

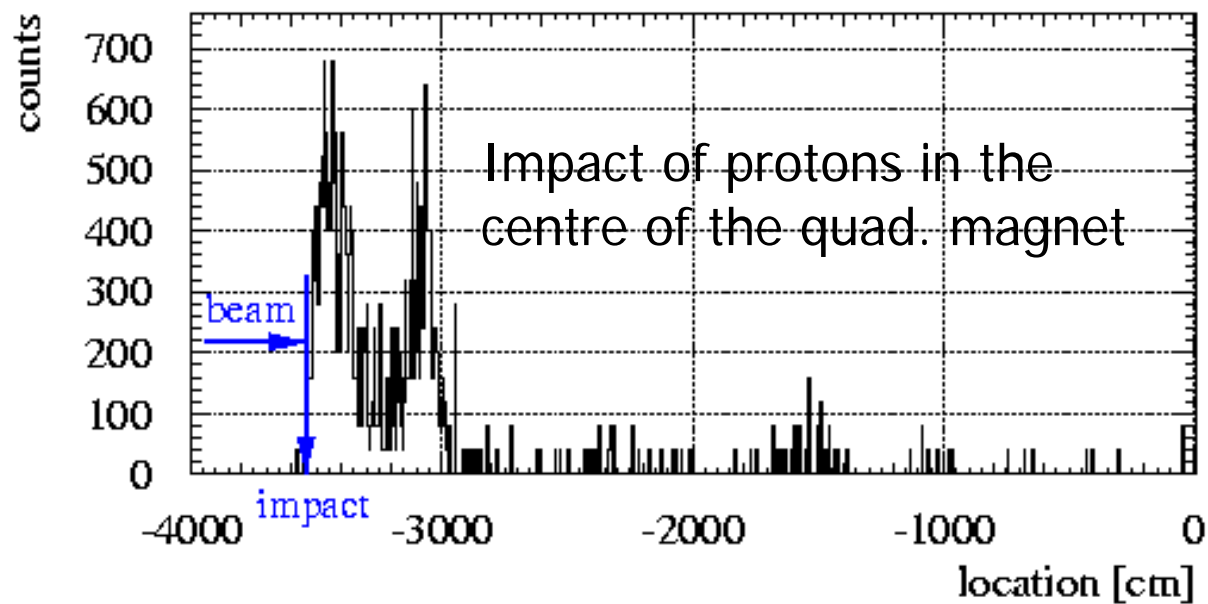
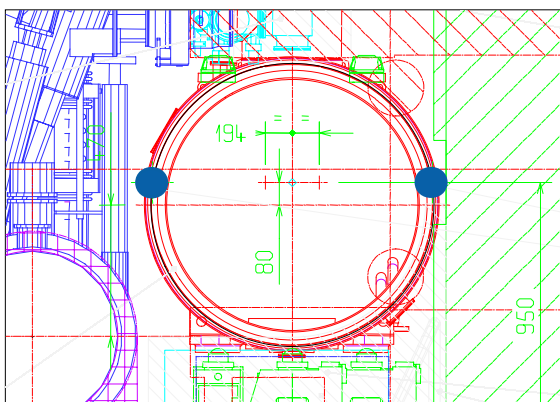
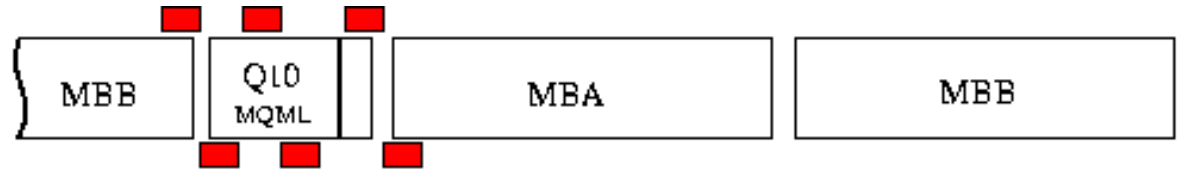
# BLMs and Sector Tests

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B. Dehning

# Location of Detectors (I)

1. Distinguish between beams
2. Observe losses due to magnet misalignments
3. Observe losses due to orbit changes and emittance growth



# Monitors at IP8

IP8 left

04/04/2005

N.	Location	IC	SEM
1	BPMSW.1L8	1	1
2	MQXA.1L8	6	
3	MQXB.A2L8	6	
4	MQXA.3L8	6	
5	TCTV.4L8.B1	1	1
6	TCLIA.4L8.B2	1	1
7	TCTH.4L8.B1	1	1
8	MBRC.4L8	1	1
9	MQY.A4L8	6	
10	MQM.A5L8	6	
11	TCLIB.6L8.B2	1	1
12	MQML.6L8	6	
13	MQM.A7L8	6	
14	MBA.8L8	6	
	MBA.8L8		6
15	MQML.8L8	6	
16	MQM.9L8	6	
17	MQML.10L8	6	
18	MBA.11L8	6	
	MBA.11L8		6
19	MQ.11L8	6	
20	MQ.12L8	6	
21	MQ.13L8	6	
22	MQ.14L8	6	
23	MQ.15L8	6	

IP8 right

IP 8

N.	Location	IC	SEM
1	BPMSW.1R8	1	1
2	MQXA.1R8	6	
3	MQXB.A2R8	6	
4	MQXA.3R8	6	
5	TCDD.4R8	3	3
6	TCTV.4R8.B2	1	1
7	TDI.4R8	3	3
8	TCTH.4R8.B2	1	1
9	MBRC.4R8	1	1
10	MQY.A4R8	6	
11	MQY.A5R8	6	
12	MSIA.A6R8	3	3
13	MSIB.A6R8.	3	3
14	MQM.6R8	6	
15	MQM.A7R8	6	
16	MBA.8R8	6	
	MBA.8R8		6
17	MQML.8R8	6	
18	MQM.9R8	6	
19	MQML.10R8	6	
20	MBA.11R8	6	
	MBA.11R8		6
21	MQ.11R8	6	
22	MQ.12R8	6	
23	MQ.13R8	6	
24	MQ.14R8	6	
25	MQ.15R8	6	

# Loss Levels and Required Accuracy

## *Relative loss levels*

	450 GeV	7 TeV
Damage to components	320/5	1000/25
Quench level	1	1
Beam dump threshold for quench prevention	0.3	0.3/0.4
Warning	0.1	0.1/0.25

## Specification:

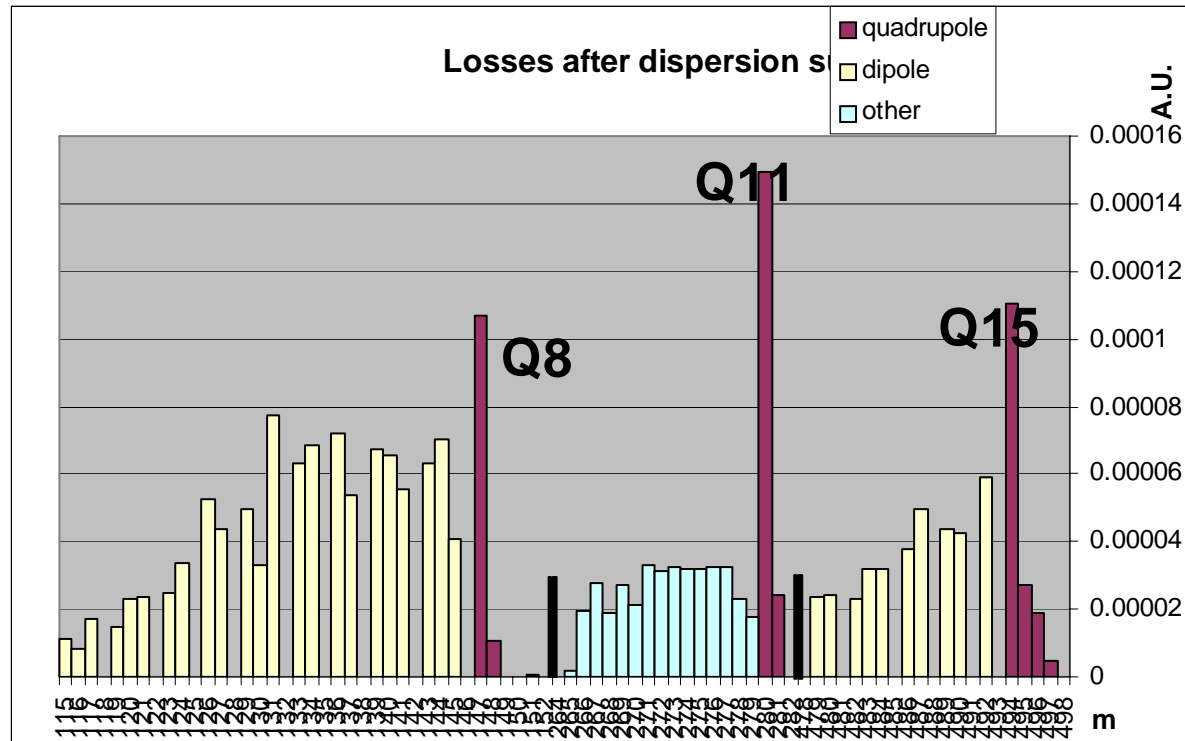
Absolute precision (calibration)	< factor 2 initial < factor 5)
Relative precision for quench prevention	< 25%

- Lab calibration of electronics
- Test of ionisation chamber before installation (source)
- Electrical test of installed system

# Systematic Uncertainties at Quench Levels

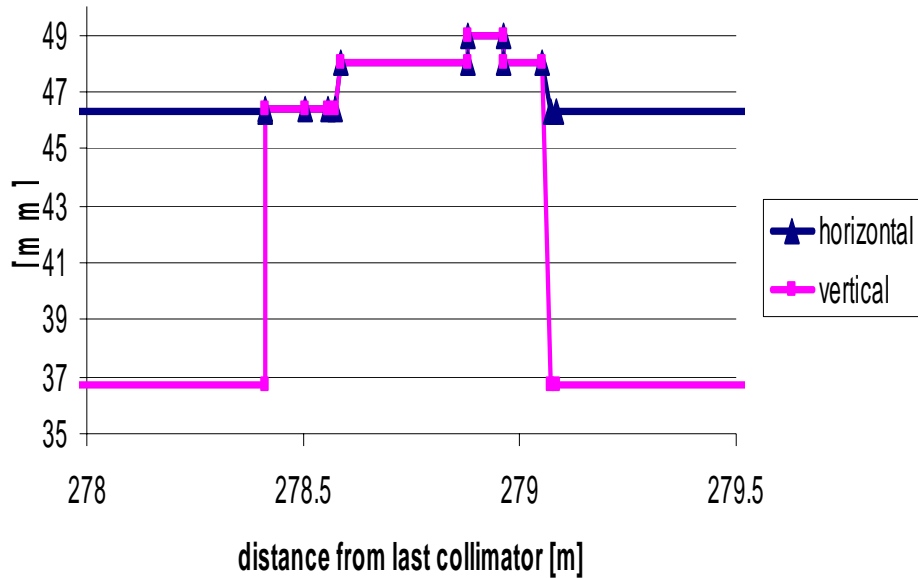
	relative accuracies	Correction means
Electronics	< 10 %	Electronic calibration
Detector	< 10 – 20 %	source/sim./measurements
Radiation - SEE	about 1 %	
fluence per proton	< 10 - 30 %	sim. / measurements with beam ( <a href="#">sector test</a> )
Quench levels (sim.)	< 200 %	measurements with beam ( <a href="#">sector test</a> ) / scaling
Topology of losses (sim.)	< large	sim. / measurements

# Proton Loss in Dispersion Suppressor

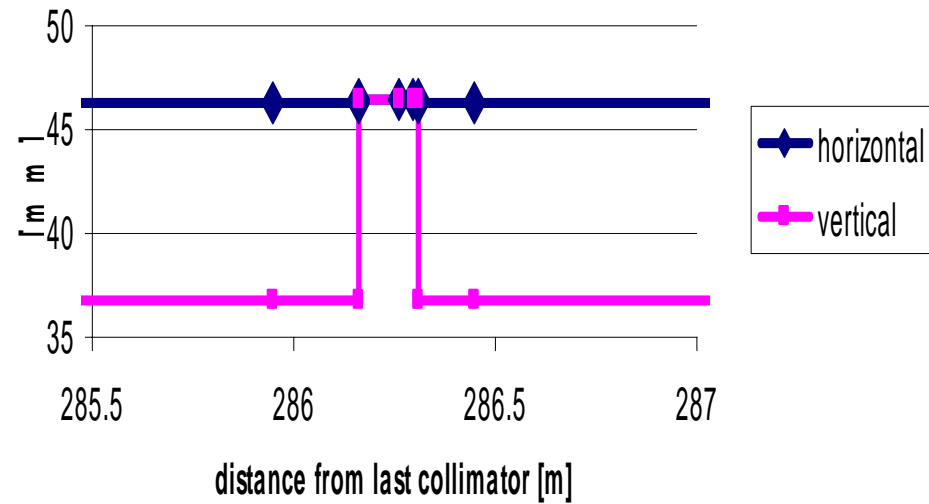


# Apertures at both sides of a arc quadrupole magnet

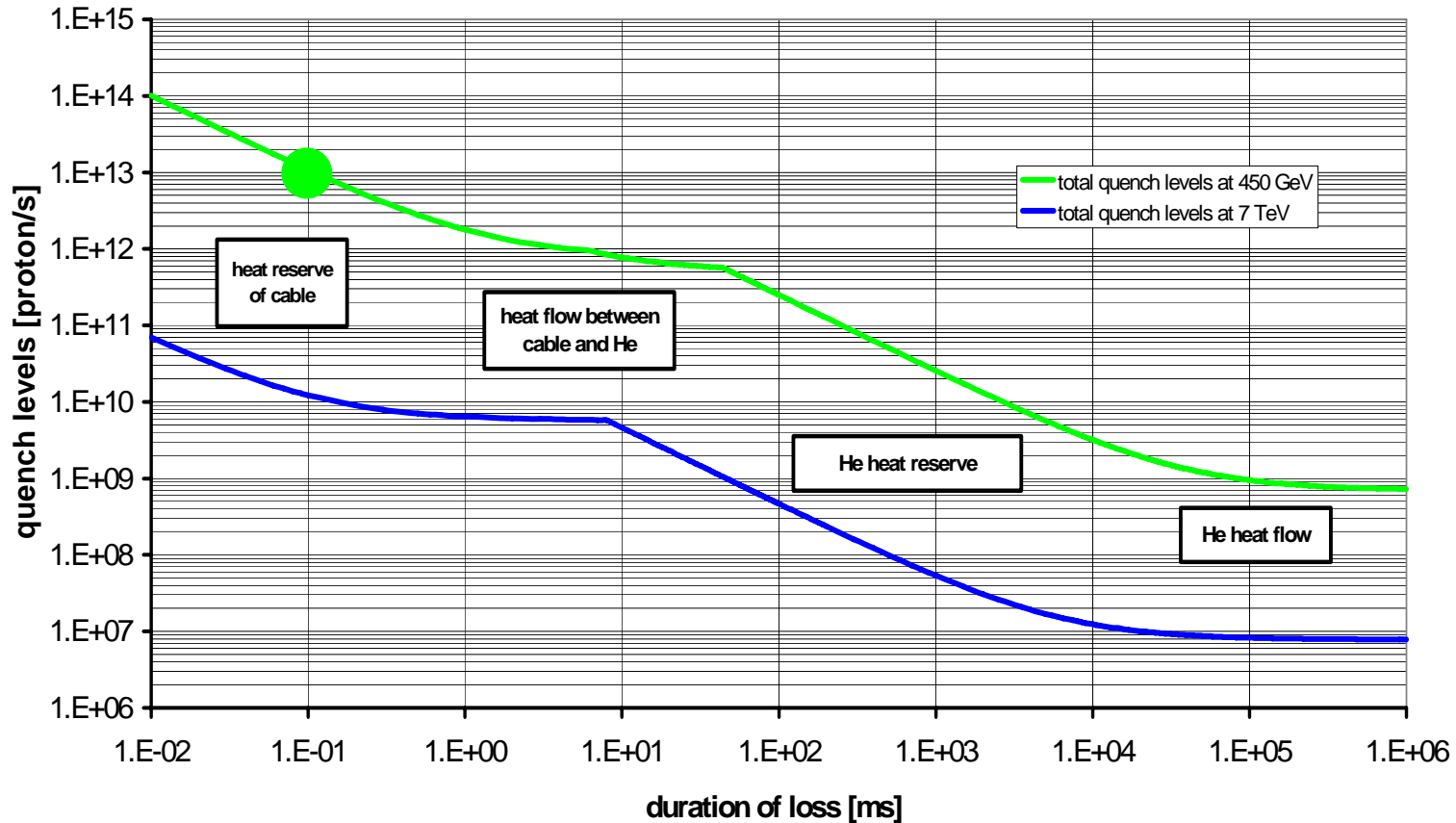
Aperture Diameter in front of Arc Qadrupole



Aperture Diameter after Arc Qadrupole



# Expected Sector Test Results



- Quench levels : Instant loss duration test => secondary particle heat deposition and heat capacity of Cu is tested at 450 GeV, **partial test**



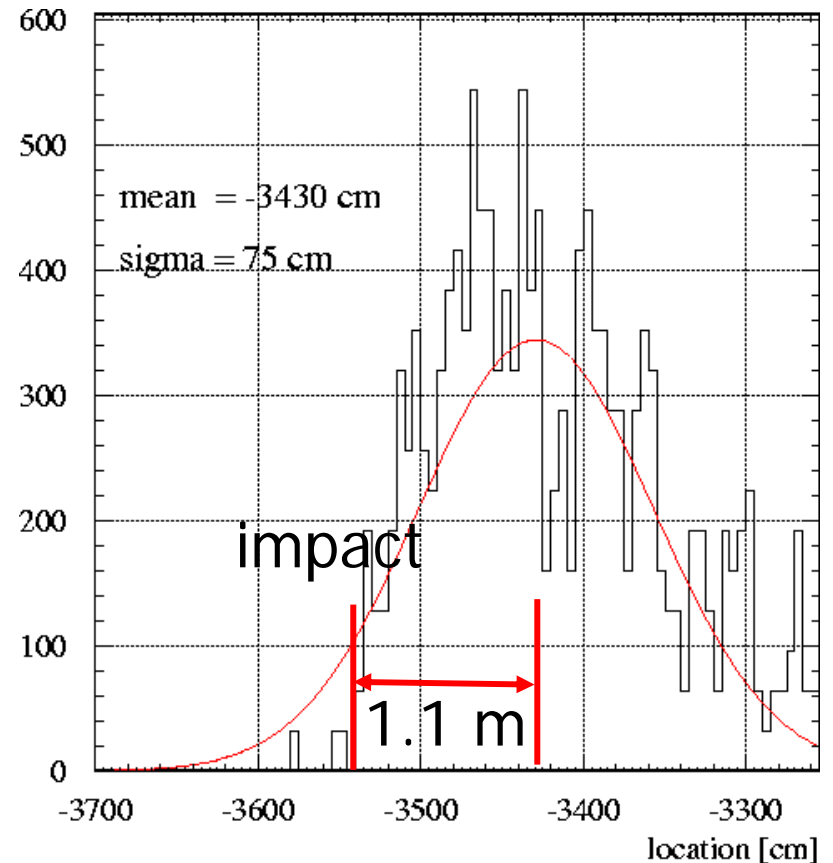
# Requirements and Procedure

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- Several BLMs along the cryostat
- Directing the beam towards the beam screen with corrector magnet
- Recording of injected beam intensity
- Estimate of impact position by using fluence simulation.
- Variation of impact position (corrector magnet)
- Outcome:
  - check of fluence simulation (radiation check)
  - Quench levels, errors ?
- To come to an “usefull” Quench level estimate about 10 quenches are needed (beam time?)

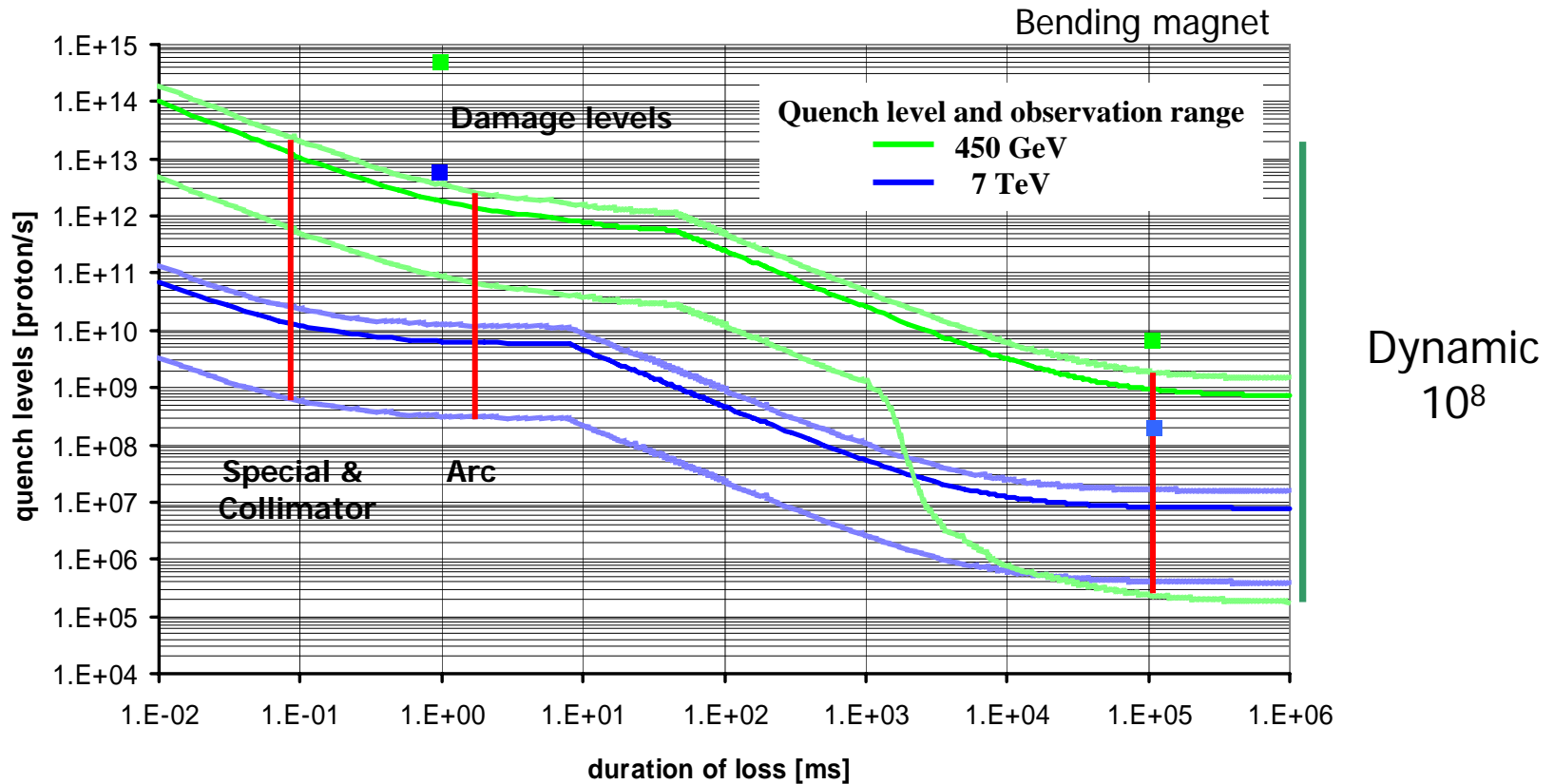
# Secondary Particle Distribution at Detectors

- Topology simulation tests
- Fluence test
- Disentangling of effects is needed
- Dense sampling of longitudinal secondary shower distribution (installation of several BLM)

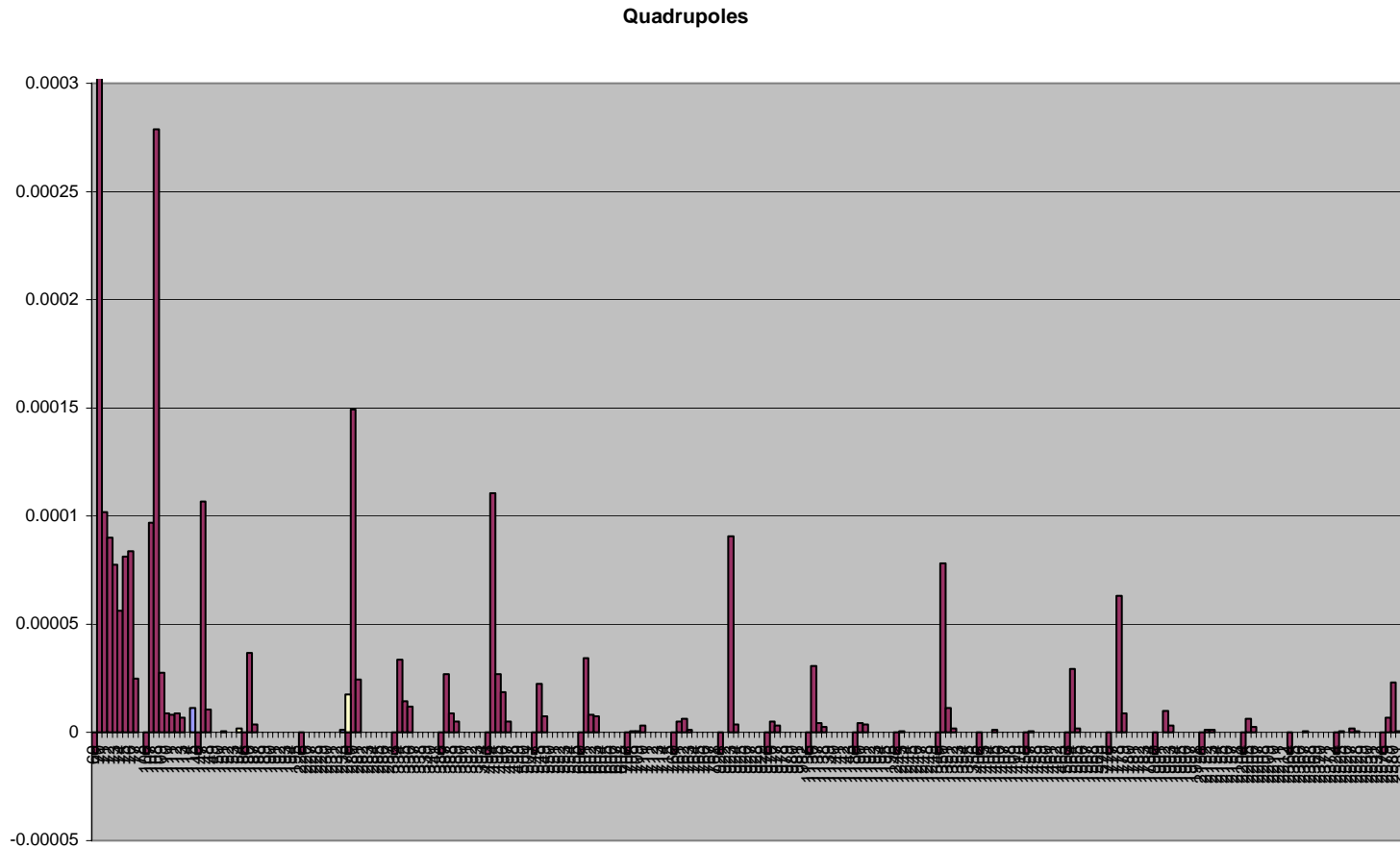


# Quench and Damage Levels

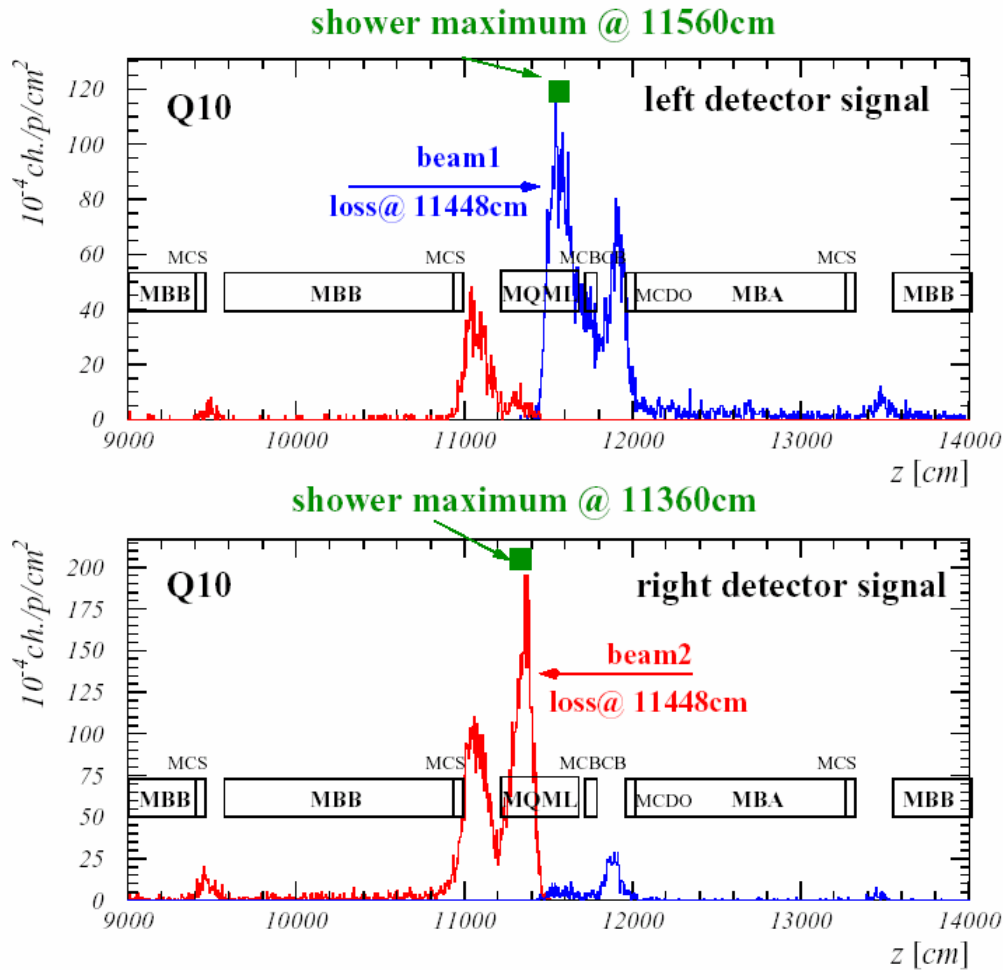
Detection of shower particles outside the cryostat or near the collimators to determine the coil temperature increase due to particle losses



# Proton Loss in Arc



# Fluence Error



Relative error  
< 30 %  
(systematic)