



Proposal for LHC CC Design Review 2010



T. Linnecar, J. Tuckmantel, E. Ciapala, E. Jensen

First questions

- ▶ What is the purpose of phase 0?
 - ▶ luminosity increase (how much is worthwhile)?
 - ▶ Proof of Technology and Reliability?
 - ▶ Show crabbing works in high intensity hadron machine?
 - ▶ Decision 400 or 800 MHz ?

Need clear objectives to prove something.

- ▶ Frequency: If phase I @ 400 MHz, why phase 0 @ 800 MHz?
 - ▶ 800 MHz cavity is not a prototype for 400 MHz cavity.
- ▶ Invisibility for high intensity beam when “off” or “warm”?
 - ▶ Do not disturb luminosity physics
 - ▶ Instabilities due to CC
- ▶ Will point 4 remain available?
- ▶ 2 experiments? How many crab cavities?



Getting to Phase 0

- ▶ Phases to final testing of crab cavity in LHC:
 - ▶ Confirm frequency
 - ▶ R & D on delicate items
 - ▶ Confirm main parameters for CC (meeting?)
 - ▶ All efforts in one direction → documentation for final design
 - ▶ **Design Review to launch final phase 0 construction with schedule taking into account status LHC**
 - ▶ Construction and system testing
 - ▶ Installation and beam tests



- ▶ Possible Schedule
-



Schedule

		2008	2009	2010	2011	2012
R & D and test stand work	Cavity					
	Vertical test					
	HOM couplers					
	LOM coupler					
	Main coupler					
	Tuner					
	Cryostat					
Confirmation main parameters						
Full Prototype Design for installation	Cryostat plus cavity					
	Personnel / Hardware safety					
	Tunnel layout, cryogenics interface					
	Survey / Alignment					
	Radiation Issues					
	Cavity servo-control control					
	Synchronisation control					
	Slow controls					
	RF power source					
Paperwork for review						
Design validation review						
Construction & Installation	Construction cryomodules					
	Full bunker tests					
	Construction power source					
	Construction electronics					
	System tests					
	Tunnel mods.					
	Installation					
	Beam tests					



▶ **April 2009:**

- ▶ Confirm phase 0 CC parameters in April 2009.
- ▶ Review installation schedule and possibilities according to LHC status
- ▶ Get approval from CERN management for possible installation

▶ **July 2010:**

- ▶ Design review to validate final crab cavity system design and to decide on the number of cavities to be built for installation in LHC at point 4
- ▶ Review installation schedule

▶ Installation of capture cavities @ 200 MHz / transverse damper upgrade will require a complete rethink.

▶ No attempt has been made to define the necessary resources



Conclusion

- ▶ Define aims of phase 0 installation
- ▶ Decide on final frequency to minimise effort
- ▶ Design review in 2010
 - ▶ to validate the complete CC system design and infrastructure to be installed in 2012 as phase 0.
 - ▶ To give a focus for the R & D and design and also is an occasion to make sure that all interfaces with the LHC have been adequately looked at.
- ▶ Questions
 - ▶ Do you agree?
 - ▶ Are enough resources available?

