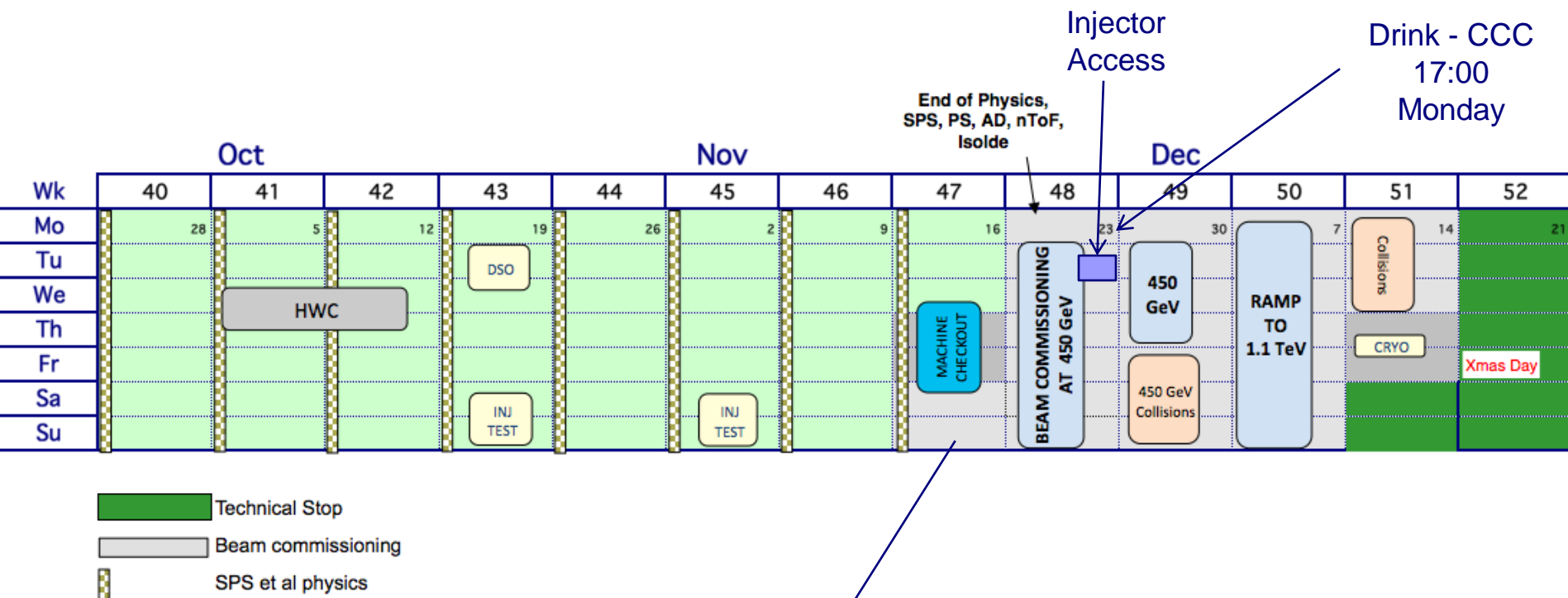
	1.2	1.4	1.5	1.8	1.9	2	OP
sector 12	X	X				partial	
sector 23	X	X	X	X	X	X	
sector 34	X	NO!				partial	
sector 45							
sector 56	X	X	X	X	X	X	precycled
sector 67							
sector 78	X	X	X	X		X	precycled
sector 81							

1.2	Arc to nominal and down
1.4	MB – heater induced quench
1.5	600 A - FPA
1.8	MS to nominal
1.9	separation dipole
HR	8 hour heat run

S12	XR1	LR1	A12	ML2	XL2
S23	XR2	MR2	A23	WL3	
S34		WR3	A34	ML4	
S45		MR4	A45	LL5	XL5
S56	XR5	LR5	A56	ML6	
S67		MR6	A67	WL7	
S78		WR7	A78	ML8	XL8
S81	XR8	MR8	A81	LL1	XL1



# LHC 2009 - schedule



Injector Access

Drink - CCC  
17:00  
Monday

End of Physics,  
SPS, PS, AD, nToF,  
Isolde

Monday - Wednesday

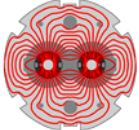
Finish HWC, PGCs etc.

Thursday – Friday

Global machine checkout

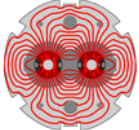
Weekend

Beam on



# Global machine checkout

DAY	SHIFT	Priority	TIME hours	System	TASK	Comment
1	A	1	8	BIS	debugging with everything connected - as prerequisite, plus experiments, connection to beam dump etc	Both loops close, beark loops, check PM events etc., much tried before
1	N	1	3	WIC/FMCM	interlocked warm magnets	RD in 3 & 7
1	N	1	5	OP	Pre-cycle and full sequence tests, RBAC operational	all circuits, RF, collimators
2	M	1	8	PIC	Check configuration, mapping to BIS etc.	Markus Z.
2	M	1		SIS	Orbit correctors etc.	<b>in parallel</b> with Markus (4 hours)
2	A	1	3	LASS/LBDS	DSO-like test of LBDS connection to LASS:	check the timing between LASS signal, BIS loop and Dump trigger. check with Ghlain
2	A	1	2	LBDS	At 450 GeV trims of all 8 magnet currents, up and down, to check BETS and LBDS trigger (rearm LBDS after) [16 trims & resets]	Minimum LBDS energy tracking tests with all inputs connected (4xRB, 2xMSD, 2xQ4): - this and following LBDS tasks
2	A		4	EPC	RBIH 8733 au SR8 - tests (note this is an EIS)	<b>in parallel</b> with beam dump tracking which doesn't need beam permit
2	A	1	2	LBDS	full system ramp to top energy, checking tracking of kicker power supplies.	
2	N	1	8	OP	Pre-cycle and full sequence tests, RBAC operational	Power converters, collimators, RF, Injection, Beam Instrumentation
3	M	1	2	LBDS	at top energy, trims of all 8 magnet currents, up and down, to check BETS triggers (rearm BETS only)	
3	M	1	2	LBDS	Check of energy distribution from BETS with RBs connected.	recycle LHC and ramp to top energy, monitoring energy distribution. (combine partly with 2) [time estimate: 2 h extra for recycle?].
3	M	1	2	LBDS	Global check of ramping of protection devices for LBDS with RF, LHC collimators and magnets	needed to make sure dump ramps with all real inputs connected. - can be done in conjunction with 3
3	M		4	CV	Ventilation tests: air flow (speed/direction) with machine closed.	2 to 3 teams into ring - could have been completed in W47
3	A	2	2	OFB	Orbit feedback tests - checking RT channel control of FGCs etc.	Ralph Steinhagen/Stephen Page - already looking good
3	A	2	6	OP	Final OP preparation for beam - interlocks, pre-cycle etc.	
				ALARM	Systematic checks	In shadow of above & as sectors become operational
		TOTAL	37	hours	assuming 100% machine availability	
			1.5	days		



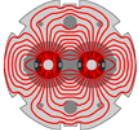
# Days 1 to 3

Phase	Day	Shift	Time (h)	Activity	Beam	Target values
Injection and circulating 450 GeV beam	1	M	8	Injection and First turn b1	B1, pilot	Beam thread around ring with splash events (~30 per experiment)
	1	A	8	Injection and First turn b2	B2 pilot	Beam thread around ring with splash events
	1	N	8	SF		
	2	M	8	Circulating Pilot and RF capture b2	B2, pilot	
	2	A	8	Circulating Pilot and RF capture b2	B2, pilot	c.o established. >5h beam lifetime
	2	N	8	SF		
	3	M	8	Circulating Pilot and RF capture b1	B1, pilot	
	3	A	8	Circulating Pilot and RF capture b1	B1, pilot	c.o established. >5h beam lifetime
	3	N	8	SF		

Over the weekend we would hope to injection, circulate and capture both beams working with one beam and then the other.

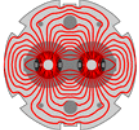
Start with beam 1

If we do start Friday evening, take both beams around overnight and give beam to RF during the day Saturday



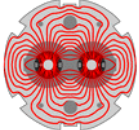
# Weekend

		Duration [h]	Comments	Names
Friday 17:00	<b>LHC ready for beam</b>			
approx 18:00	<b>Beam 1 - fast track first turn</b>	2	Same settings at last time - should be straightforward	OP
approx 20:00	<b>Beam 2 - fast track first turn</b>	2		
20:00 - 21:00	<b>Beam to point 5 for splashes</b>	1	RF see beam, splashes for CMS from left	
21:00 - 22:00	<b>Beam to point 6, initially to TCDQ, then inject &amp; dump</b>	1		Bren & co
22:00 - 23:00	<b>Beam to point 7, TCTs in point 8</b>	1	Splashes for LHCb	
23:00 - 24:00	<b>Beam to point 1 - L1 TCTs</b>	1	Splashes for Atlas	
00:00 - 01:00	<b>Through point 1 - full turn</b>	1	Establish N turns	
01:00 - 07:00	<b>Repeat for beam 2</b>	6	Establish N turns - BBQ parasitically	
07:00 - 15:00	<b>RF capture - beam 1</b>	8	extend as required	RF team - point 4
15:00 - 23:00	<b>Operational checks of orbit, tune etc</b>	8		OP, BI
23:00 - 07:00	<b>Kick-response checks of BPM/corrector polarities</b>	8		Shift crew
07:00 - 15:00	<b>RF capture - beam 2</b>	8	extend as required	RF team - point 4
15:00 - 23:00	<b>Operational checks of orbit, tune etc - beam 2</b>	8		OP, BI
23:00 - 07:00	<b>Kick-response checks of BPM/corrector polarities</b>	8		Shift crew
07:00 - 15:00	<b>RF - continued commissioning B1/B2</b>	8	RF trims, energy matching	BI
07:00 - 15:00	<b>BCTs, BPMs - capture mode B1/B2</b>	8	Parasitic to above	BI
15:00 - 18:00	<b>Injection aperture check IR8</b>	3		Bren & co



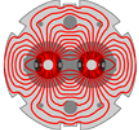
# Days 4 - 11

4	A	8	BCTFR, BPM setup (phases) with pilot intensity, b2	B2, pilot	BCT, BPMs working in capture mode, lifetime measurement
4	A	8	RF further commissioning (loops, ...) b2	B2, pilot	RF loops
4	N	8	SF		
5	M	8	Tune, Dispersion measurements, b2	B2, pilot	Check integer tune, measure dispersion. BBQ - only minor re-commissioning expected (tests), 1-2 half-shifts/beam
5	A	8	Orbit studies, b2	B2, pilot	c.o corrected, energy matching done
5	N	8	SF		
6	M	8	Chromaticity - check trims and adjust, b2	B2, pilot	Chromaticity corrected to ???
6	A	8	Initial commissioning of beam dumping system, b2	Extracted pilot, b2	Aperture, extraction trajectory, LBDS BI
6	N	8	SF		
7	M	8	Basic protection device and collimator setting-up - b2	B2, pilot	TCDQ, TCTs, collimators as aperture.
7	A	8	MPS tests: FMCM, time delays	B2, pilot	FMCM, PIC, WIC 896393, 896390, 896395
7	N	8	BCTFR, BPM setup (phases) with pilot intensity, b1	B1, pilot	BCT, BPMs working in capture, lifetime measurement
8	M	8	RF further commissioning (loops, ...) b1	B1, pilot	RF loops
8	A	8	Tune, Dispersion measurements, b1	B1, pilot	Integer tune oK, fractional to ???, disp, measured
8	N	8	SF		
9	M	8	Orbit studies, b1	B1, pilot	c.o corrected, energy matching done, local correction
9	A	8	Chromaticity - check trims and adjust, b1	B1, pilot	Chromaticity measurement and trim, RF radial loop/modulation → 1-2 half-shifts/beam
9	N	8	SF		
10	A	8	Initial commissioning of beam dumping system - b1	Extracted pilot, b1	Aperture, extraction trajectory, LBDS BI
10	A	8	Basic protection device and collimator setting-up - b1	B1, pilot	TCDQ, TCTs, collimators as aperture.
10	N	8	SF		
11	M	8	Emittance measurements- b1 - b2	B1 and B2 pilots	Wires, BSRT cross checked, AGM
11	A	8	MPS: BLM thresholds - check plus thresholds and checks on beam dump BLMs	B1/B2 pilots	896394, Decrease BLM threshold and create IL with very small beam intensity
11	N	8	SF		



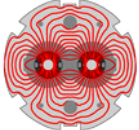
# Days 12 - 13

450 GeV two beam operation	12	M	8	Two Beam Operation setting-up - 450 GeV	2x2, 5e9	Two beams stored, RF cogging, Lifetime ~10 hours, Common correction.
	12	A	4	MPS: experiments' dump tests	pilot	Dump test for each experiment, based on BCM monitor data...
	12	A	4	MPS: Provoke magnet 'trip' and check adequate protection by collimators	pilot	Combined with BLM on triplets check
	12	N	8	450 GeV collision setting-up - experiments	Solenoids & dipoles ON	Commission LHCb and Alice at 450 GeV only (4 hours). Solenoids will take 4 hours for CMS, not long for Alice, and a few hours for Atlas
	13	M	8	MPS: aperture in insertion regions, Calibration/check of triplet BLMs	pilot	
	13	A	8	450 GeV collisions	2x2, 2e10	First fill during daytime
	13	N	8	450 GeV collisions	2x2, 2e10	



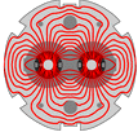
# 14 – 18: ramp & 450 GeV collisions

14	M	8	Snapback- Ramp setting up - b1	with sol. ON	
14	A	8	Snapback- Ramp setting up - b1 cont'd.		
14	N	8	450 GeV collisions	2x2, 5e10	BPF has to be there, trial lumi scans (using expts. data). Look at BRAN
15	M	8	Snapback- Ramp setting up - b1 cont'd.		
15	A	8	Protection device and collimator setting-up - b1 ramp		TCDQ, TCTs, collimators as aperture.
15	N	8	450 GeV collisions	2x2, 5e10	
16	M	8	Snapback- Ramp setting up - b2	with sol. ON	
16	A	8	Snapback- Ramp setting up - b2, cont'd.		
16	N	8	450 GeV collisions	4x4 5e10	
17	M	8	Snapback- Ramp setting up - b2, cont'd.		
17	A	8	Protection device and collimator setting-up - b2 ramp		TCDQ, TCTs, collimators as aperture.
17	N	8	450 GeV collisions	4x4 5e10	
18	M	8	MPS and beam dumping system - extracted pilot, b1 - 0.45-1.2 TeV		BLM checks, energy tracking, LBDS BI
18	A	8	MPS and beam dumping system - extracted pilot, b1 - 0.45-1.2 TeV		BLM checks, energy tracking, LBDS BI



# Stocking fillers

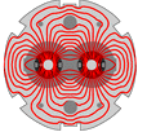
<b>SF (mostly N shifts):</b>		
Kick response measurements		
BPM commissioning (Capture mode)	stable, pilot	1 - 2 nights
Aperture measurement		
Basic injection tuning - b1, b2	B1, pilot	Basic inj. steering & matching, 3.75 (??) um e <sub>xy</sub>
Beating measurements		
Cycle machine		2 hours as required
Trial ramps		
Tune injection protection - 450 GeV		
Check beam presence flag to allow high intensity injection		
Measure injection efficiency (should be around 95%) trajectories		
TDI setting : goal 7 $\sigma$		
Collimation setting-up & protection - 450 GeV		
Two Beam Operation - 450 GeV		
Set up of two beam collimators (TCT, TCL) IR1, IR2, IR5, IR8		
IR set up: separation bumps, SIS limits (I)		
IR1,2,5,8 set up: aperture measurements with separation on		
IR set up: separation bumps, SIS limits (II)		
Dedicated losses for R2E		'dedicated' losses in order to evaluate what are 'safe limits' for direct-loss induced radiation levels to electronics.
Stable single bream for a least 4 hours (if lifetime good enough)		
Stable - two uncolliding beams - 4 hours - experiments timing		
Tune-PLL (though tested in the SPS) → 2-4 half-shifts/beam		
Continuous Q' measurement via RF frequency modulation		1 - 2 shifts - try and get working before ramp commissioning
Orbit feedback tests		1 - 2 shifts
RF phasing:		
Coarse - relative bucket and phase beam 1 & beam 2		
Fine adjust: longitudinal crossing point		
Adjust of crossing point in collisions		
<b>Parasitic machine development</b>		
Roman pots to 15 sigma		
<b>Before access</b>		
Intrusion test. Verify signals and beam dump OK before access block in		0.5 hours per beam



# Meetings

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- 8:30 meetings
  - Chaired by HWC until Wednesday (if things go to plan)
  - Thursday onwards: Chaired - joint HWC/LHC machine coordinators as required.
    - Continued involvement of HWC during initial phase considered vital
  
- 17:00 meetings
  - will continue for discussion of more detailed operational issues
  
- 9:00 meetings on Saturday & Sunday
  - probably upstairs on the first weekend



# Latest news

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<http://cern.ch/lhc-commissioning/news/LHC-latest-news.htm>

To be diligently updated by machine coordinators

Commissioning doc now available from the above  
site (see Documentation) and  
<G:\Departments\BE\Groups\OP\LHC\planning>