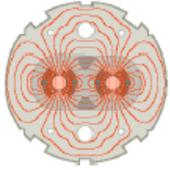


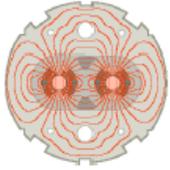
Beam Commissioning

- TI-8 transfer line tests -- Sept-Oct 04 (2 x 48-hrs)
 - Thus, FY04, FY05
- Hardware tests/commissioning -- CY05
 - LARP H/W commissioning (M. Lamm)
 - US LHC hardware contributions only?
 - Either way, may want some LARP APBC people to participate during CY05 to gain knowledge / experience w/ LHC prior to beam commissioning
- Injection Test -- CY06 (schedule will slide??)
 - 2 week period in the second half of 2006, take beam into the LHC and round roughly one octant
- Beam commissioning sometime 2nd half of CY07
 - Estimate 3 months for first collisions

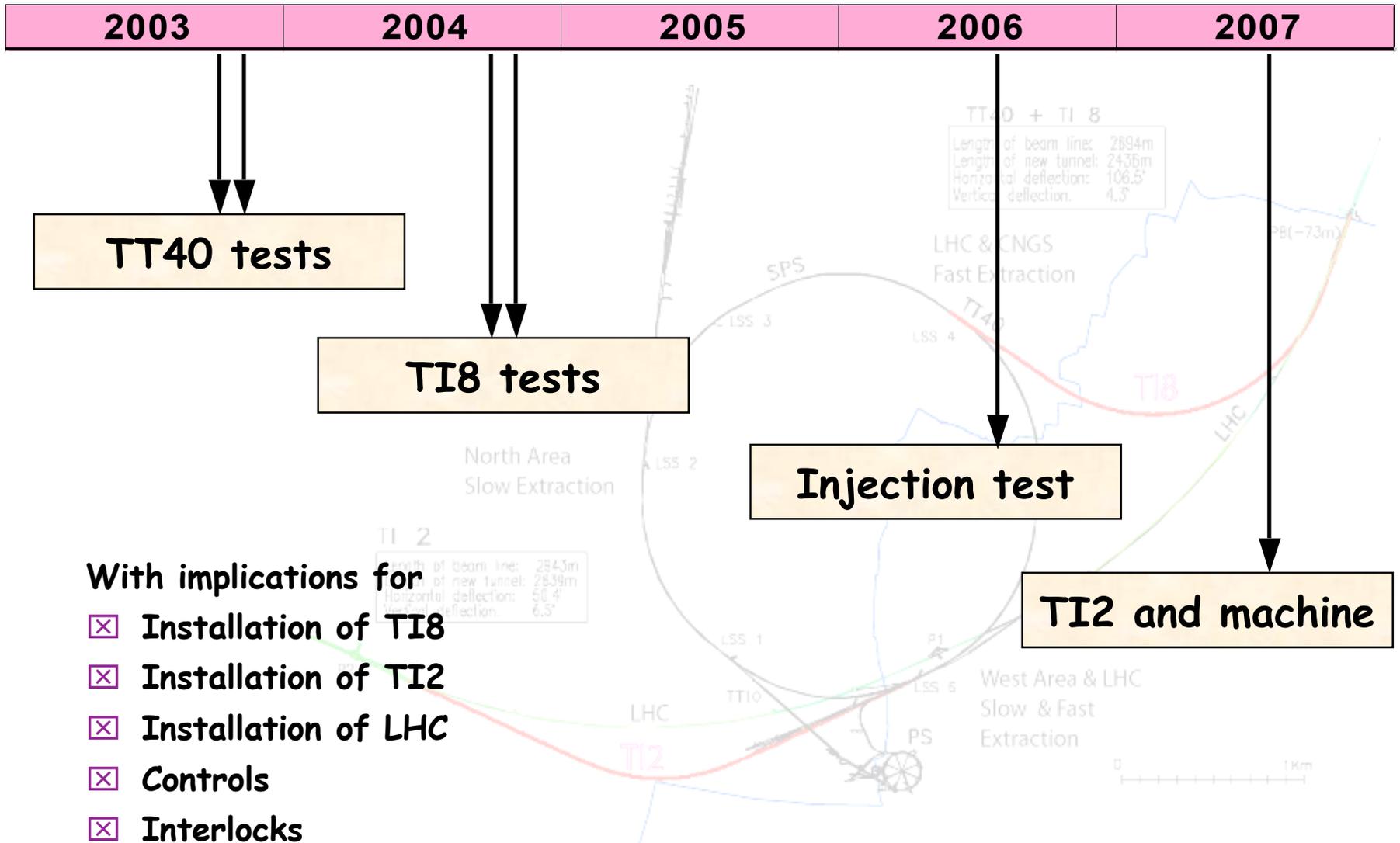


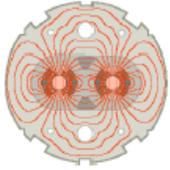
Status of the proton beams at 450GeV

Beam	N_{bunch} [$10^{11}p$]	$\epsilon_{H/V}^*$ [μm]	ϵ_L [eV s]	$\#_b$	Δt_b [ns]	Ghost [%]	Comm.	
😊 Pilot	0.05±? 0.055±0.004	1-3.5\1-3.5 0.6-14\0.6-9	<0.8 0.3-1.2	Small#	>225	-		
😊 Commiss. /TOTEM	0.3±? 0.055 0.7 1.2	0.9\0.9 0.6\0.6 0.9\1.1 1.2\1.5	<0.8	Small#	>225	-		
😊 Early ϕ -75ns	0.4±? 0.6 1.15	2.5\2.5 1.8±0.1\1.5±0.05 0.9±0.05\0.8±0.05	<0.8 <0.6 <0.6	1-6x4 1-4x24	75	<1 ~2-3		
Not fully tried	Early ϕ -25ns	0.4±?	2.5\2.5	<0.8	1-6x12 1-4x72	25	<1	1.4/1.3 @26GeV (1 batch)
😐 Nominal	1.15±0.1 1.15	3.5\3.5 2.8±0.6\4.2±0.2	<0.8 0.6	1-6x12 1-4x72	25	<1		
😞 Ultimate	1.7±?	3.5\3.5	<0.8	1-6x12 1-4x72	25	<1		

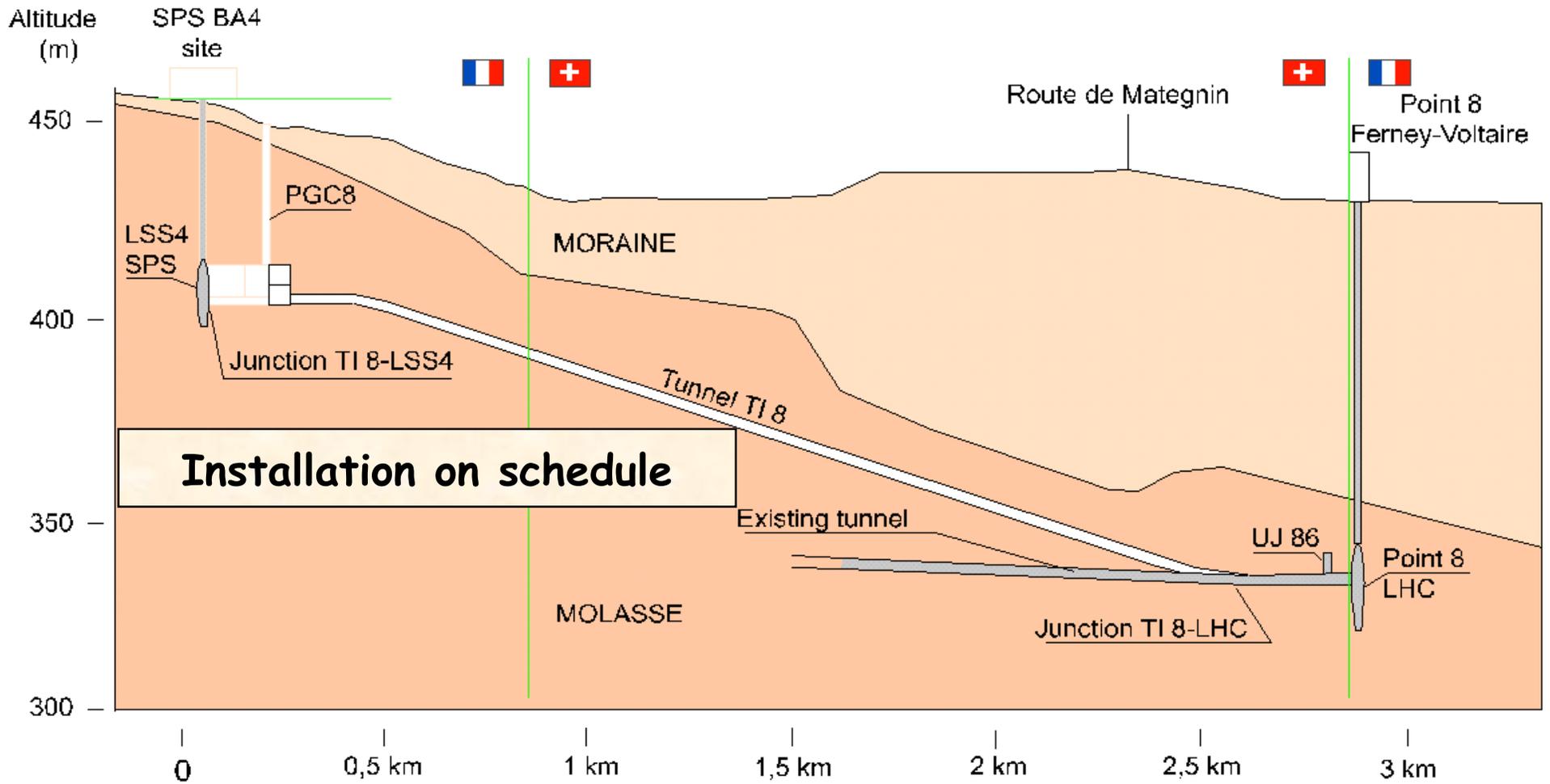


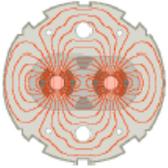
Beam milestones on the official schedule



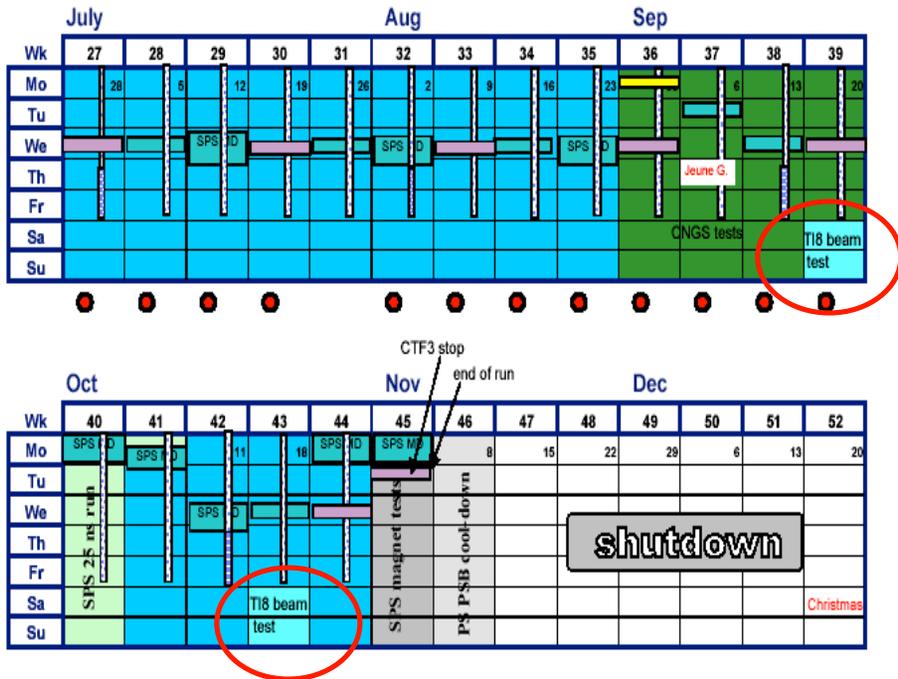


TI8 schematic





TI8 beam tests in 2004



Primary objective

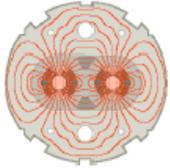
- ☒ Pilot bunch to second TED
 - ☒ Access system and interlocks needed
 - ☒ Check functionality of hardware
 - ☒ Equipment control
 - ☒ Data acquisition
 - ☒ Beam steering applications

Secondary objectives

- ☒ Beam stability
- ☒ Optics and matching
- ☒ OASIS
- ☒ Logging

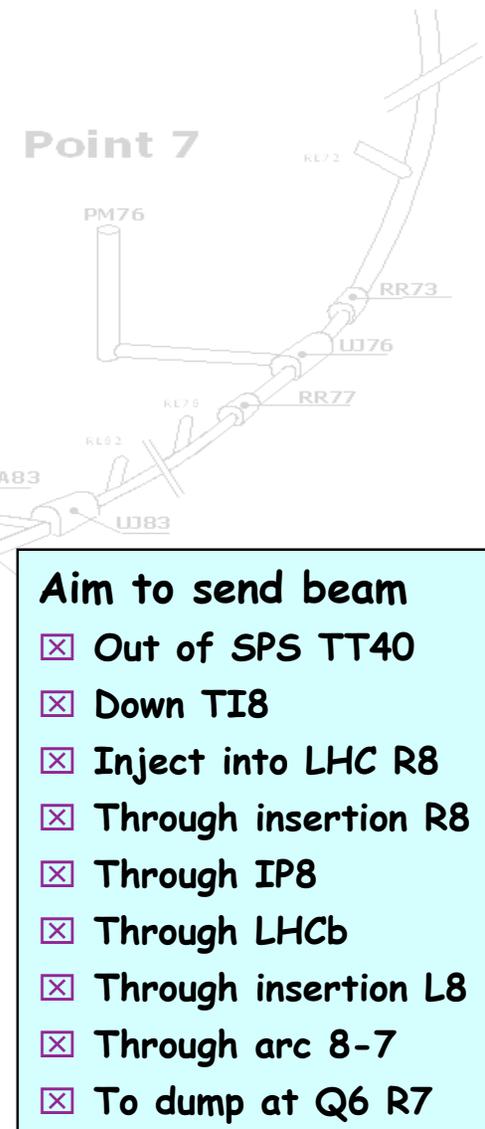
Other tests foreseen in TT40

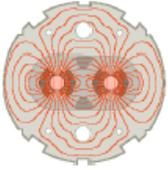
- ☒ Extraction of CNGS set-up beam on the P2 cycle in September
- ☒ **TT40 high intensity tests**, scheduled after the second TI8 test
 - ☒ Collimator robustness (R. Assmann)
 - ☒ Material studies (R. Schmidt)



Sector test with beam in 2006

- ⊗ **Much bigger deal** - most LHC systems implicated
- ⊗ Requirements established for
 - ⊗ Injection elements
 - ⊗ Magnets, Magnet circuits and thus Power Converters
 - ⊗ Cryostats, DFBs and PICs...
- ⊗ Beam Instrumentation
- ⊗ Dump/IR7
- ⊗ Access
- ⊗ Radiation Monitoring
- ⊗ Controls & Interlocks
- ⊗ Beam tests enumerated
- ⊗ Expected **activation** and implications detailed
- ⊗ HWC planning established
- ⊗ Follow-up incoming





Summary of operations startup activity

4 phases of operations activity, covering 8 months

1	Machine checkout in parallel with hardware commissioning until T_0	3 months
2	Safety systems, vacuum, equipment on, first beam	1 month
3	Machine checkout continues interleaved with beam commissioning, first collisions	3 months
4	Pilot runs for experiments interleaved with beam commissioning	1 month

Role(s) of LARP APBC

- Commissioning of particular equipment/systems?
- AP computational support -- diagnostics efforts?
- Diagnostic S/W development?
- General troubleshooting?
- Shift leader / EIC role?
- Help develop overall commissioning plan?

We have some idea, or plan, for FY04; 05/06???