BLMs and Sector Tests

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- Specification
- Quench Levels
- Expected Uncertainties of BLM System at Quench Levels
- Fluence Simulations
- Proton Loss Distribution
- Requirements

Loss Levels and Required Accuracy

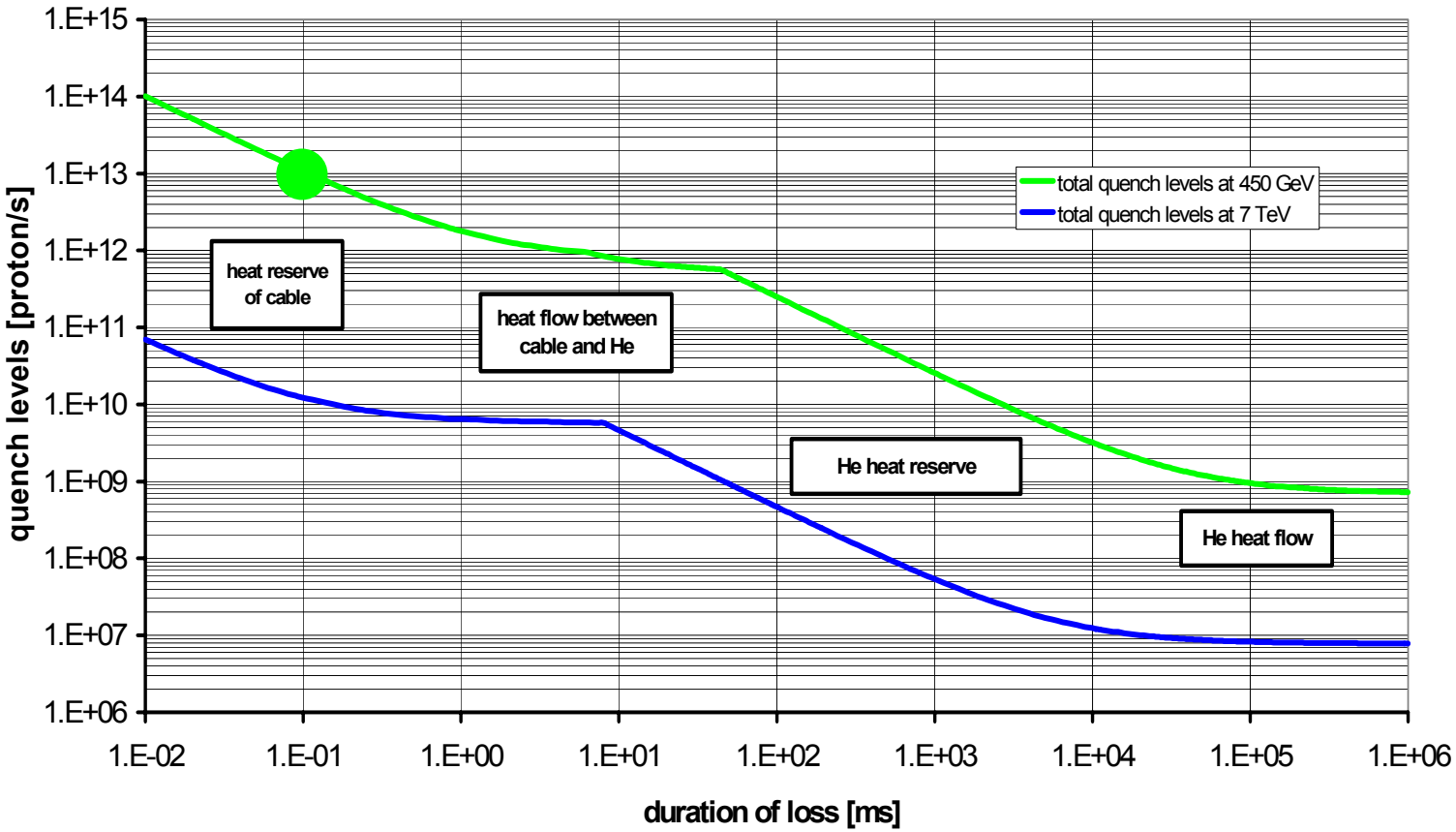
Relative loss levels		
	450 GeV	7 TeV
Damage to components	320/5	1000/25
Quench level	1	1
Beam dump threshold for quench prevention	0.3	0.3/0.4
Warning	0.1	0.1/0.25

Specification:

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

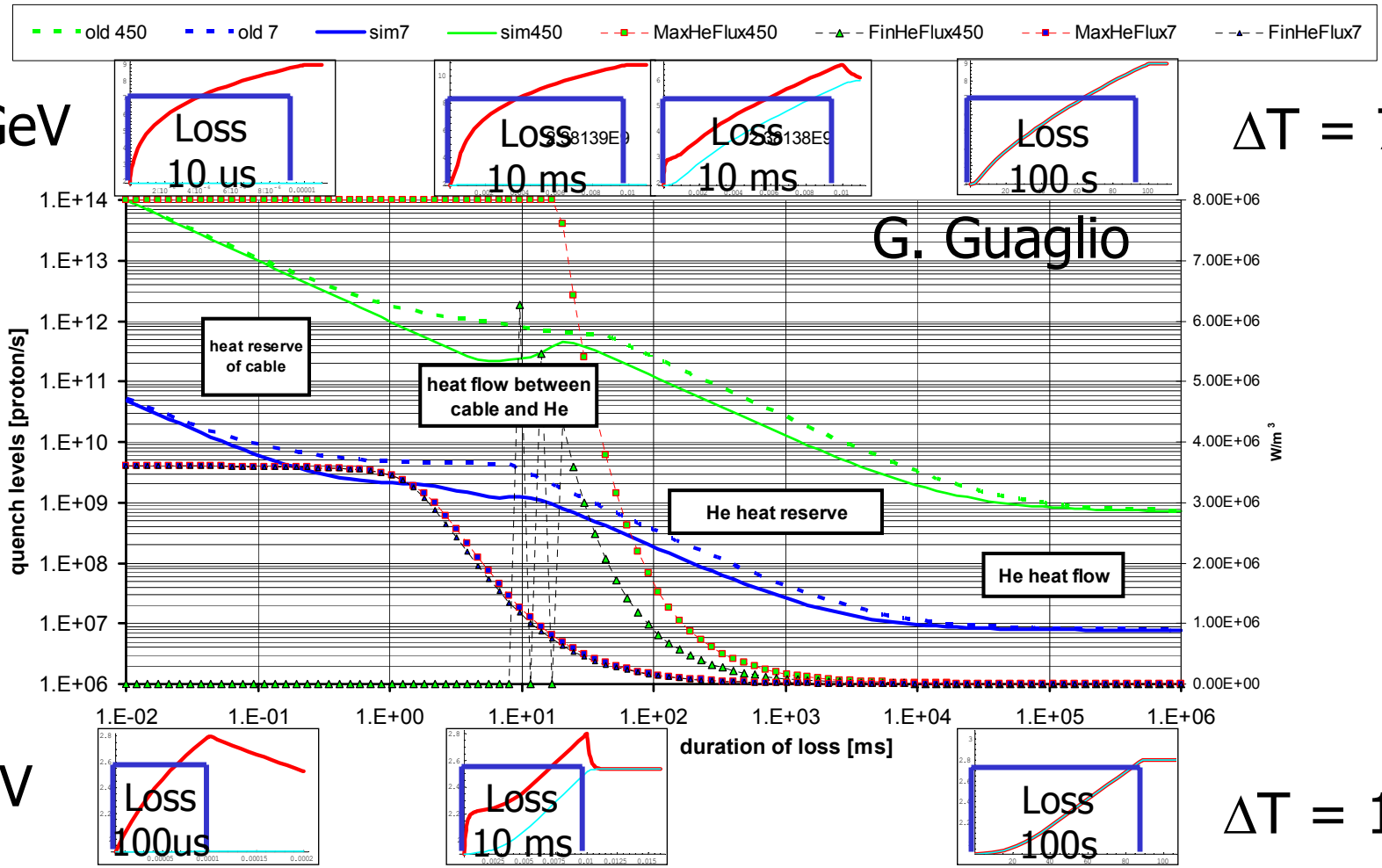
- Lab calibration of electronics
- Test of ionisation chamber before installation (source)
- Electrical test of installed system

Expected Sector Test Results

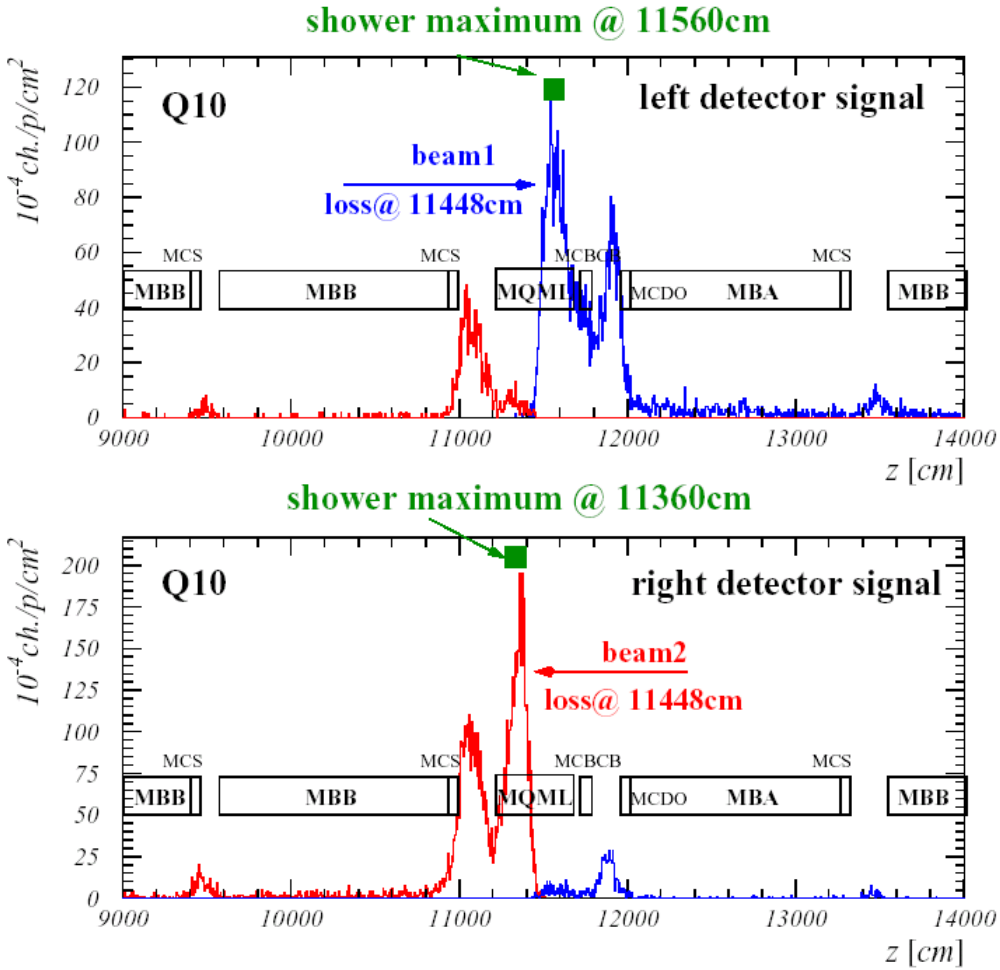


- Quench levels : Instant loss duration test => secondary particle heat deposition and heat capacity of Cu is tested at 450 GeV, partial test

Quench Level and Heat Flow



Fluence Error

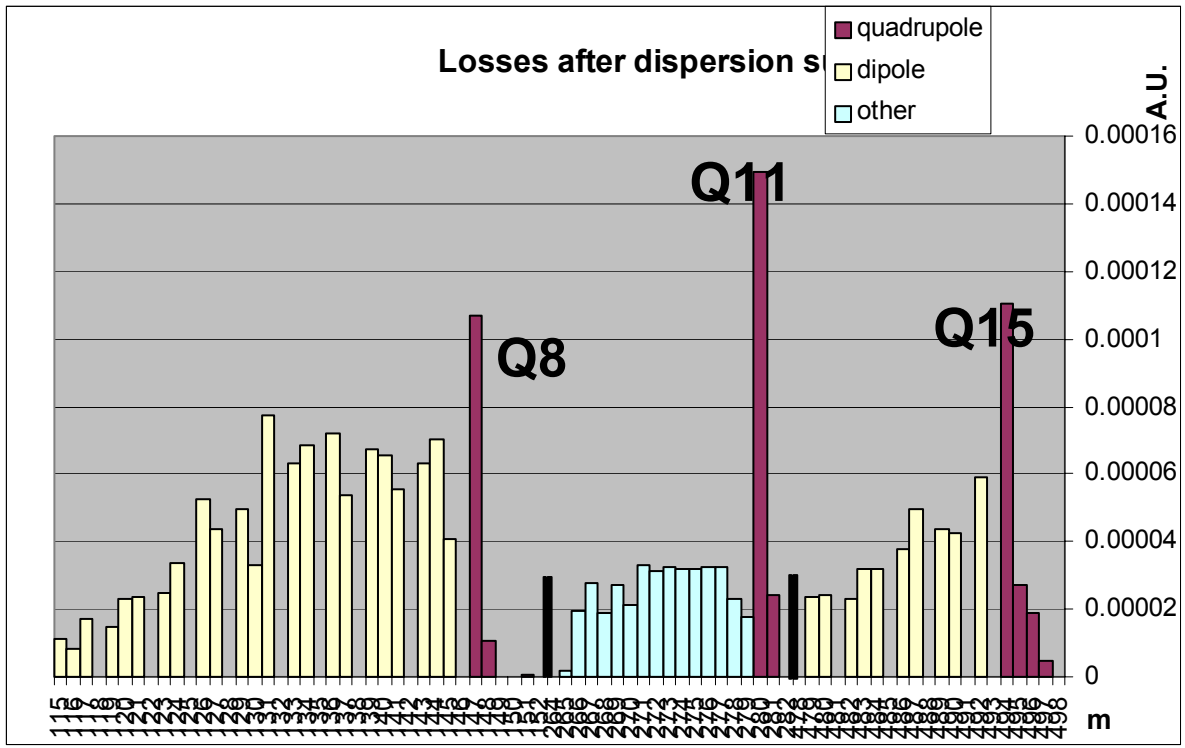


Relative error
< 30 %
(systematic)

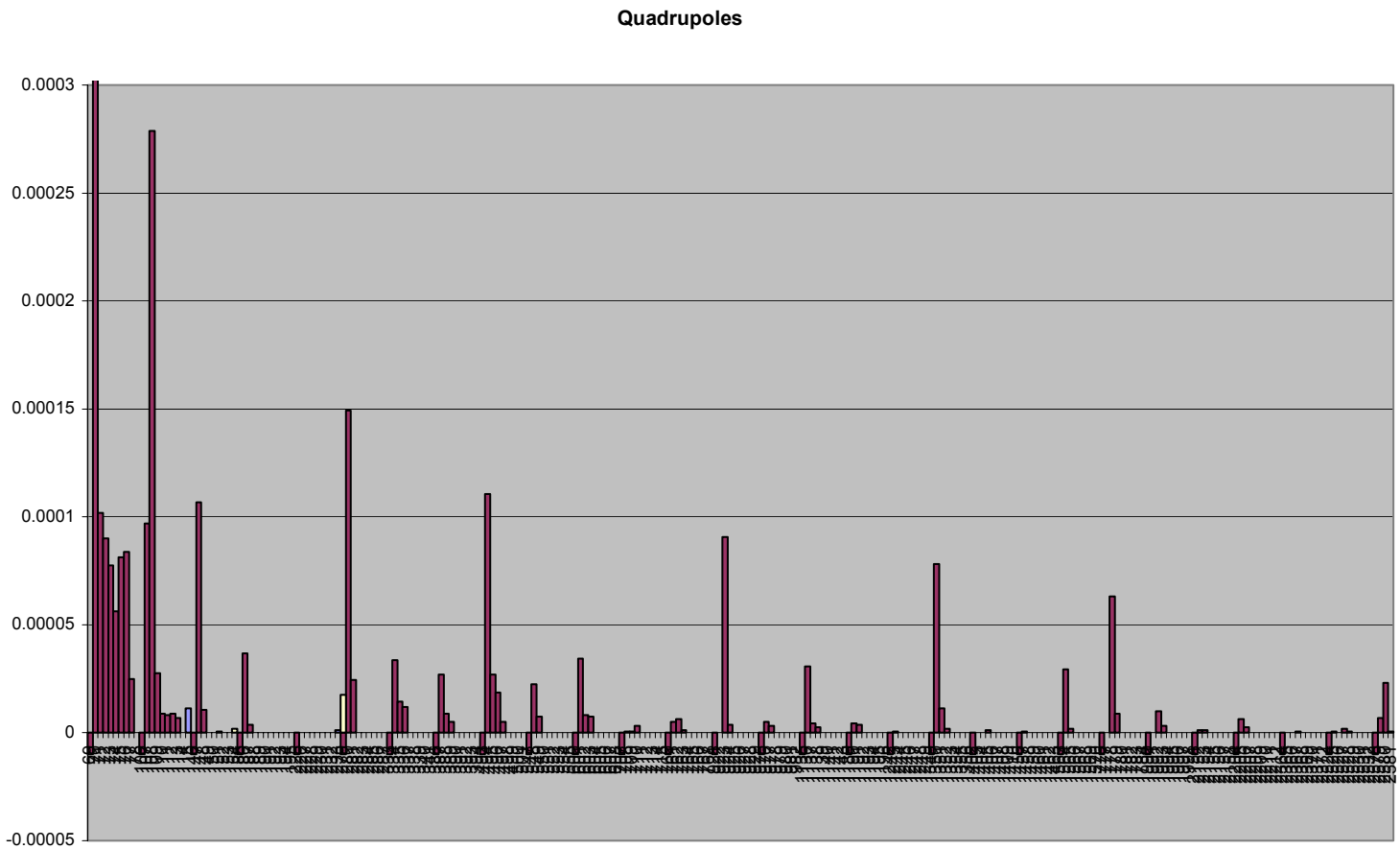
Systematic Uncertainties at Quench Levels

	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 (sector test)
Quench levels (sim.)	< 200 %	measurements with beam (sector test) / scaling
Topology of losses (sim.)	< large	sim. / measurements

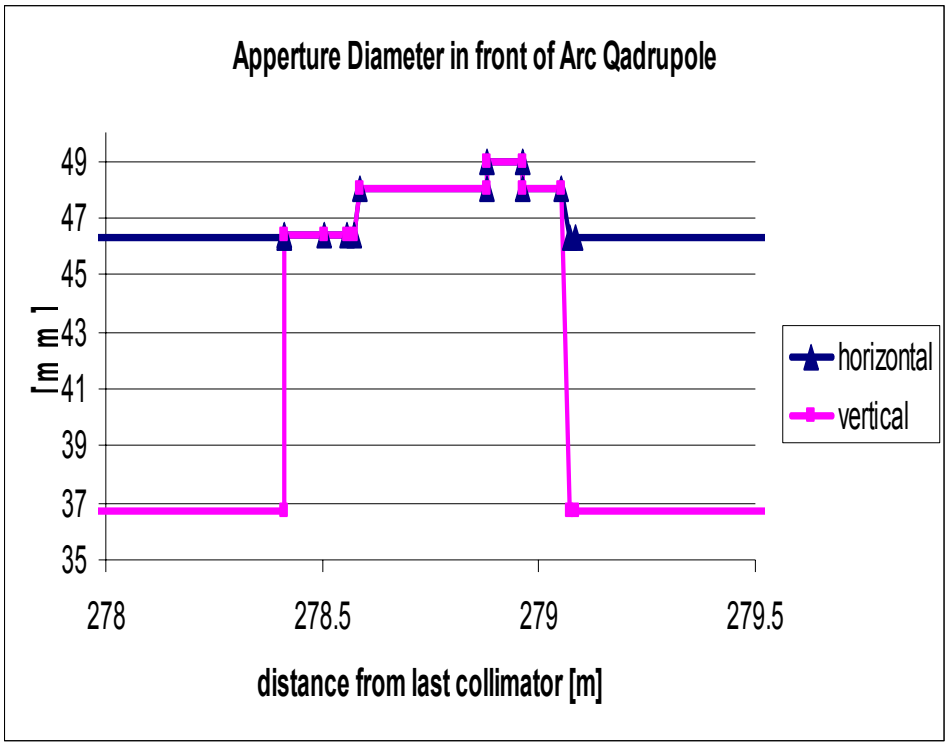
Proton Loss in Dispersion Suppressor

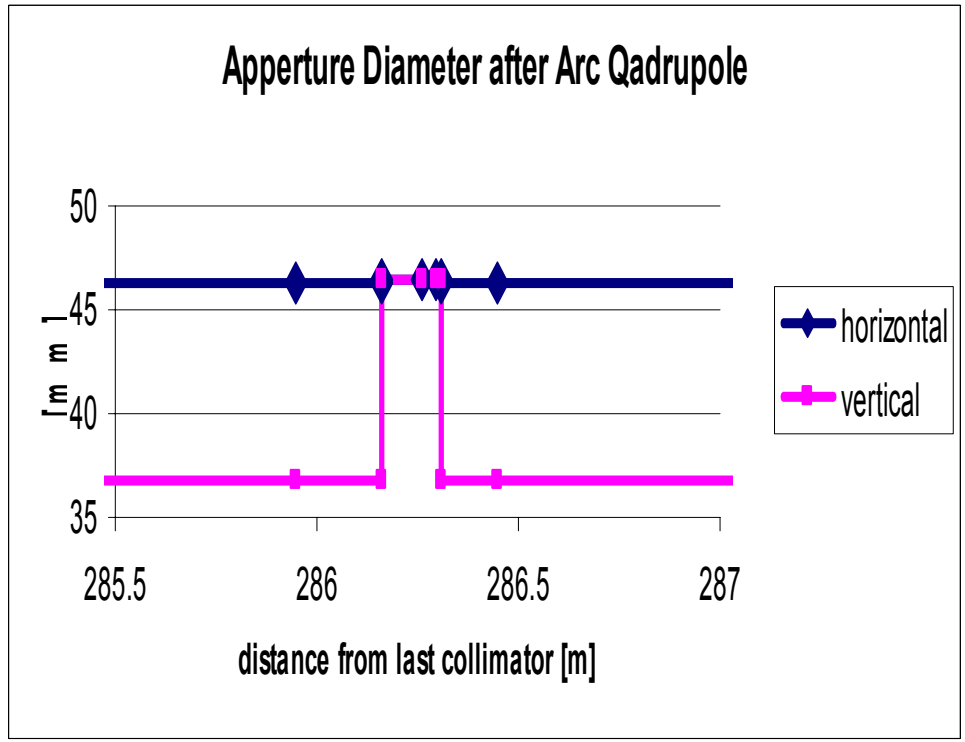


Proton Loss in Arc



Apertures at both sides of a arc quadrupole magnet



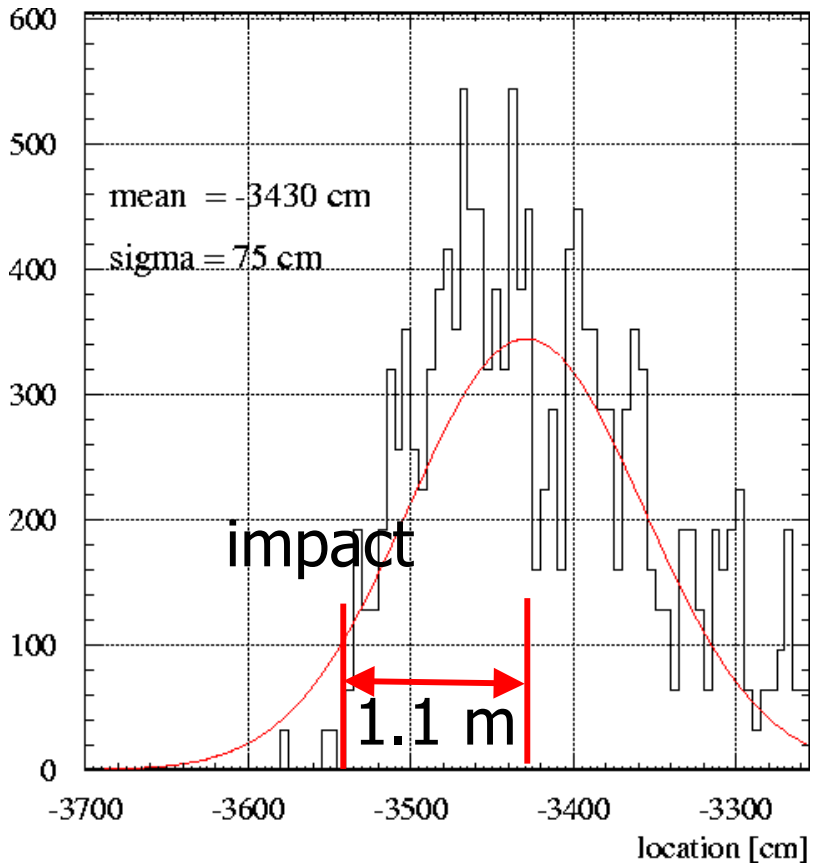


Secondary Particle Distribution at Detectors

- Topology simulation tests
- Fluence test

  Disentangling of effects is needed

- Dense sampling of longitudinal secondary shower distribution (installation of several BLM)



Requirements and Procedure

- Several tents of BLMs along the croystat
- 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 ?