



# Status of the FMCM Installation and Production

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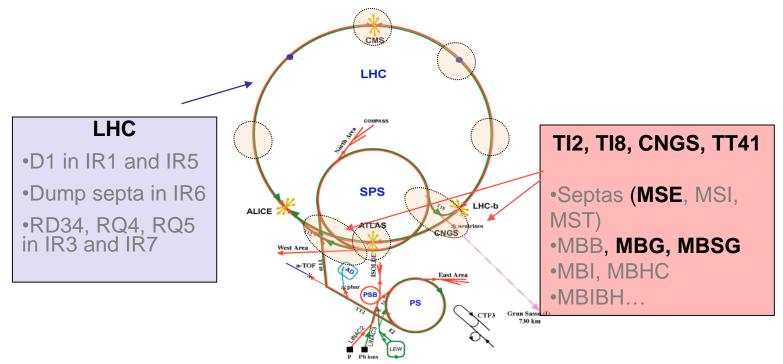
## **Some First Test Results from CNGS**

Acknowledgements: A.Dinius, R.Genand, K.Fischer, M.Jonker, J.Wenninger, A.Gomes Alonso and many others...



#### Progress so far....



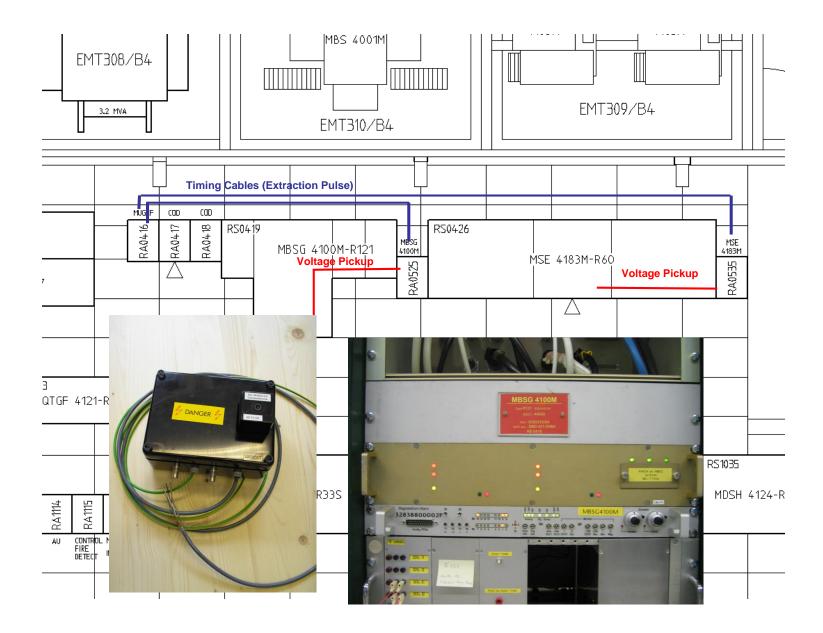


- → Three FMCM units (DESY version) out of the final 25? (see future presentation of A. Gomes Alonso) have been installed and commissioned in the last weeks for CNGS operation
- Covering the most critical circuits, namely the extraction septa, the switching magnet and the main dipole chain
- ➔ First encouraging test results



### **Installations in BB4**

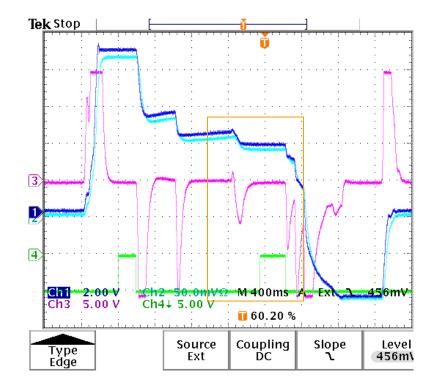




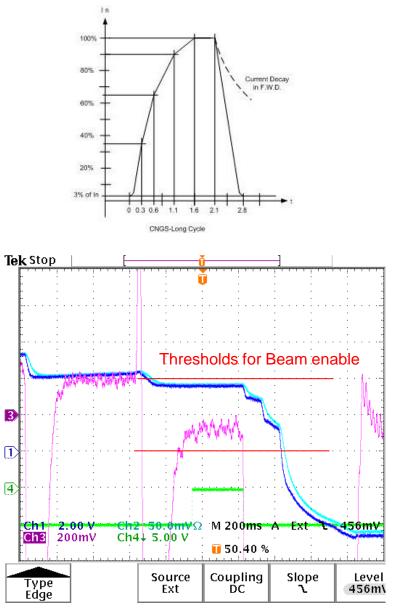


#### First Results – MBG 4101M





(Light) Green: Dump signal towards the CIBU Dark Blue: U pc out Light Blue: I sim (Calculated & filtered) Magenta: I diff sim (Calculated & filtered)





# MBG 4101M – Current Step of -1% on Flat Top

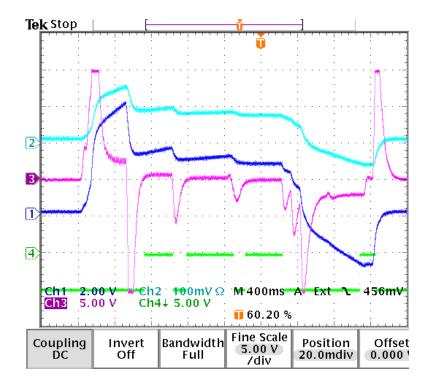


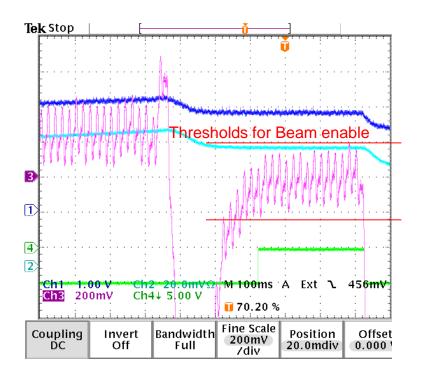
	Measurement Display	Measurement Display						
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1BI8160M @ Cycle null		Nar			e and Value		Axis	
Name	Type and Value	outputCurrent			3984.8628192999 3984.8628192999			
utputCurrent	(double[]:4001) -> 161.6687520981475,	referenceCurrent theoreticalCurrent			3984.8628192999			
eferenceCurrent	(double[]:4001) -> 161.9983520004882	time			50, 16151, 16152, 1			
		timeStamp			93494790558000			
heoreticalCurrent	(double[]:4001) - > 161.9983520004882							
ime	(int[]:4001) -> 14000, 14001, 14002, 14							
imeStamp	(long:1) -> 1148393318254823000							
		Active keys : [X] -> x	axis, [Y] -> y axis, [Z] -> z a	xis (image), [D] -> di	splay line, [H]->display l	nistogram, [SPACE] ->	clear, [T] -> time/num	bers on x axi
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	Record Text							
Active keys : [X] -> x axis, [Y] -> y axis								
→ Cline Keys . [A] -> X axis, [i] -> y axis	FMCM on MBSG (B) goes from TRUE to FALSE							
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Data for Cycle: –	FMCM on MBSG (B) goes from FALSE to TRUE	5503.3		$\wedge$				
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	FMCM on MBG (A) goes from TRUE to FALSE							
500 -	FMCM on MBG (B) goes from TRUE to FALSE	3984.5				-	2	
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	FMCM on MBG (B) goes from FALSE to TRUE				/ triggers @	2004 4	$\mathbf{A}$	
	FMCM on MBG (A) goes from TRUE to FALSE				n inggers «	<u>ສ</u>  ວອ04.4		
1000	FMCM on MBG (B) goes from TRUE to FALSE	3984		=10E-	4		4	
3000	FMCM on MBG (A) goes from FALSE to TRUE			-102				
	FMCM on MB6 (B) goes from FALSE to TRUE							
	FMCM on MBS6 (A) goes from FALSE to TRUE							
f /		3983.5-						
2500 - //	FMCM on MBS6 (B) goes from FALSE to TRUE	3903.3						
	FMCM on MBS6 (A) goes from TRUE to FALSE						1	
	FMCM on MBSG (B) goes from TRUE to FALSE							
1/	FMCM on MBG (A) goes from TRUE to FALSE							
2000 - //	FMCM on MBG (B) goes from TRUE to FALSE	3983-					A.	
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1/	FMCM on MBG (B) goes from FALSE to TRUE	16175	16180 16185	16190	16195	L6200 16	205 1621	LO
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500 - //	FMCM on MBSG (B) goes from FALSE to TRUE	A						
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11	FMCM on MBG (A) goes from TRUE to FALSE	H:11:29 PM	77513	16236	16236527	FALSE	FALSE	
	FMCM on MB6 (B) goes from TRUE to FALSE	4:11:29 PM	77513	16236	16236527	FALSE	FALSE	
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H	BPL record found (0x44077f8)	4:11:29 PM	157478	16316	16316492	FALSE	FALSE	
500 //	FMCM on MBS6 (A) goes from TRUE to FALSE	4:11:29 PM	284744	16443	16443758	FALSE	FALSE	
//	FMCM on MBSG (B) goes from TRUE to FALSE	4:11:29 PM	284744	16443	16443758	FALSE	FALSE	
	FMCM on MBSG (A) goes from FALSE to TRUE	4:11:30 PM	140850	17299	17299864	FALSE	FALSE	
	FMCM on MBSG (B) goes from FALSE to TRUE	H:11:30 PM	140850	17299	17299864	FALSE	FALSE	
0-	FMCM on MBSG (R) goes from TRUE to FALSE	4:11:30 PM	306962	17465	17465976	FALSE	FALSE	
	FMCM on MBS6 (B) goes from TRUE to FALSE	4:11:30 PM	306962	17465	17465976	FALSE	FALSE	
	Timing marker detected (67496)	4:11:30 PM	840987	18000	18000001	FALSE	FALSE	
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oint # X								
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#### First Results – MBSG 4100M





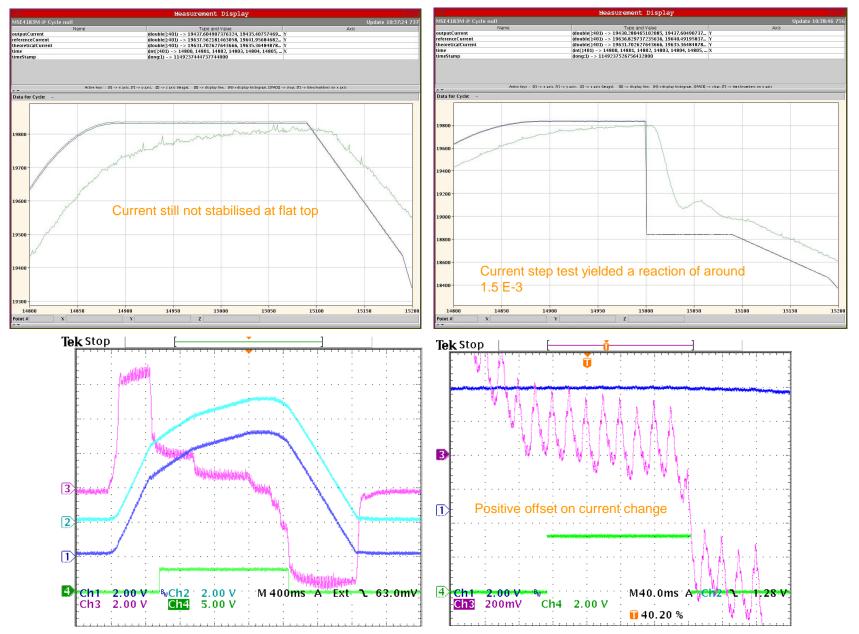


- •Same Test as for MBG performed (with 3% current step)
- •Current change of 0.4A / 3069 detected (equals 1.3E-4)
- •Reproducible enable signal from one extraction to the next one



#### First Results – MSE 4183M









- ➔ FMCM functionality validated for cycling magnets
  - CERN solution of Voltage Divider and Isolation Amplifier validated
  - Drawback are multiple extraction enables during ramp up (BIC history)
- → Reproducible extraction windows for all three installations
- → MBG and MBSG have low noise level, thus very tight windows possible
  - Results with current threshold 0.1‰ for MBG (0.6 ‰ required)
  - Results with current threshold 0.13‰ for MBSG (1.0 ‰ required)
- → MSE noise comparable to MBG and MBSG, but cycle not yet optimized
  - Positive offset limits the threshold window to 0.4 (factor 2 to gain)
  - Results with current threshold 1.5% for MSE (2.0 % required)





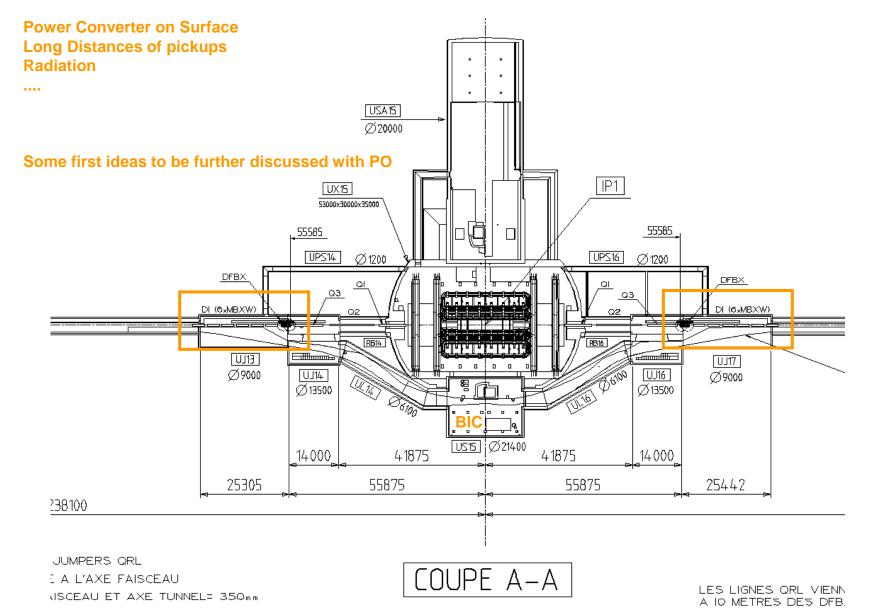
- → Cabling requests done with too short notice cables had to be put by ourselves
- Voltage pickup misplaced in first installation (before passive filter) difficult to get data on ,old' power supplies
- After installation one of the wires in the cable FMCM-Voltage Divider was in open circuit

### ➔ Timing signals from MUGEF

- pps pulse and extraction pulse needed by the FMCM for PM aquisition; not yet clear if enough free channels to provide these signals
- Timing channel only with extraction pulses (PM of inhibited extractions)
- ➔ CNGS ramps and MSE ripple
  - Cycles and extraction pulses have been changed by PO with respect to specification – more noise and offset at extraction
- → Cabling for future installations
  - Preparation of LHC and remaining SPS installations have started
  - Some integration questions remain open and might require some further simulations in collaboration with PO (D1 magnet)











- Production of Voltage Dividers and Amplification Amplifiers at CERN well advanced (15 units of HV and 20 units of LV type)
- ➔ Re-design completed according to the specification delivered by CERN
- → DESY workshop has started the layout of the new board
- Official offer for the re-design and production at DESY should reach CERN any day
- → To be integrated in the draft of the Collaboration agreement
- → Finalization of the design and Agreement during a possible visit in July