

Machine-Detector-Interface

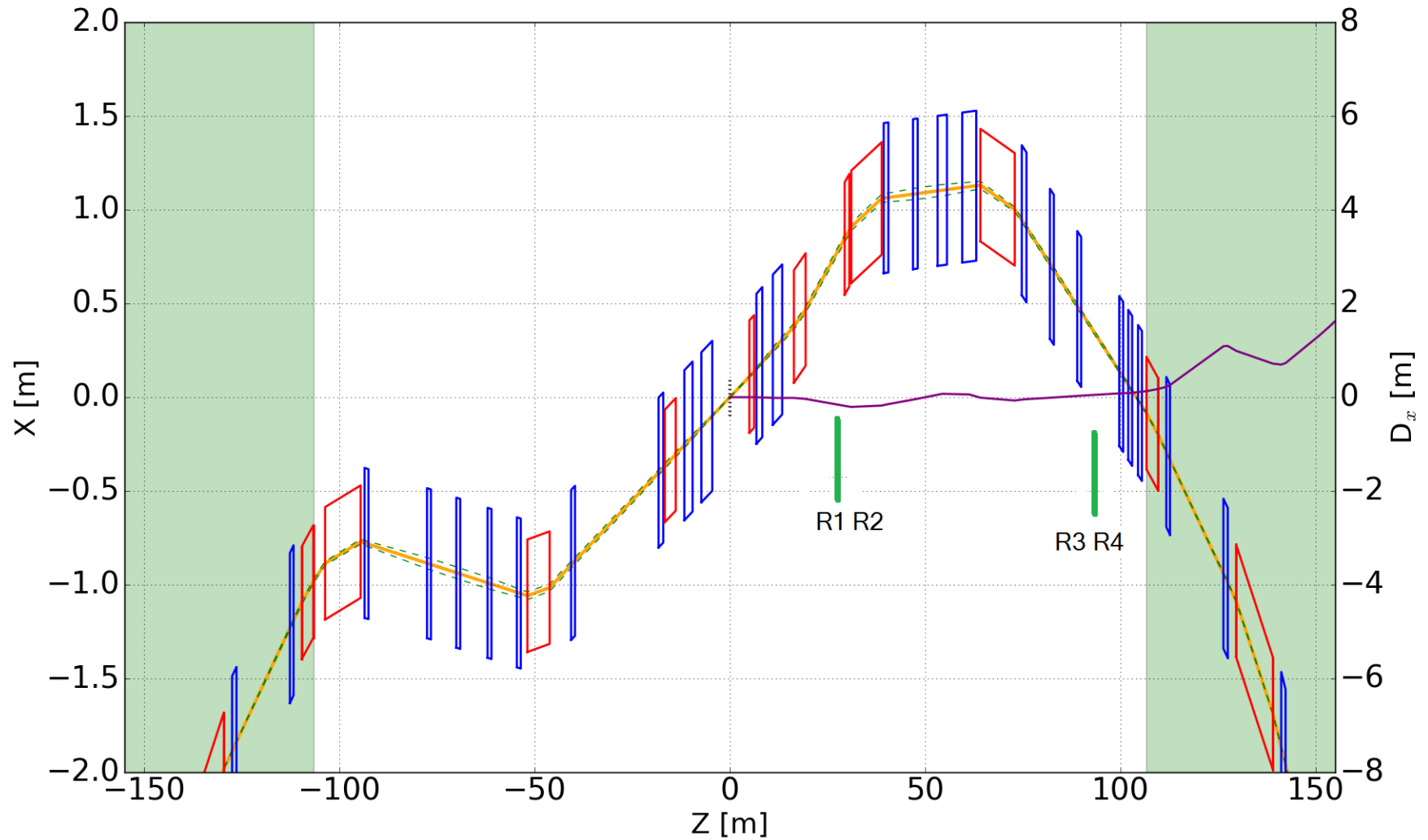
11/8/17

Bob Palmer

Two changes are in the works

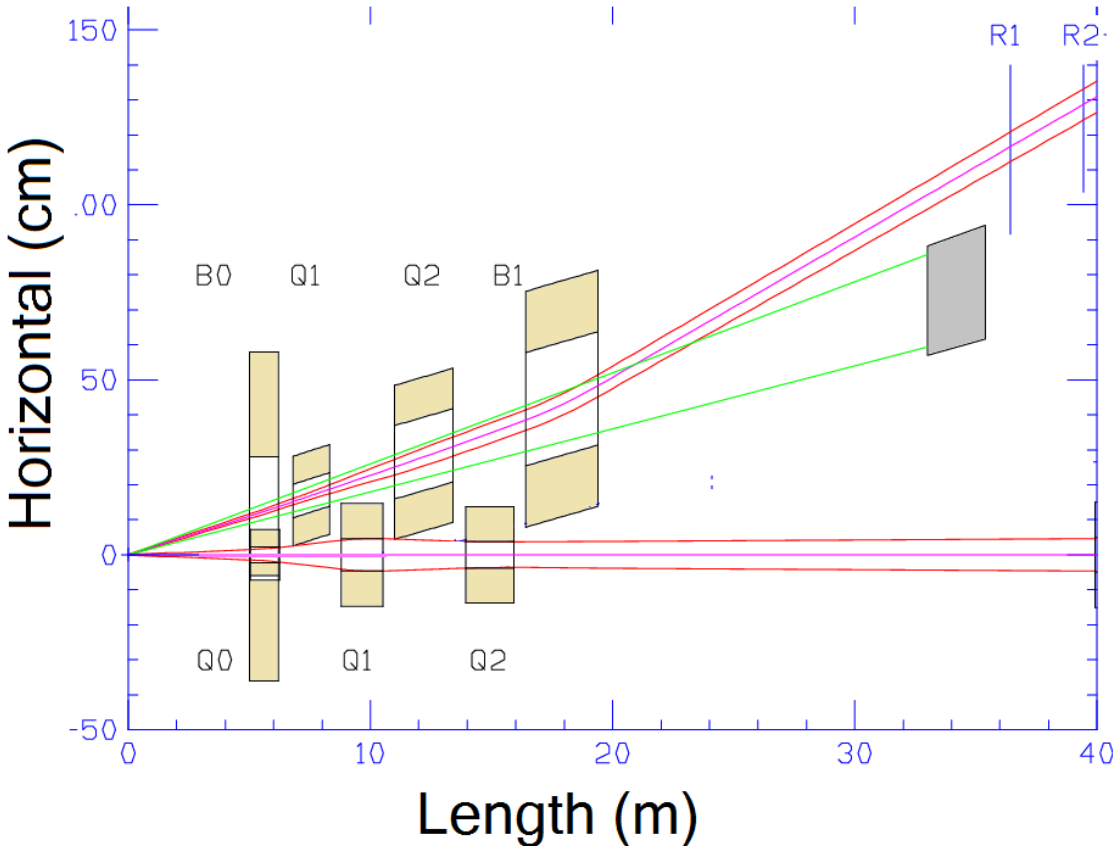
- Now matched into ring (Guillaume)
No more R3 and R4 at high dispersion
- To reduce chromaticity for dynamic acceptance
Spectrometer magnet has electron Quadrupole (Ferdinand)

New Full Layout

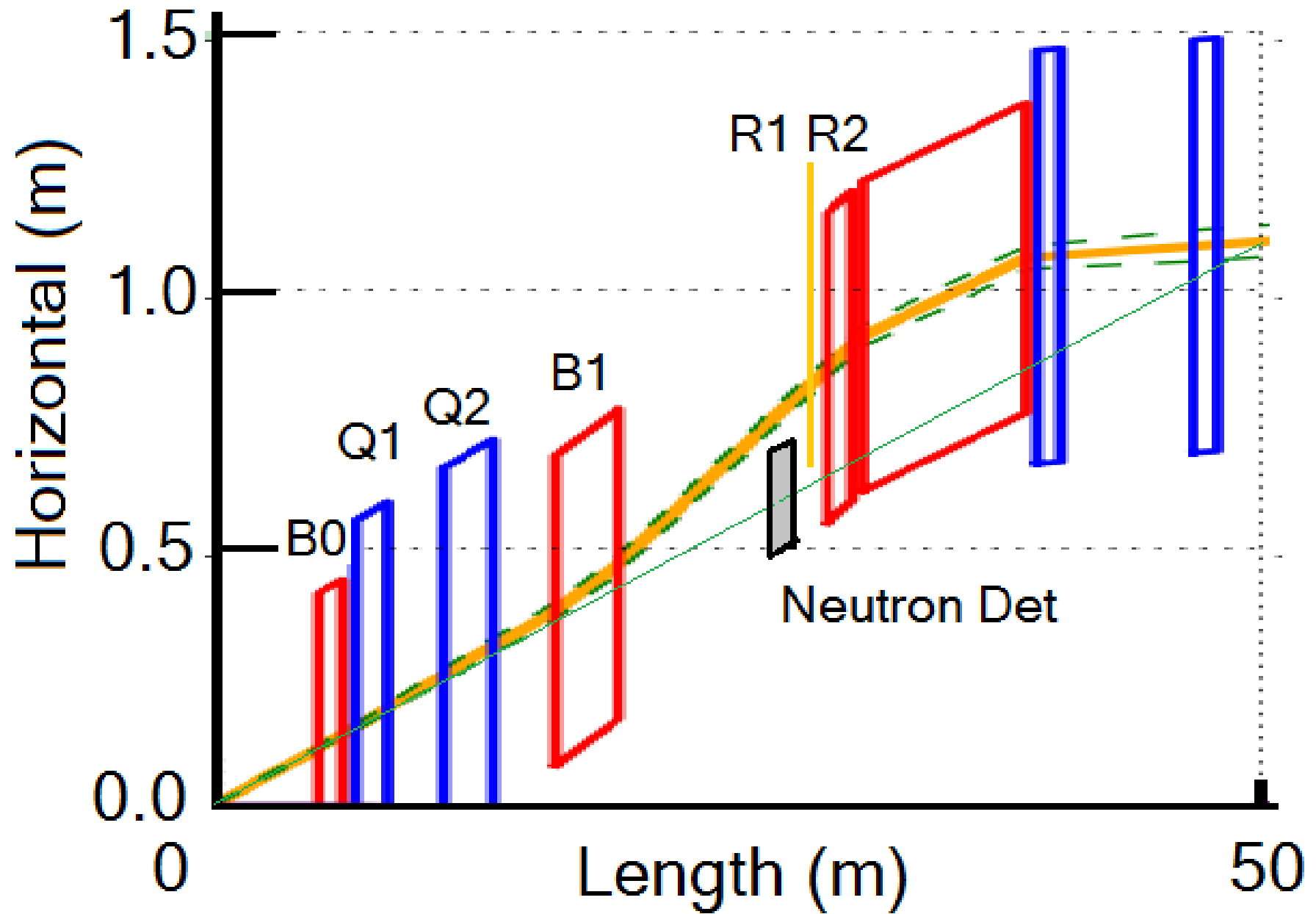


Note low dispersion where R3 & R4 used to be

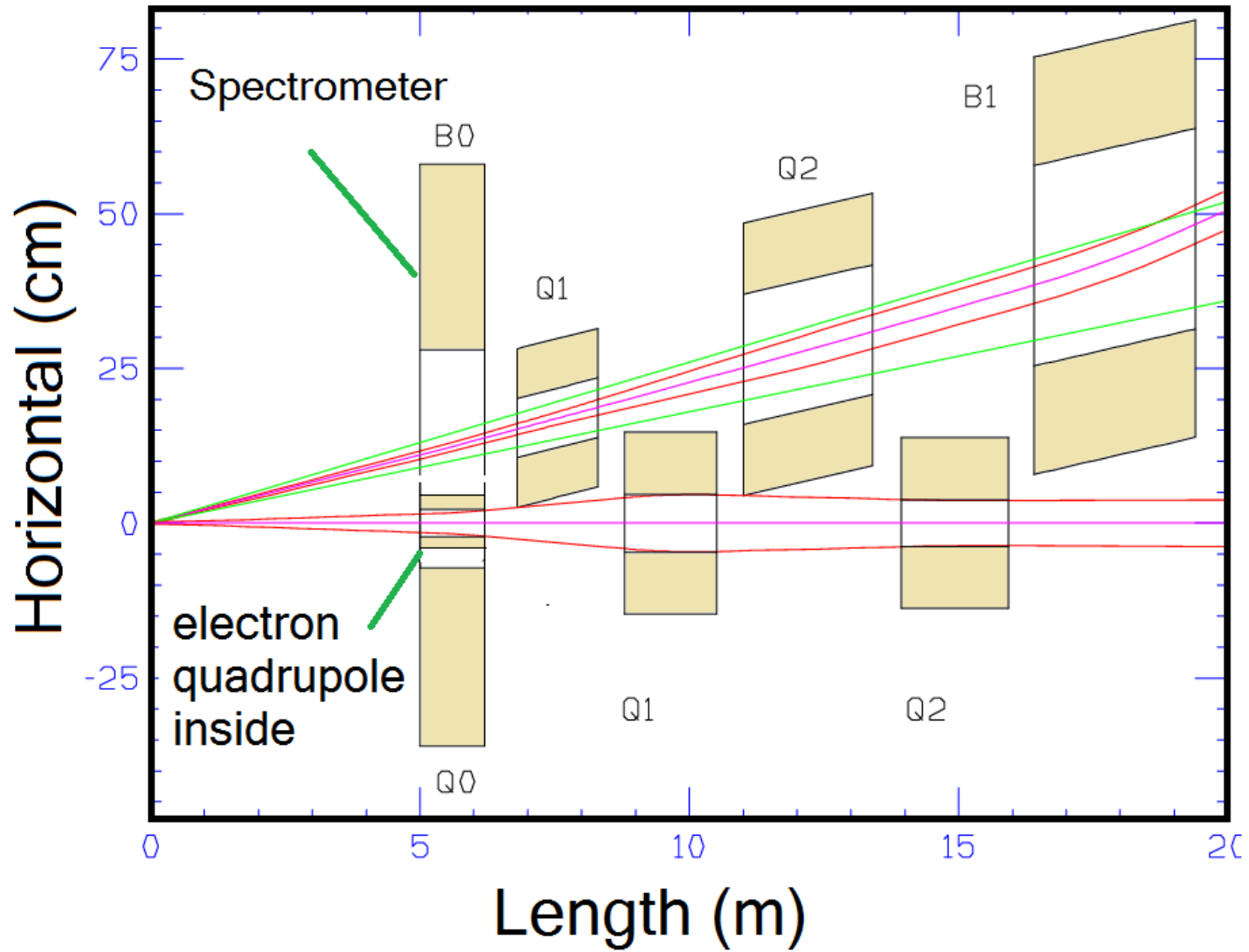
cf Old Layout Detail



New Forward Detail



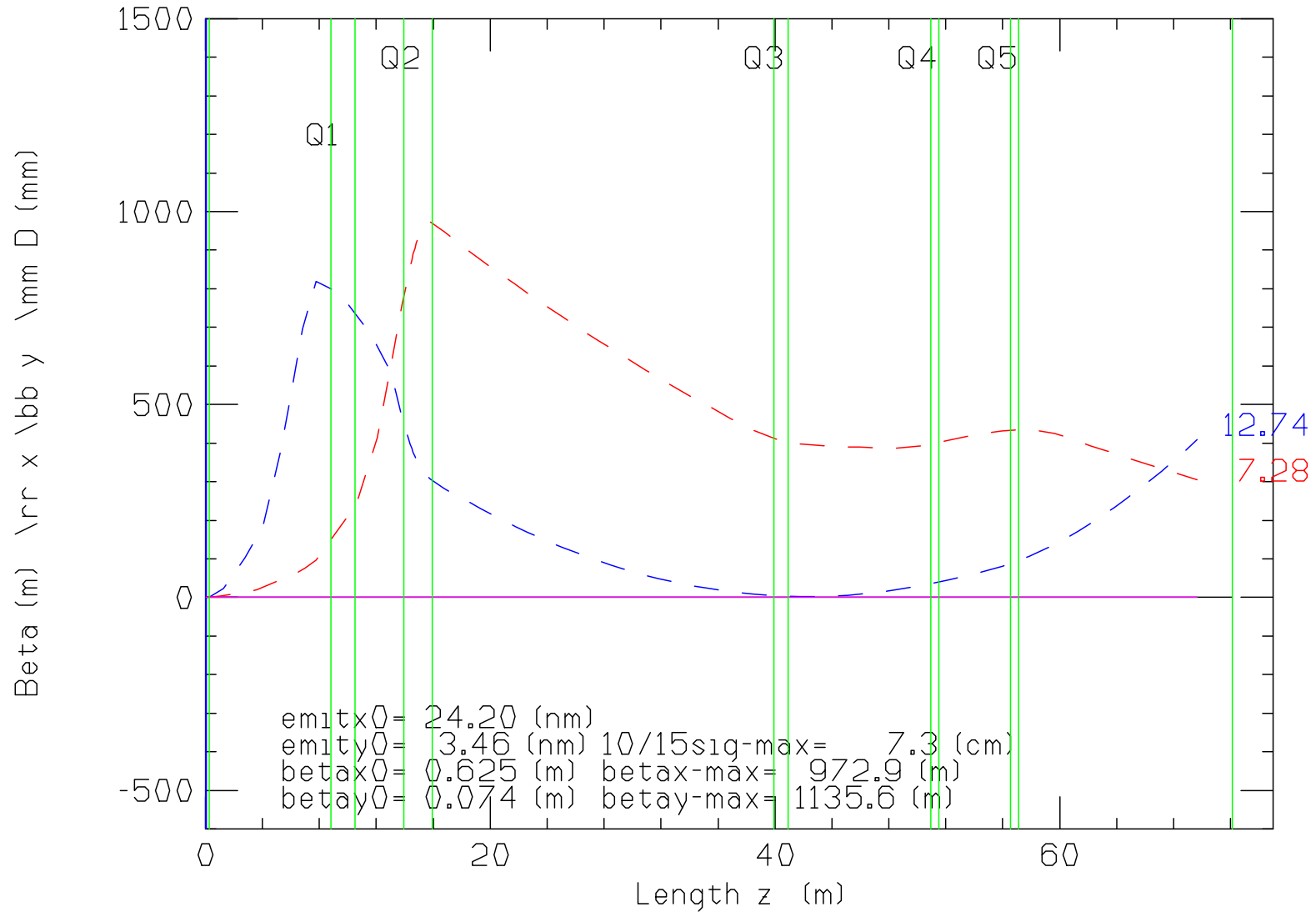
New Detail



Old forward electron betas

E=18 GeV

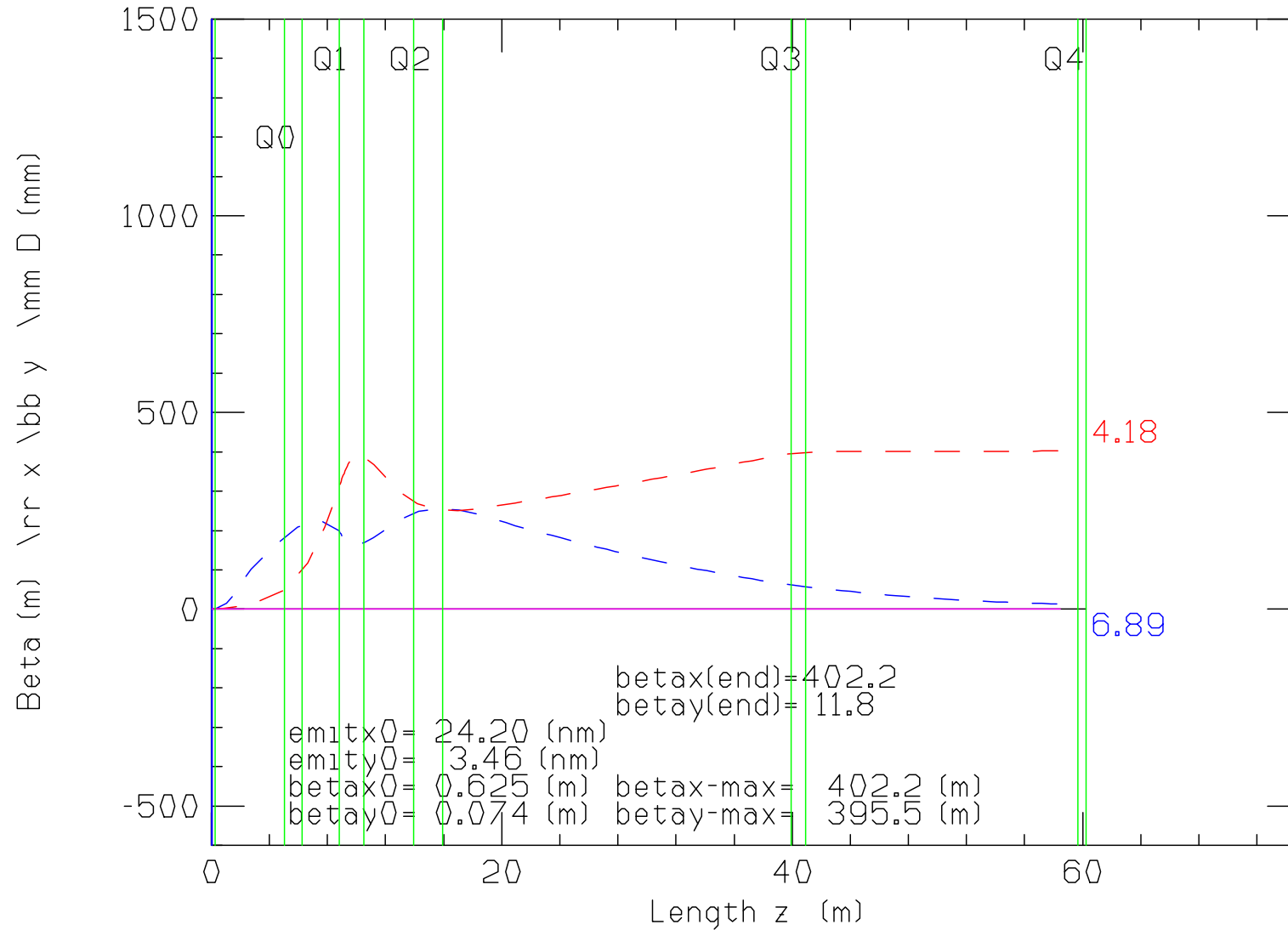
Nne NC140 Div = 3 Hadrons



New forward electrons betas

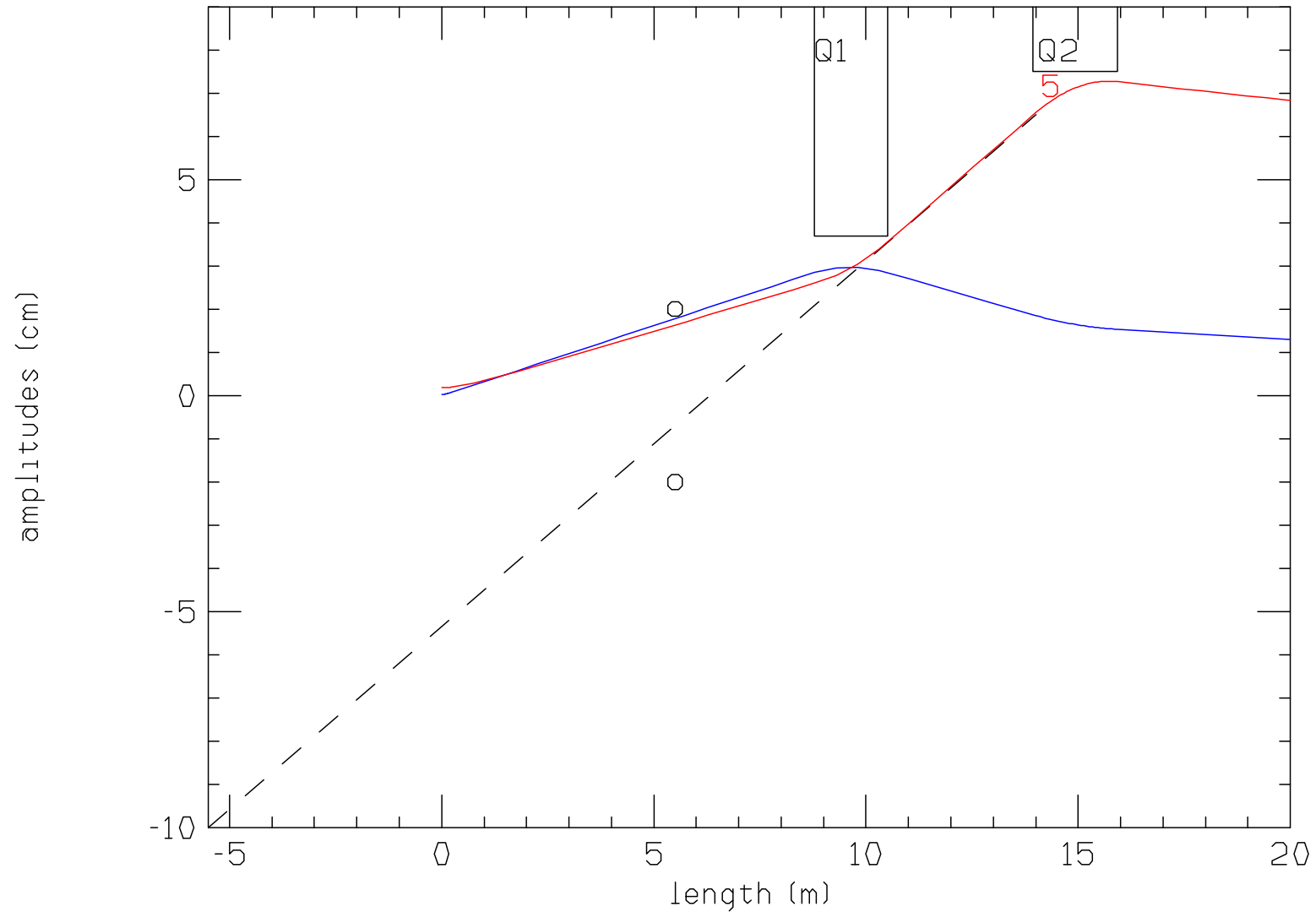
E=18 GeV

Nne NC140 Div = 3 Hadrons



Old forward electron apertures

crab Nne NC140 Div = 3 Hadrons

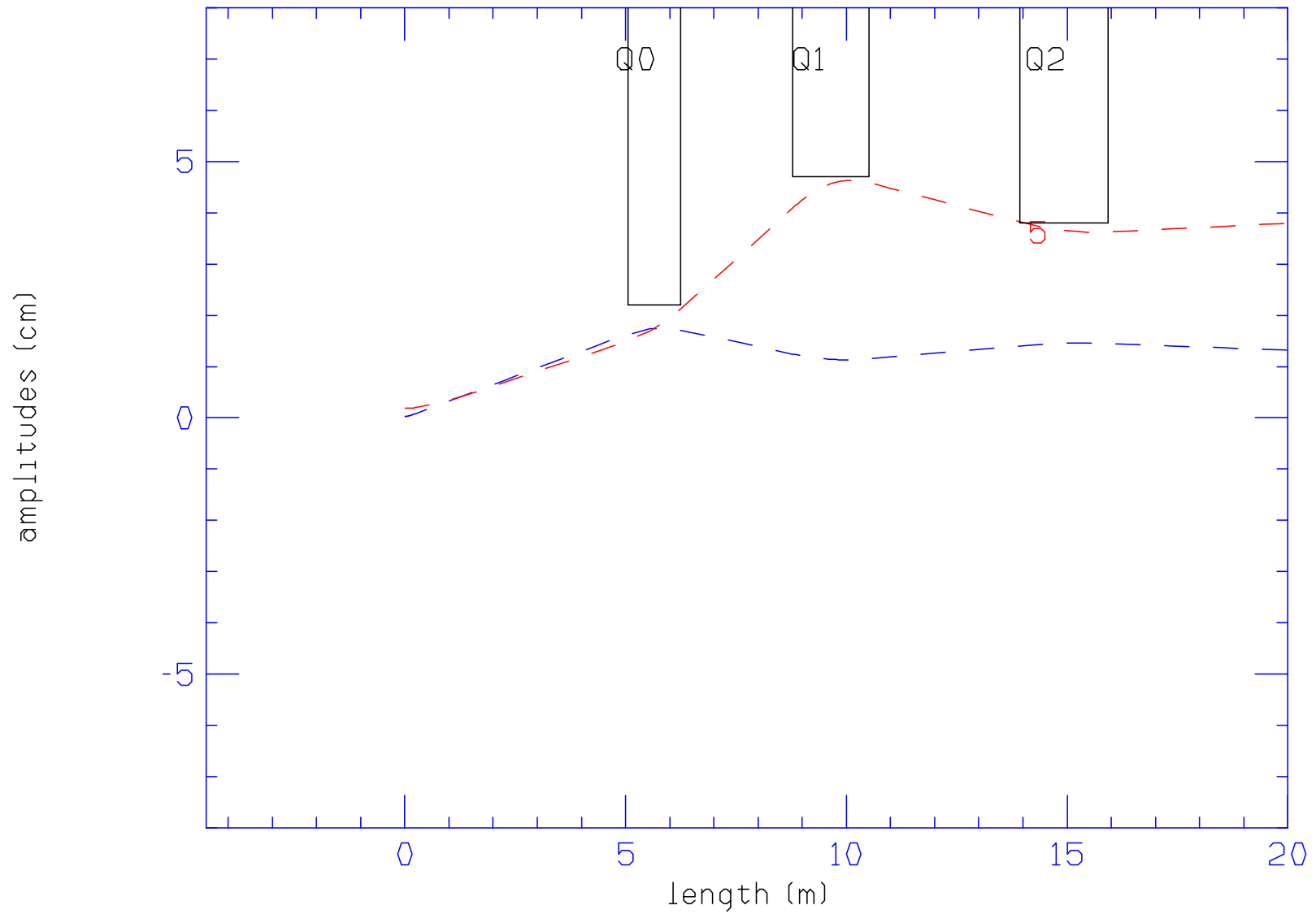


Beam pipe with at far end of detector is +/- 9 cm (Christoph got less)

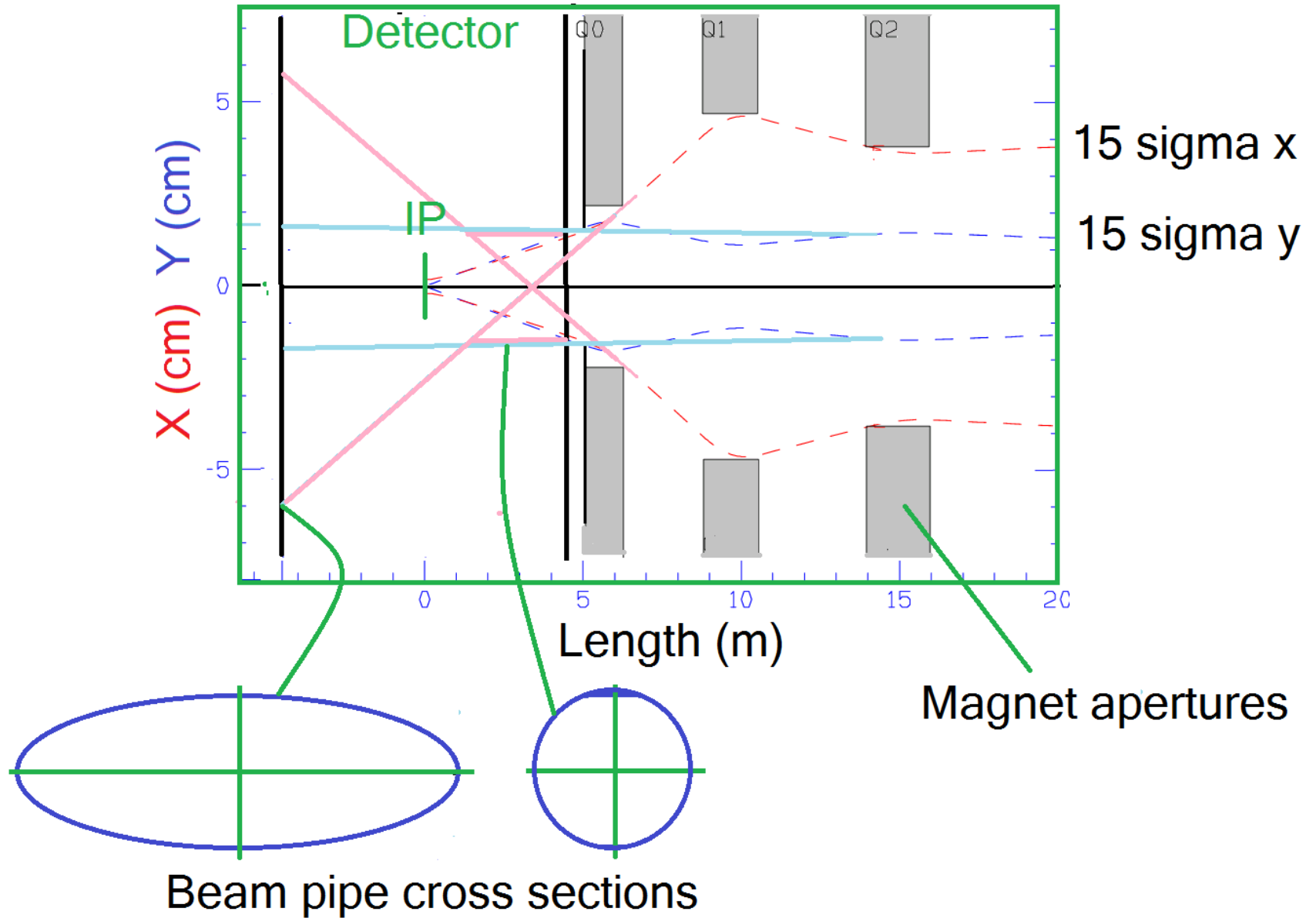
New forward electrons apertures

crab

Nne NC140 Div = 3 Hadrons



Quad Synchrotron Fans



Electron Magnet Parameters

Old

		L1	DL	gap	x	θ	IR	OR	B	Grad)
		m	m	m	cm	mrad	cm	cm	T	T/m
Q1	3	8.79	1.72	3.42	0.0	0.00	3.70	8.7	0.137	-3.701
Q2	5	13.93	2.00	24.00	0.0	0.00	7.50	17.5	0.171	2.284
Q3	7	39.93	1.00	10.00	0.0	0.00	5.00	15.0	0.036	-0.728
Q4	9	50.93	0.60	5.00	0.0	0.00	5.00	15.0	0.054	-1.070

New

		L1	DL	gap	x	θ	IR	OR	B	Grad)
		m	m	m	cm	mrad	cm	cm	T	T/m
Q0	3	5.05	1.20	2.54	0.0	0.00	2.0	8.7	0.28	-13.868
Q1	5	8.79	1.72	3.42	0.0	0.00	7.50	17.5	0.587	7.825
Q2	7	13.93	2.00	24.00	0.0	0.00	5.00	15.0	0.110	-2.205
Q3	9	39.93	1.00	18.72	0.0	0.00	5.00	15.0	0.028	0.559
Q4	11	59.65	0.60	5.00	0.0	0.00	6.00	16.0	0.000	0.000

New Quad is small and has very low grad times radius = .28 T

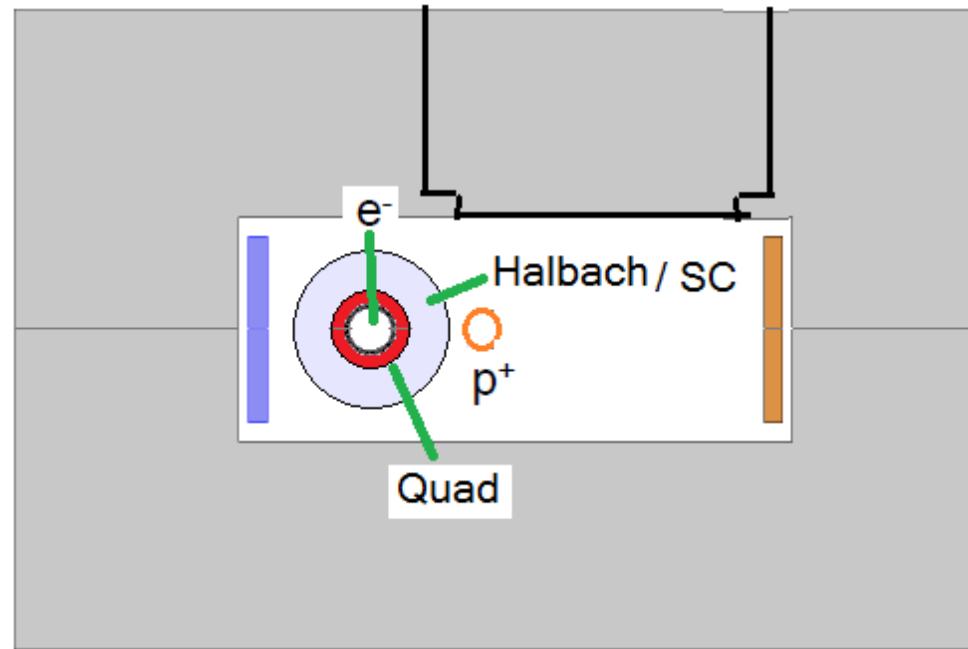
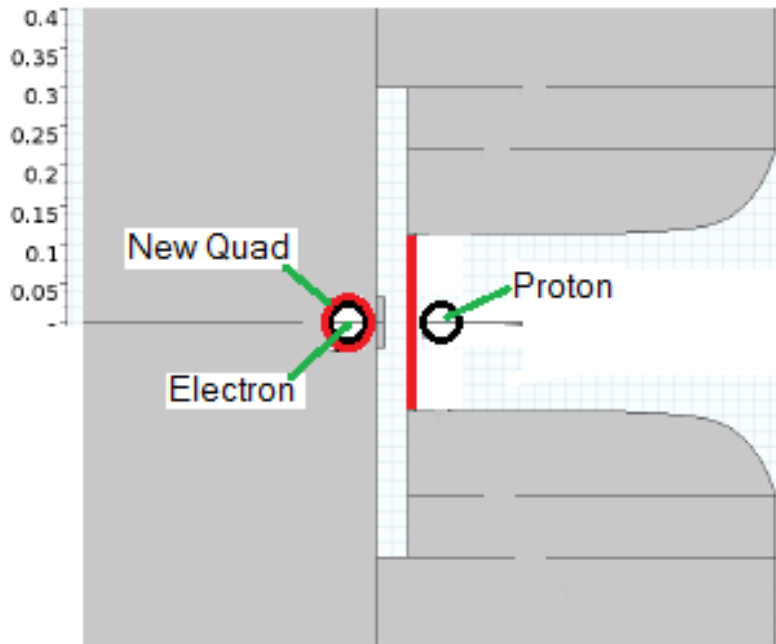
Compare New and Old e Parameters

E=18 GeV

	Old	New	ratio
L* (m)	8.79	5.5	1.60
Max beta x (m)	900	402	1.50 ²
Max beta y (m)	1050	395	1.63 ²
Chromaticity x	7.3	4.18	1.75
Chromaticity y	11.8	6.89	1.71

B0 with Q0 based on old designs

Both have good access to detectors

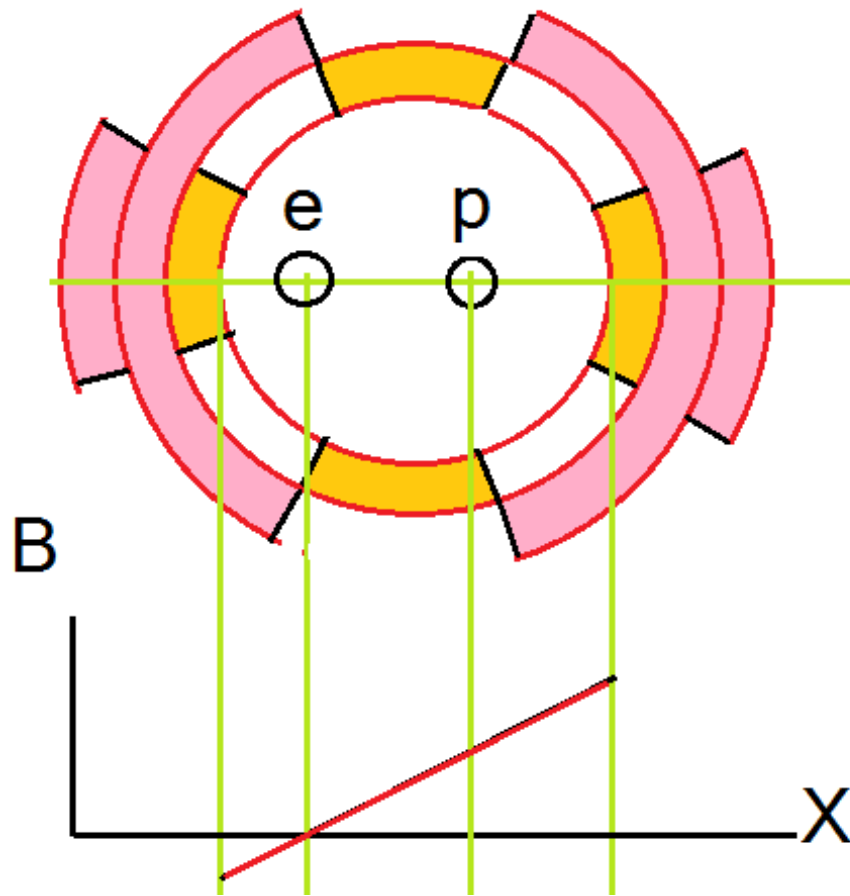


Septum
best access

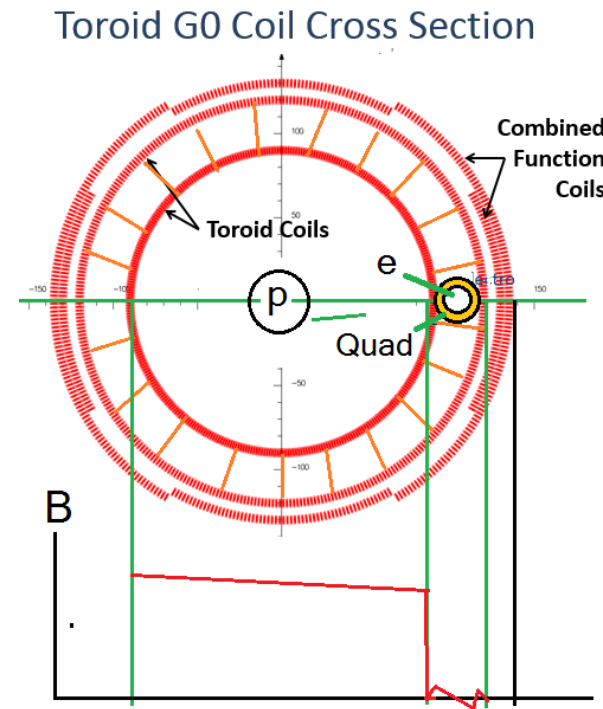
Active shielding
Best acceptance

B0 with Q0 new designs

Both have poor access



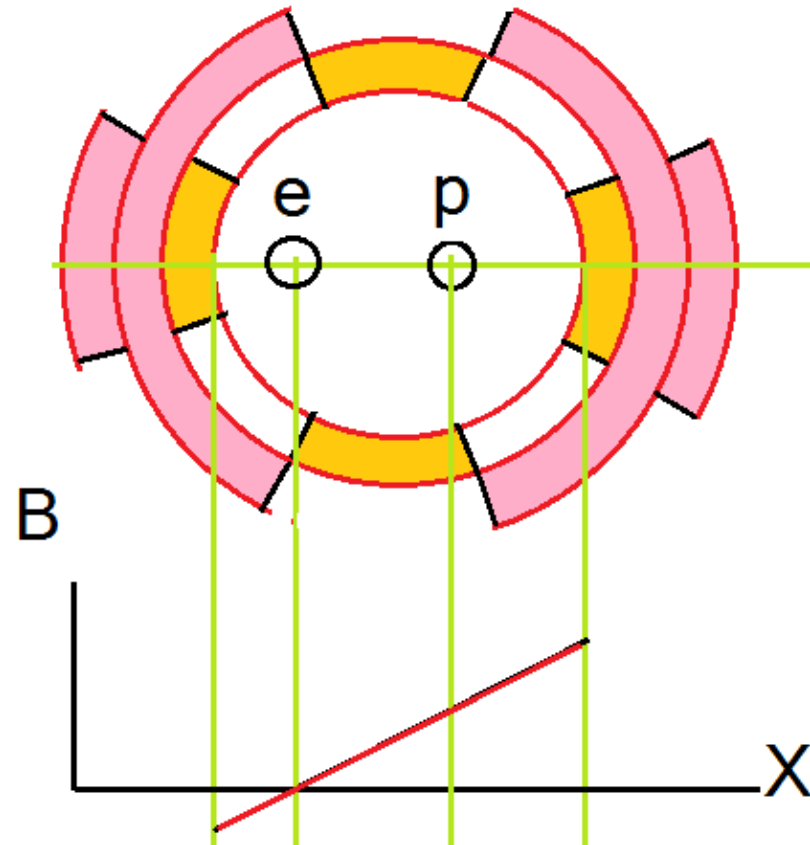
Ferdinand's Spectrometer B depends on Q0 grad lower for lower Ee



Toroidal Spectrometer B Fixed

Gradients and fields for Ferdinand's

E(e) GeV	Grad T/m	B(p) T	Bmax T
18	13.4	1.65	3.3
10	7.4	0.92	1.8
5	3.7	0.46	0.9



Discussion

- These options need to be studied
- How important is the spectrometer field
- How important is the access to detectors
- How difficult are these magnets to build

It would be nice to reduce the number of options