



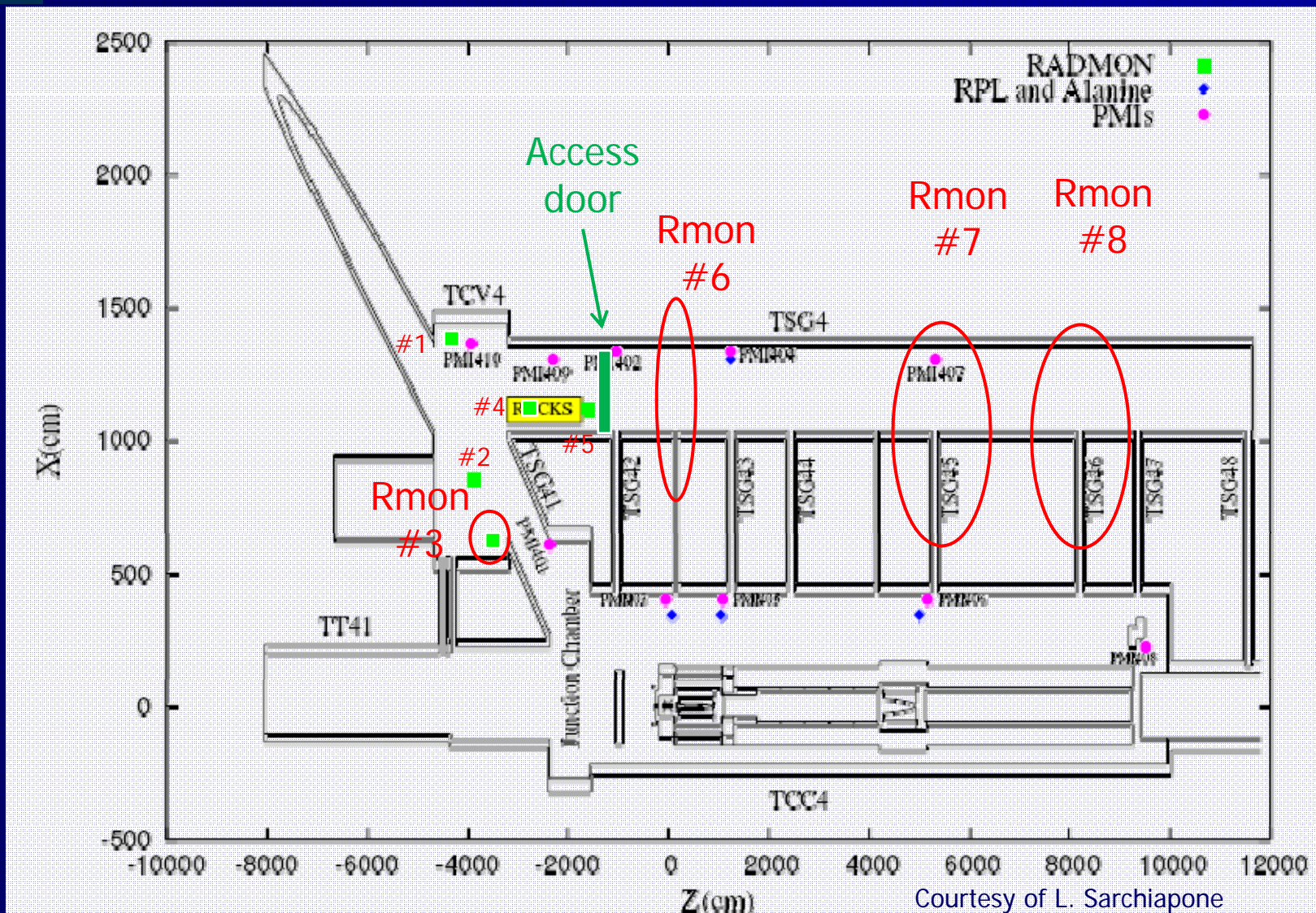
# RadMon Radiation measurement results from CNGS side gallery

Data from 2008

D. Kramer for the RadMon team

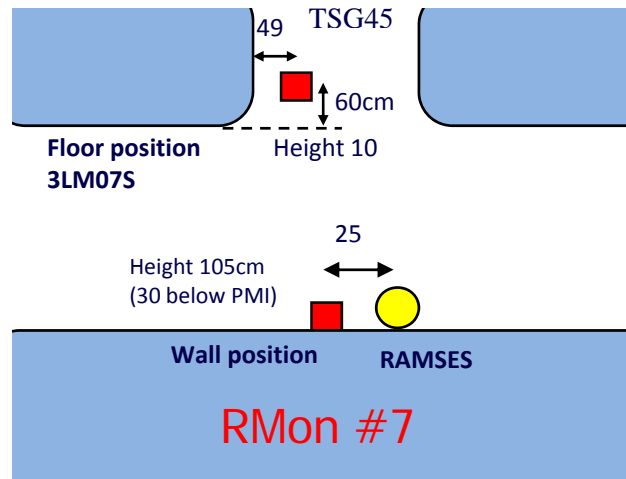
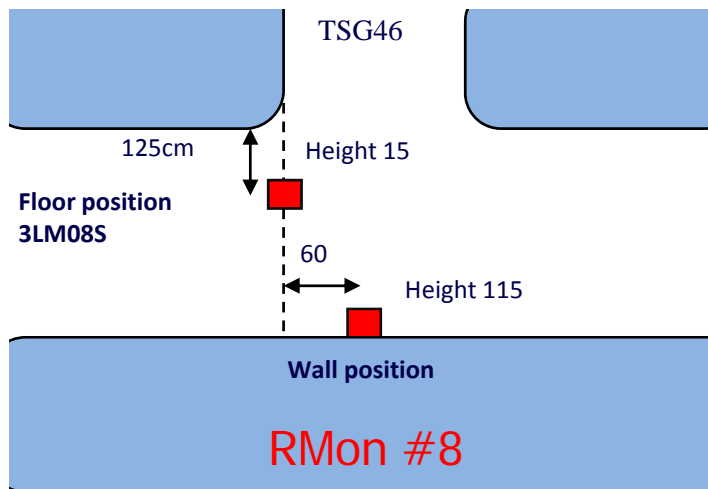


# Positioning of RadMons in the test area (naming conventions)

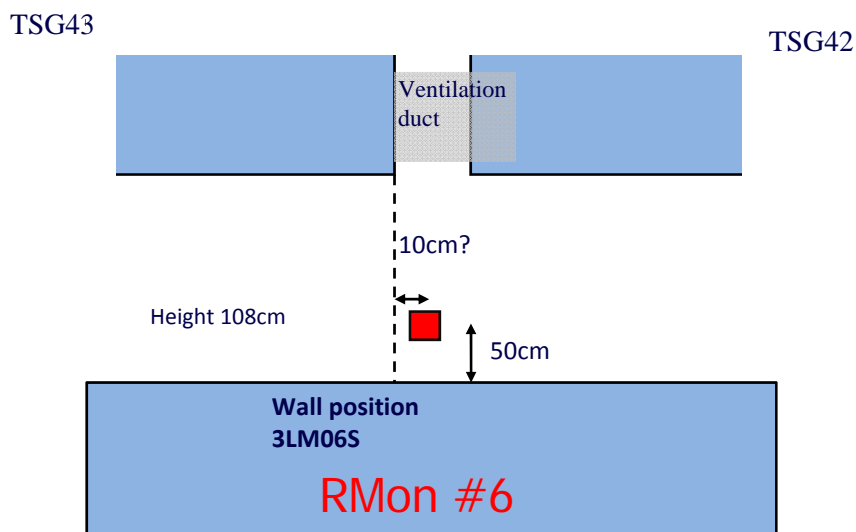




# Positioning of RadMons in the test area



Access door

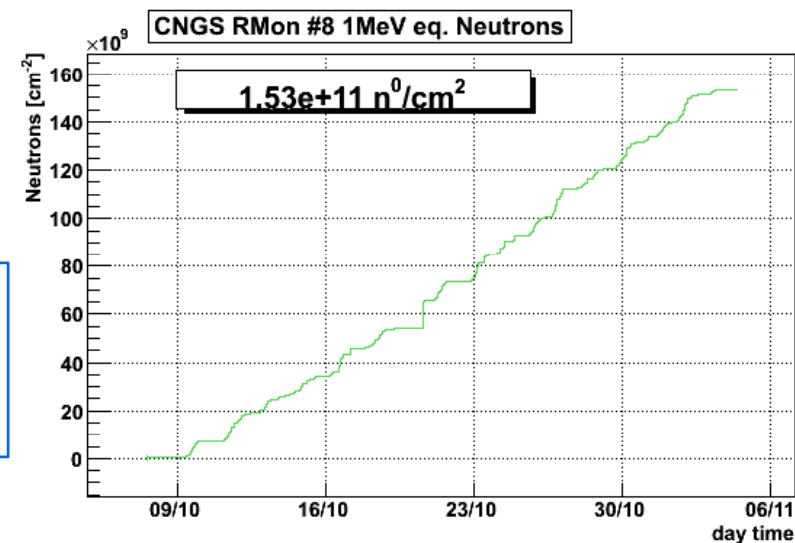
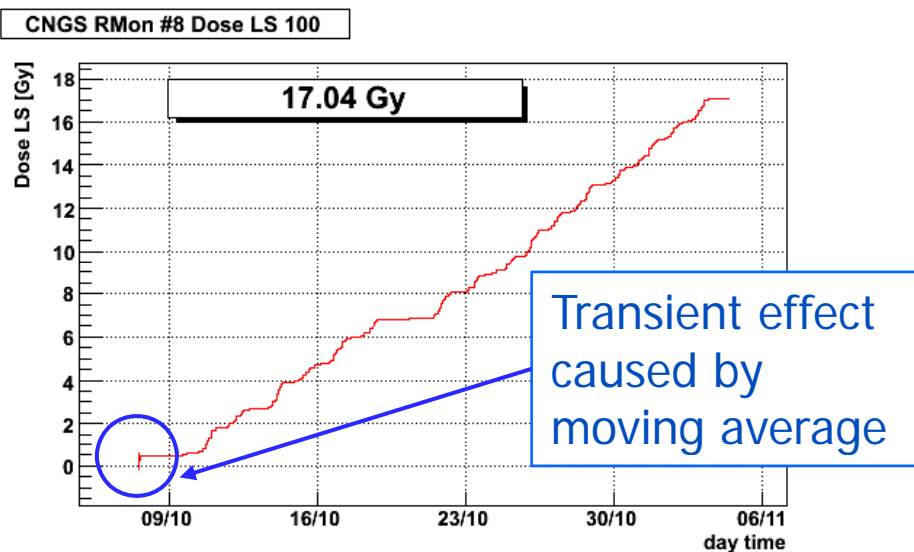
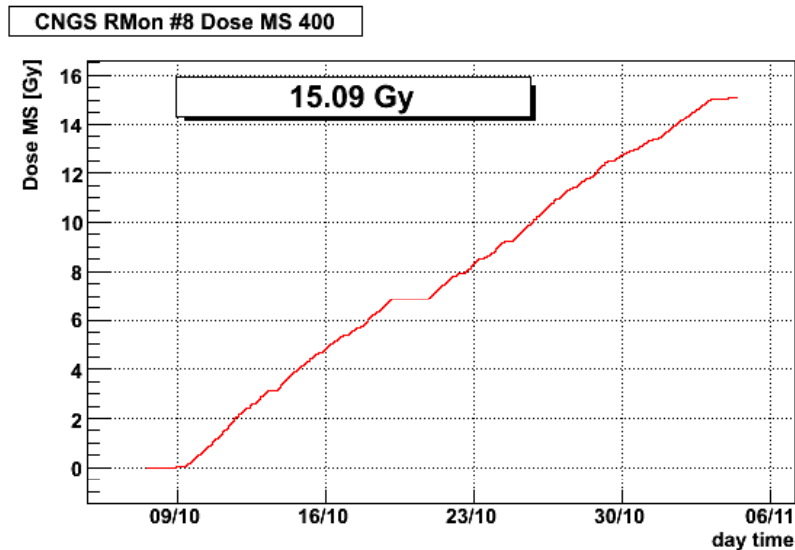
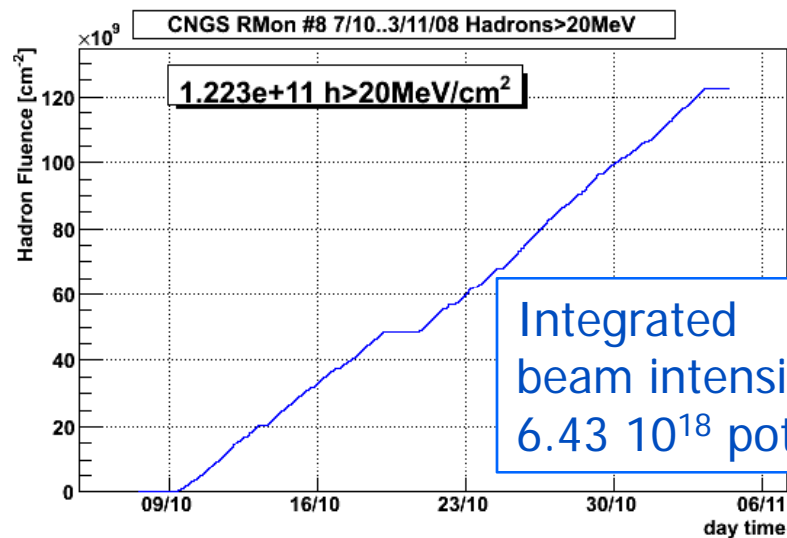


Access door

- Wall positions used before the installation of electronics
- No electronics tests performed with RMon#6
- RMon#7 wall pos. comparable with PMI407

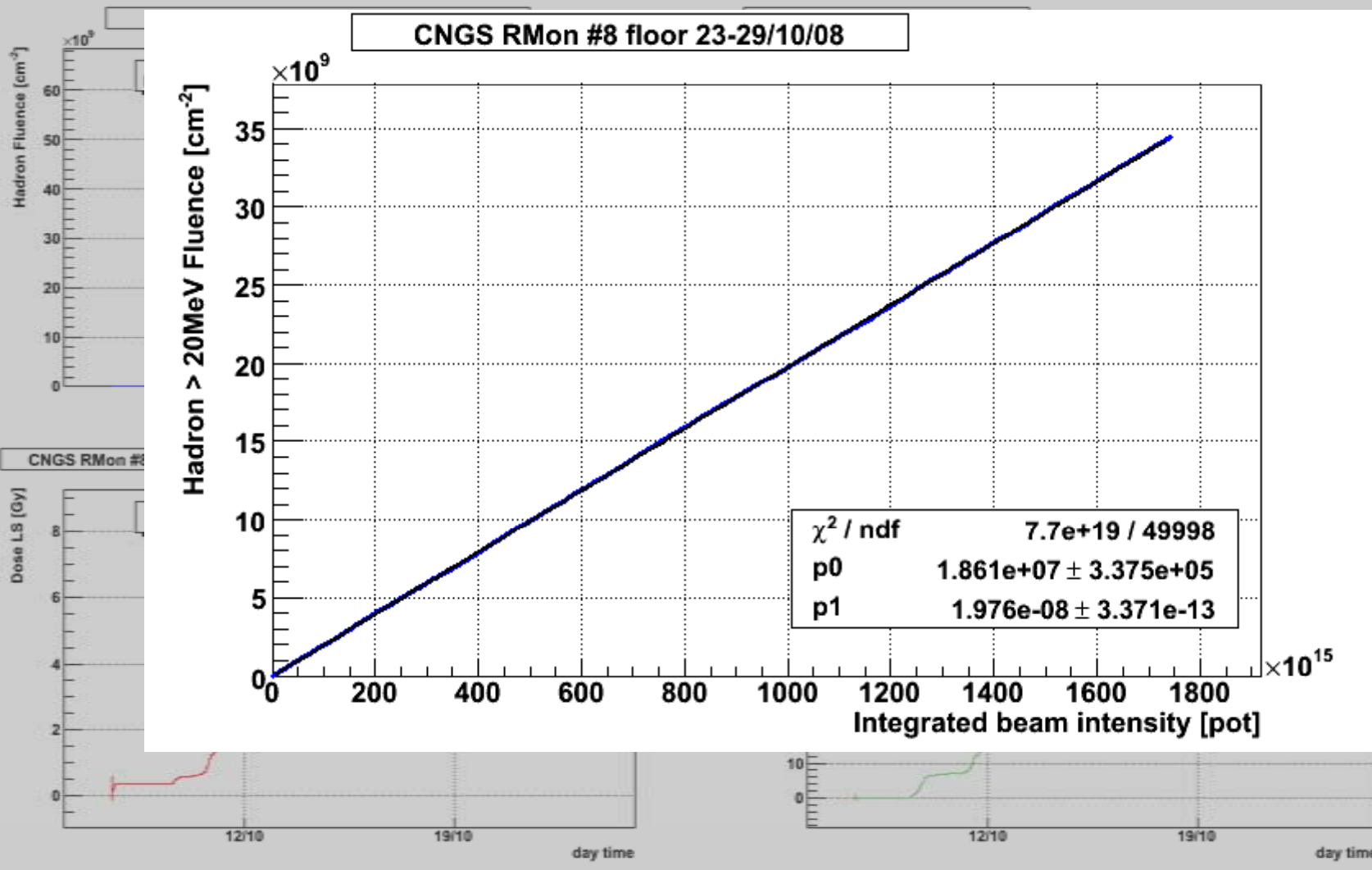


# RMon #8 for 7/10..3.11/08 floor position i.e. from installation of equip. to end of beam





# RMon #8 for 7..23/10/08 floor position fitted Hadron fluence vs. Beam intensity







# RMon #7 working fine after position change, but...





# A power cut in the test station occurred after ~2h of beam







## RMon #7 power cut after ~2h of beam

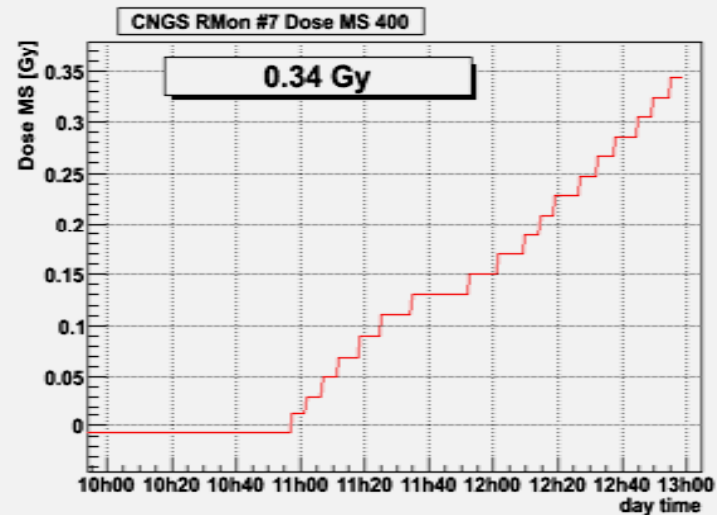
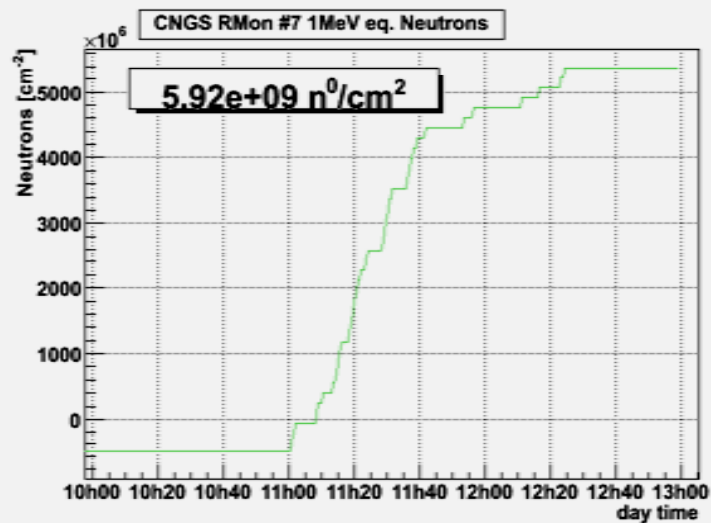
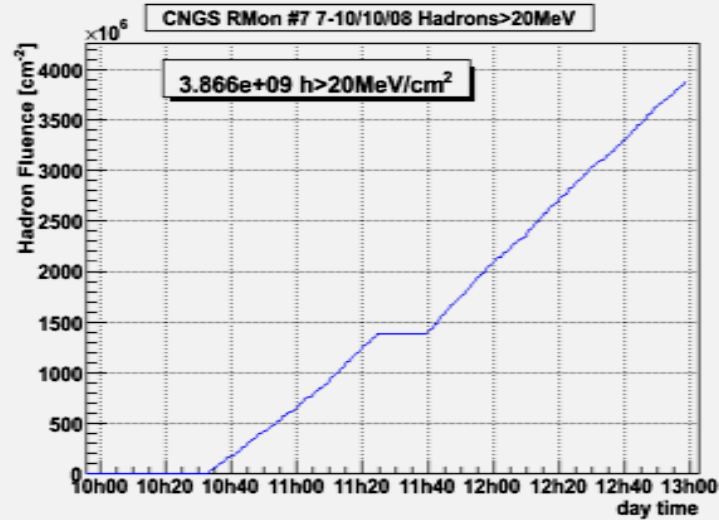
hadrons [cm <sup>-2</sup> ]	Dose MS [Gy]	Dose LS [Gy]	neutrons [cm <sup>-2</sup> ]
3.87E+09	0.34	0.14	5.92E+09

- 1<sup>st</sup> Beam after placement of electronics started
  - 10:45 on 9 Oct 2008
- Power off for Rmon#7 (caused by PConv rack)
  - 12:58 on 9 Oct 2008
- Integrated beam intensity =  $2.01 \cdot 10^{16}$  pot
- Hadron fluence unavailable since due to HW problem



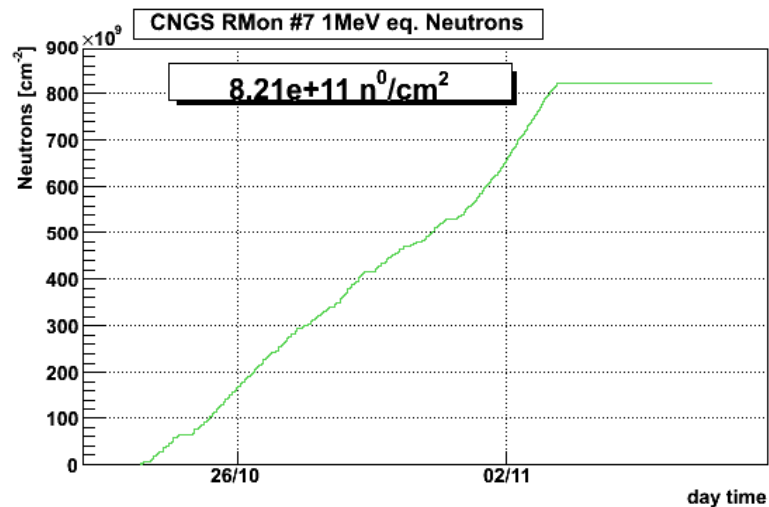
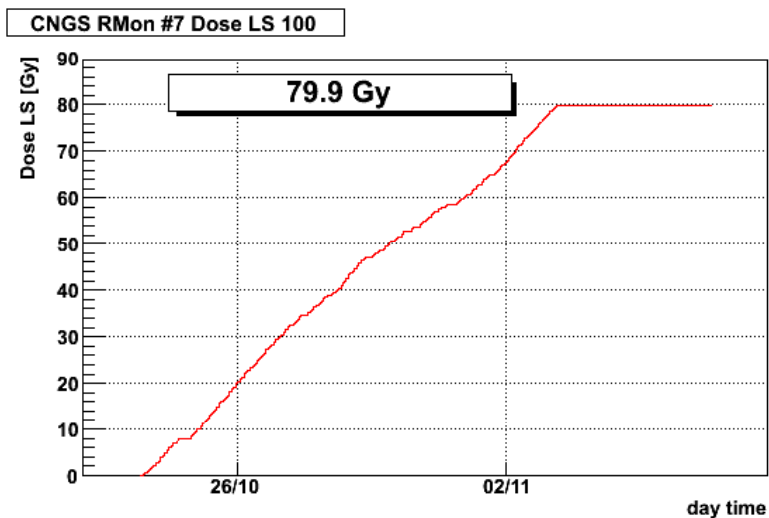
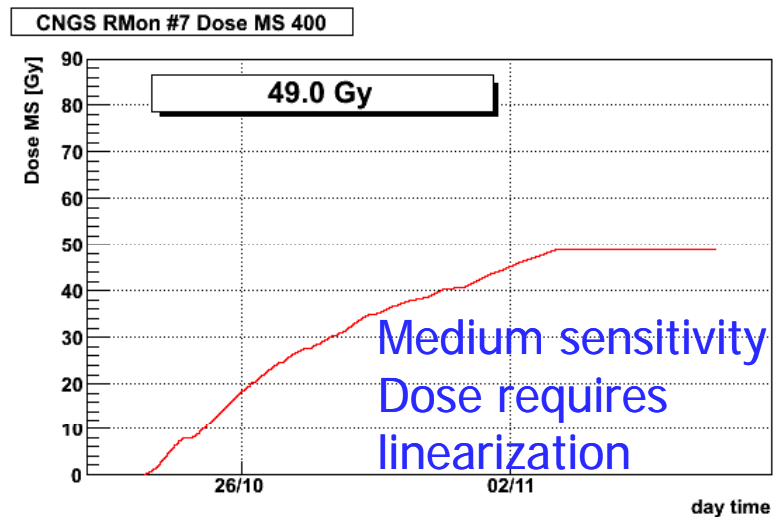
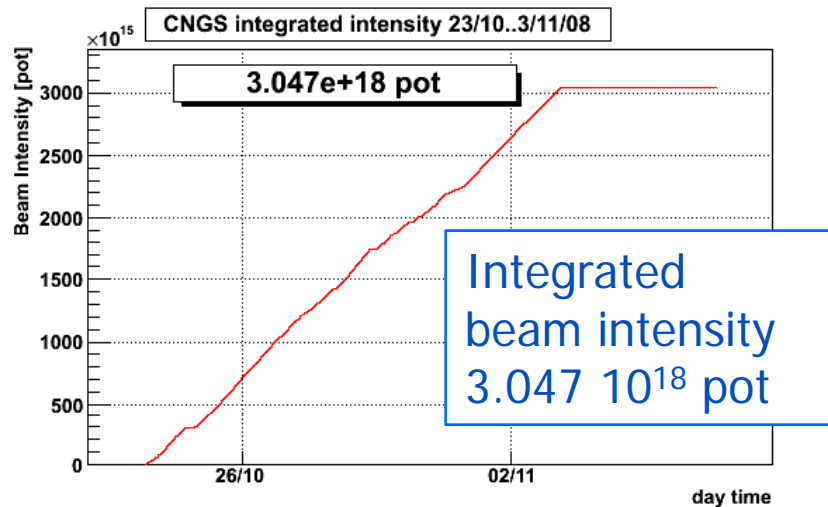


# RMon #7 power cut after ~ 2h of beam





# RMon #7 for 23/10..3/11/08 floor position





# Combined results for the 5 RadMon positions normalized to $10^{18}$ protons on target

		VALUES NORMALIZED TO $w_{pot} = 1E18_{pot}$		
rad mon	POSITION	DOSE [Gy/wpot]	1MeV eq $n^0$ [/cm <sup>2</sup> /wpot]	HADRONS>20MeV [/cm <sup>2</sup> /wpot]
3LM06S	wall	0.85	1.4E+10	1.2E+10
3LM07S	wall (TSG45)	6.4	8.7E+10	5.6E+10
3LM07S	floor (TSG45)	26.2	2.7E+11	1.9E+11
3LM08S	wall (TSG46)	1.3	1.6E+10	9.1E+09
3LM08S	floor (TSG46)	2.4	2.4E+10	1.8E+10

**PRELIMINARY comparison with FLUKA data;**  
**High gradients, geometry details (corners, empty ducts) and statistics produce uncertainties of factor  $\sim 2$**

rad mon	POSITION	DOSE	1MeV eq $n^0$	HADRONS>20MeV
3LM06S	wall	2.50	2.14	2.58
3LM07S	wall (TSG45)	2.62	2.64	1.25
3LM07S	floor (TSG45)	1.25	2.17	0.84
3LM08S	wall (TSG46)	1.62	2.50	1.32
3LM08S	floor (TSG46)	1.67	1.58	0.83

**Generally higher Fluka values than measurements as seen with PMI comparisons (see talk of A. Ferrari in SBWG)**



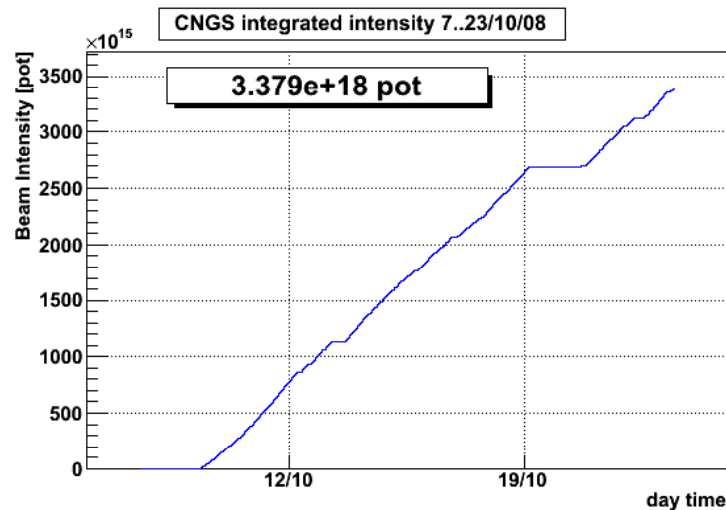
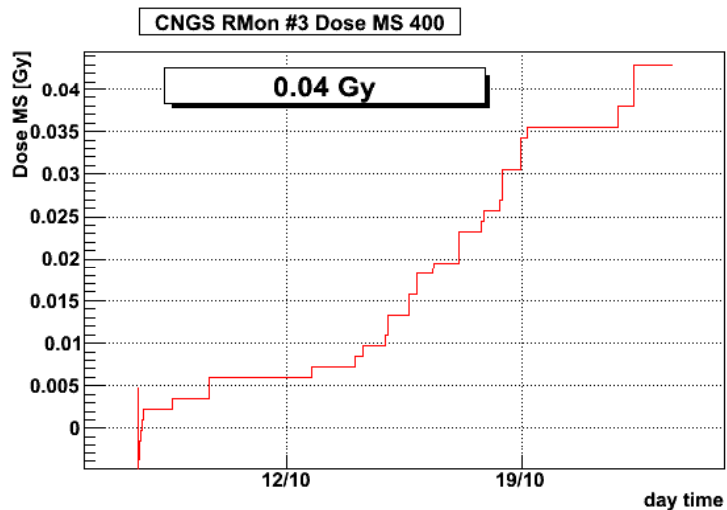
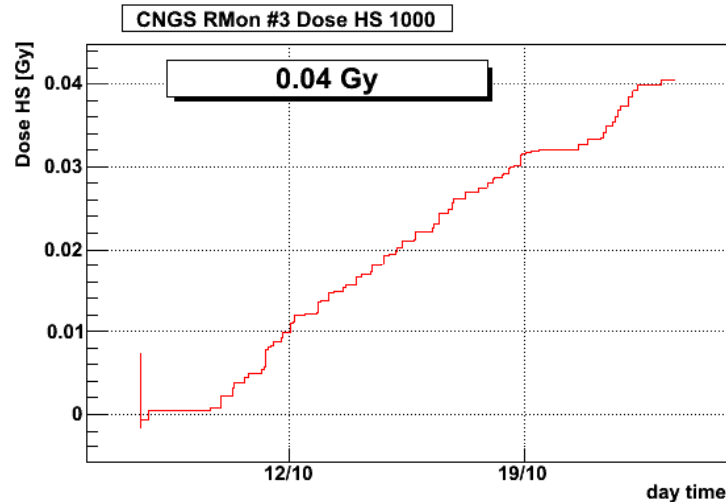
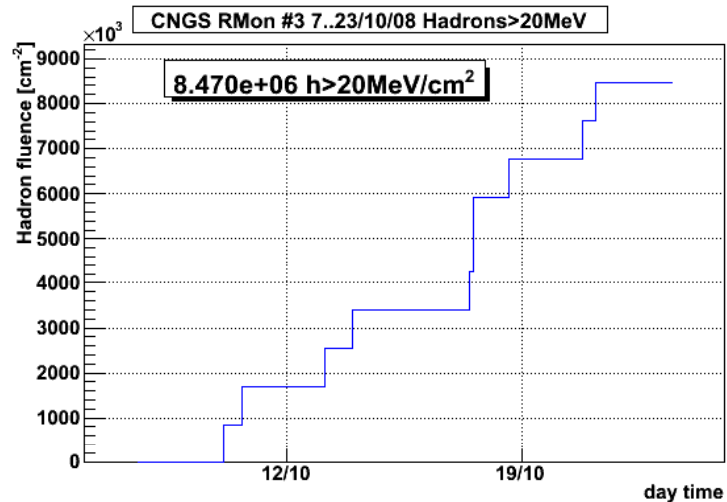
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		Ratios FLUKA SIMULATIONS / MEASUREMENTS		
rad mon	POSITION	DOSE	1MeV eq $n^0$	HADRONS>20MeV
3LM06S	wall	2.59	3.14	1.58
3LM07S	wall (TSG45)	2.62	2.64	1.25
3LM07S	floor (TSG45)	1.46	1.71	0.84
3LM08S	wall (TSG46)	1.62	2.50	1.32
3LM08S	floor (TSG46)	1.67	1.58	0.83





# RMon #3 for 7..29/10/08 **ventilation room**





# RadMon #3 location





# Values integrated by the RadMons in CNGS from 7 Oct 2008 (**6.43 10<sup>18</sup> pot**)

Radmon #	location	Hadrons [cm <sup>-2</sup> ]	Dose [Gy]	Neutrons [cm <sup>-2</sup> ]
1	Ventil.	0	0.069	0
2	Ventil.	8.5e5	0.178	0
3	Ventil.	9.3e6	0.078	0
4	Ventil.	8.5e5	0.066	0
5	Ventil.	0	0.084	0
6	CNGS	7.65e10	5.34	9.16e10
7	CNGS	1.24e12	168.5	1.62e12
8	CNGS	1.22e11	16.5	1.51e11

Comparison with the values integrated during 1 year of Nominal LHC operation – alongside arc dipole

- Dose : 10 Gy
- Hadrons > 20 MeV : 4 10<sup>10</sup> cm<sup>-2</sup>
- 1 MeV eq. Neutrons : 3 10<sup>11</sup> cm<sup>-2</sup>





# TSG45



20.11.2008 RadWG

D.Kramer

TS-LEA-RAD





# TSG46



20.11.2008 RadWG

D.Kramer

TS-LEA-RAD