200 MHz Exp Layouts

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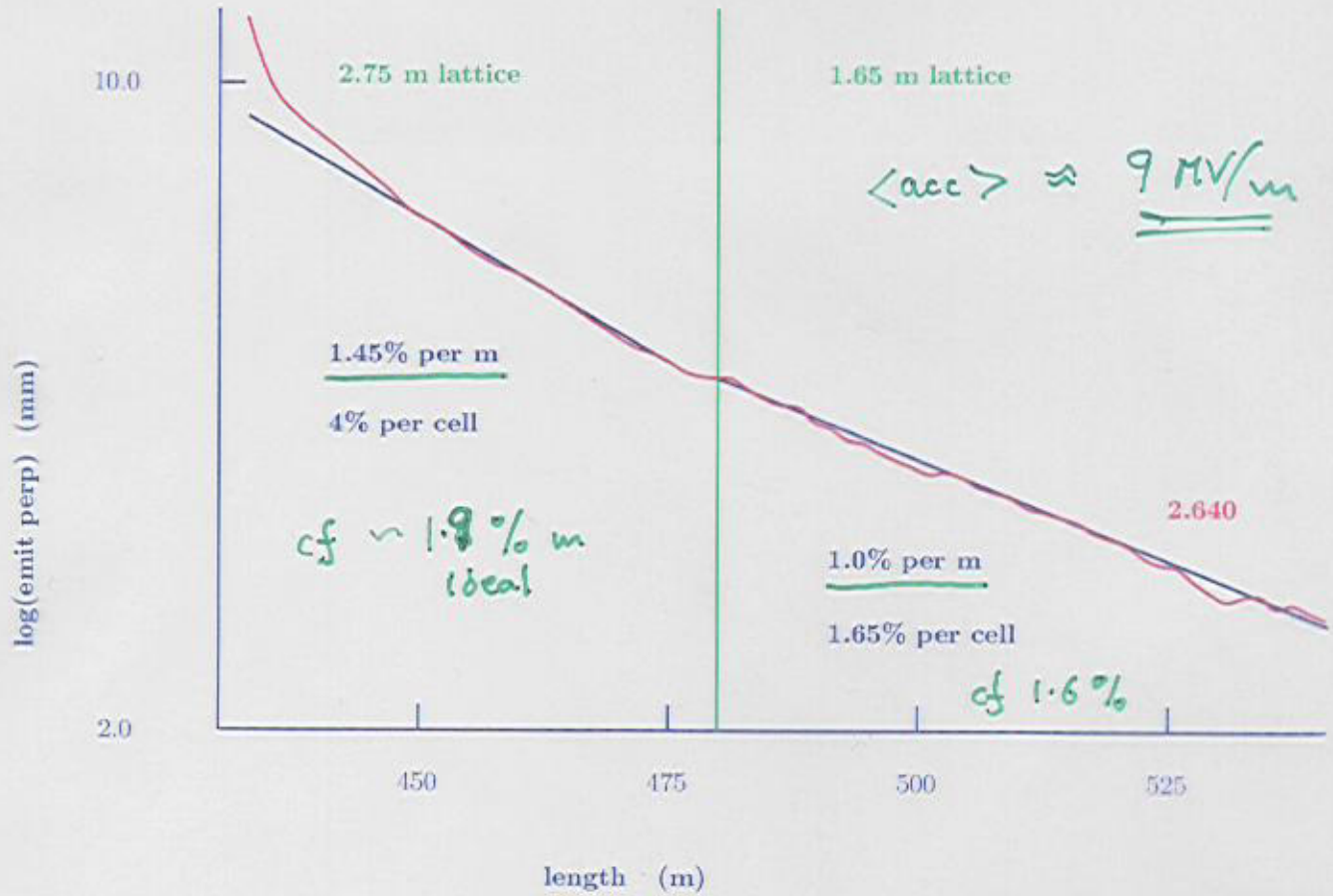
CERN 10/25/01

Choice of lattice

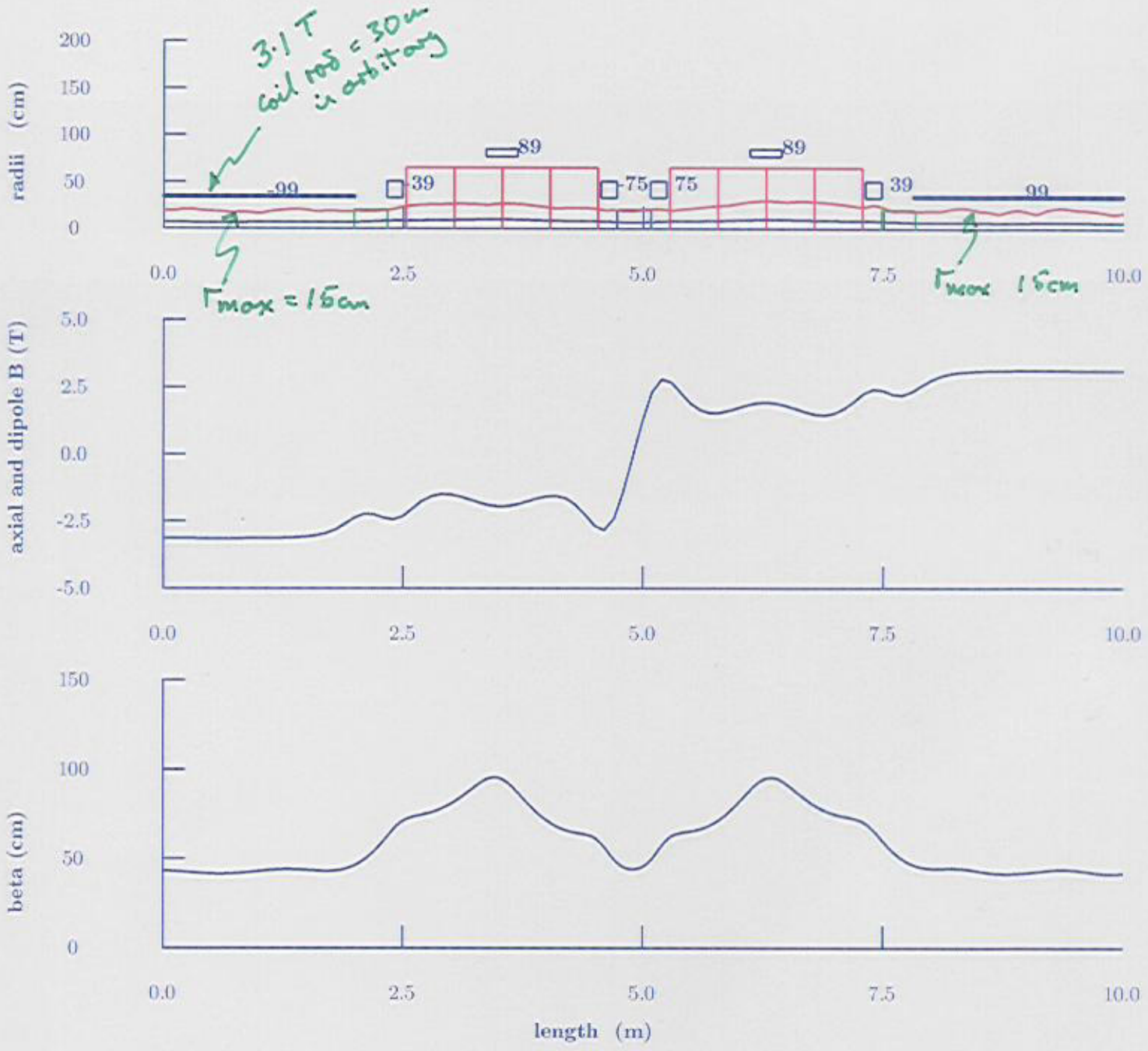
look at Study 2 : 2·75 m or 1·65 m ?



$\langle acc_{grad} \rangle \approx 12$ MV/m cf CERN $\langle acc_{grad} \rangle \approx 4$ MV/m

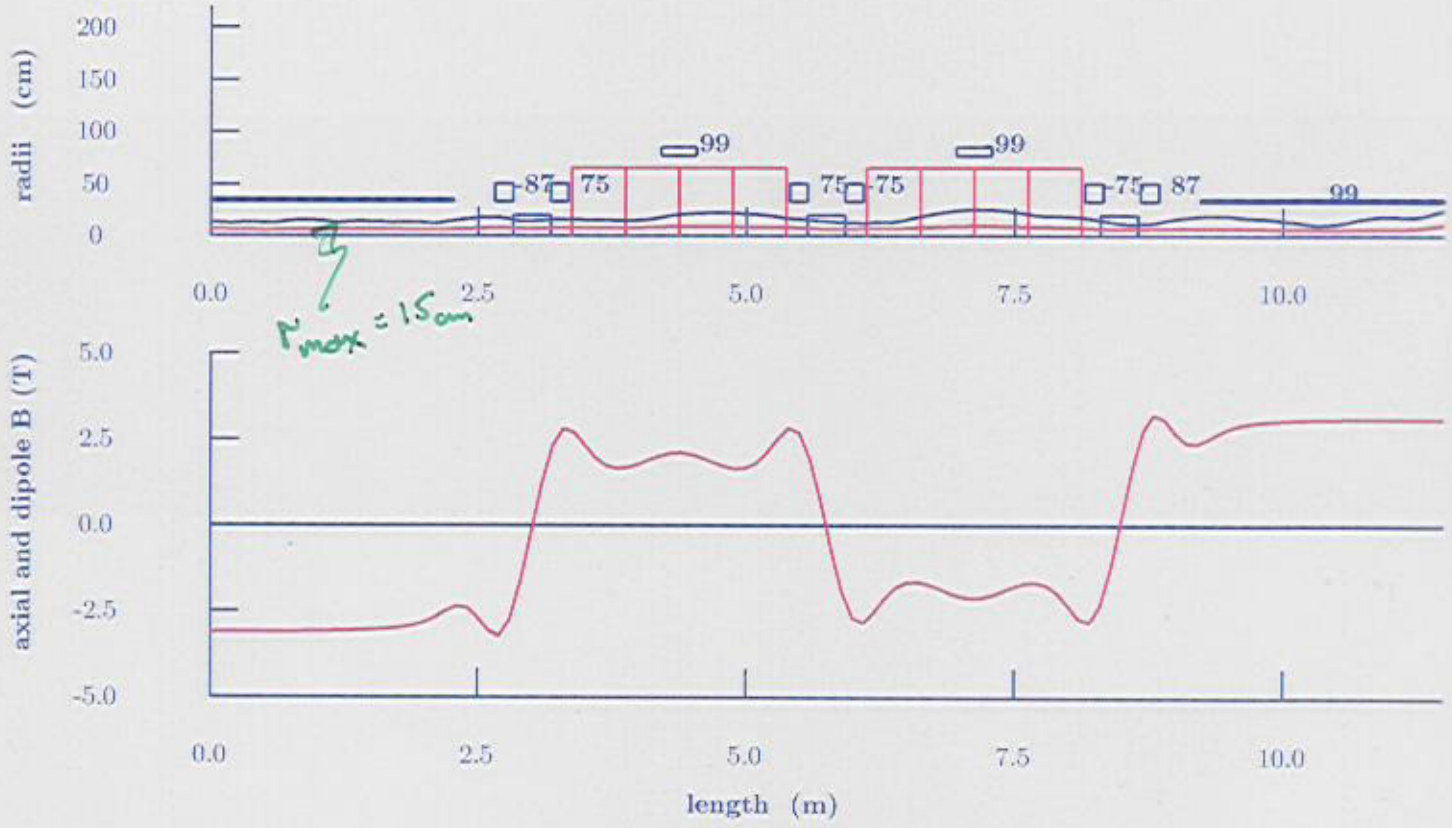
ie ≈ 1/3 length for same cooling

Geometry A


radii (cm)
200
150
100
50
0
3.1 T coil rad = 30cm is arbitary
89
89
99
39
75
75
39
99
0.0
2.5
5.0
7.5
10.0
rmax = 15cm
rmax 15cm
axial and dipole B (T)
5.0
2.5
0.0
-2.5
-5.0
beta (cm)
150
100
50
0
length (m)

Geometry B

Preferred



Philosophy:

operate as in study 2

$\phi = 30°$ ← Not assumed at CERN

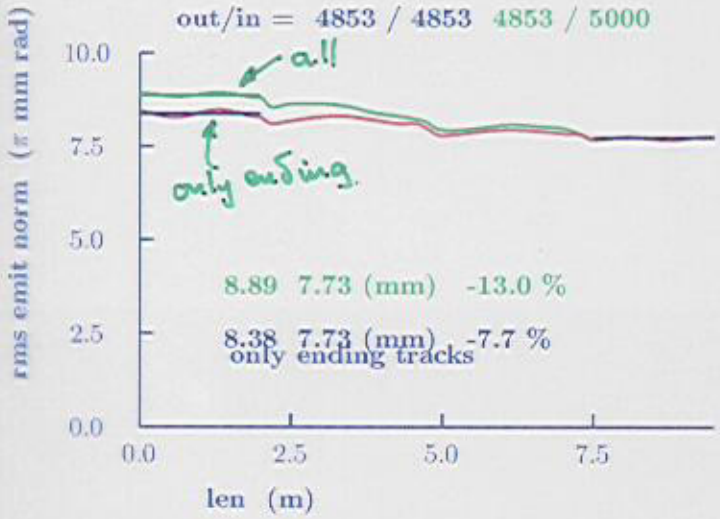
$E = 15.5$ MV/m

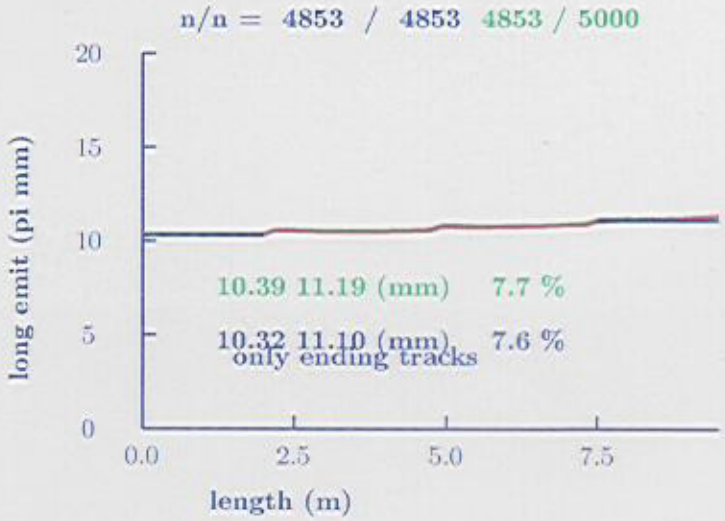
$E_{in} = E_{out}$ ← Don

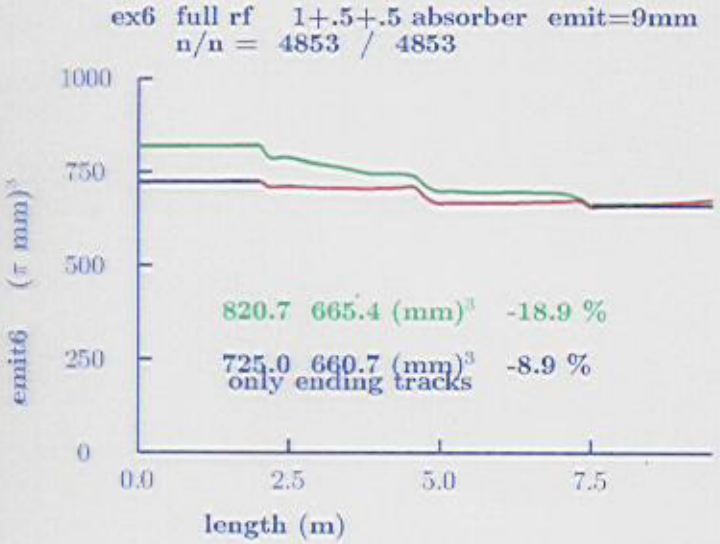
ICOOL

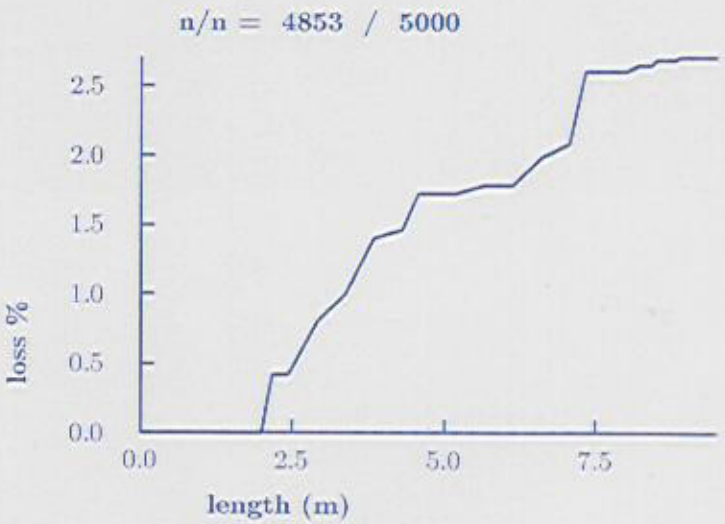
Geom A 1/2 + 1 + 1/2 abs = 2 cells

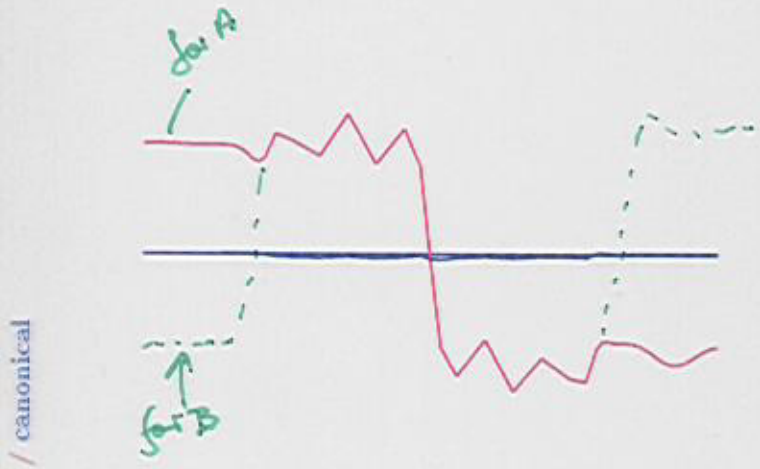
~ B

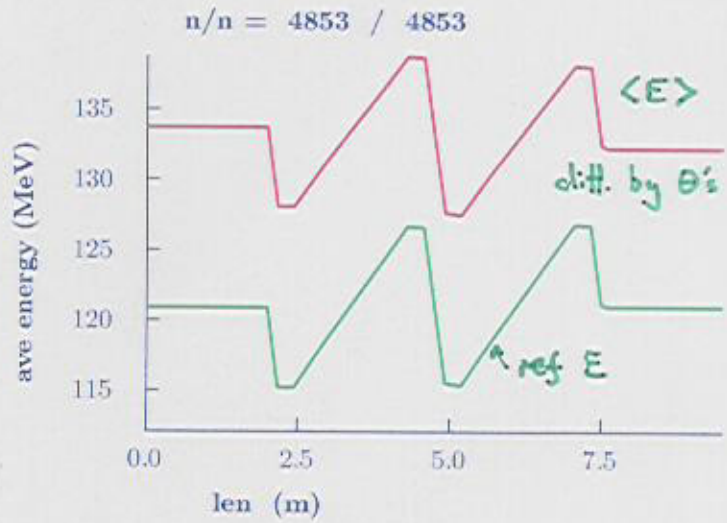












Input used

particles		5000
uncorrelated momentum	MeV	200
Transverse emittance	π mm	9
Longitudinal emittance	π mm	11
uncorrelated dp/p	%	7
rms ct	cm	9
mom-amp^2 correlation	GeV/c	.34
ct-angmom correlation	GeV^{-1}	-35
ct-dp/p correlation	m	1.14

Summary of ICOOL simulation

	all tracks	ending tracks	true*	
Transverse emittance change	-13	-7.7	-9.2	%
Longitudinal emittance change	+7.7	+7.6	+4.0	%
6-D emittance change	-18.9	8.9	-13.9	%

* From continuous cooling, i.e. ideal input matching

Run Options

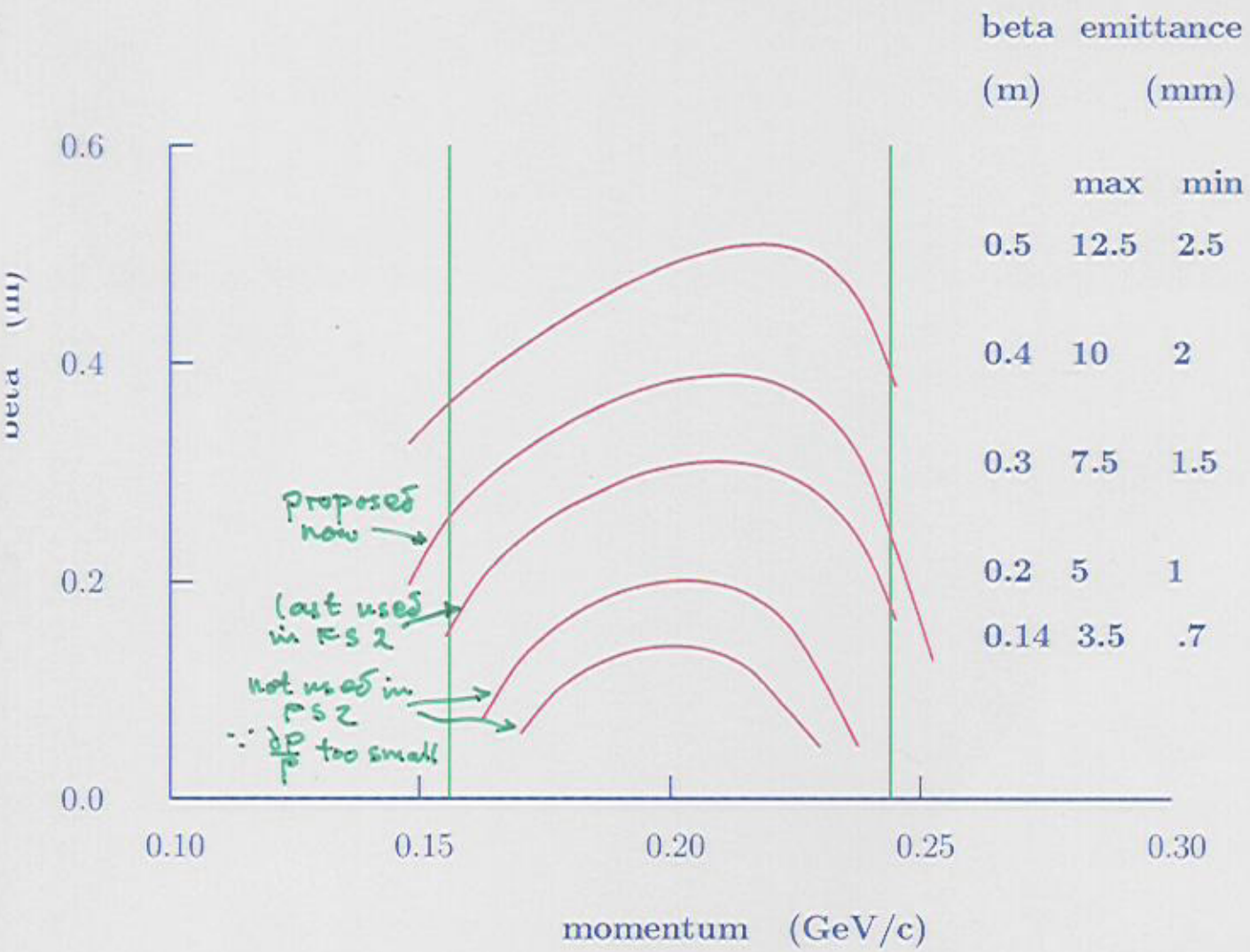
0	yes	1+1+1	13	90	12	23	

	$E_1 = E_2$?	$n_{absorbers}$	rf grad MV/m	rf phase deg	$\Delta\epsilon_\perp$ %	rf Power MW	simulated
a	yes	1/2+1+1/2	15.5	30	8	32.3	yes
b	no	1+1+1	15.5	30	12	32.3	
c	yes	1/2+1+1/2	8.7	90	2	10.3	yes
d	no	1+1+1	8.7	90	12	10.3	
e	yes	0+1+0	7.7	30	4	8.1	yes
f	no	1+0+1	7.7	30	8	8.1	
g	yes	0+1+0	4.4	90	4	2.6	
h	no	1+0+1	4.4	90	8	2.6	
i	no	0+1+0	0	0	4	0	
j	no	1+1+1	0	0	12	0	

Lower emittance ?

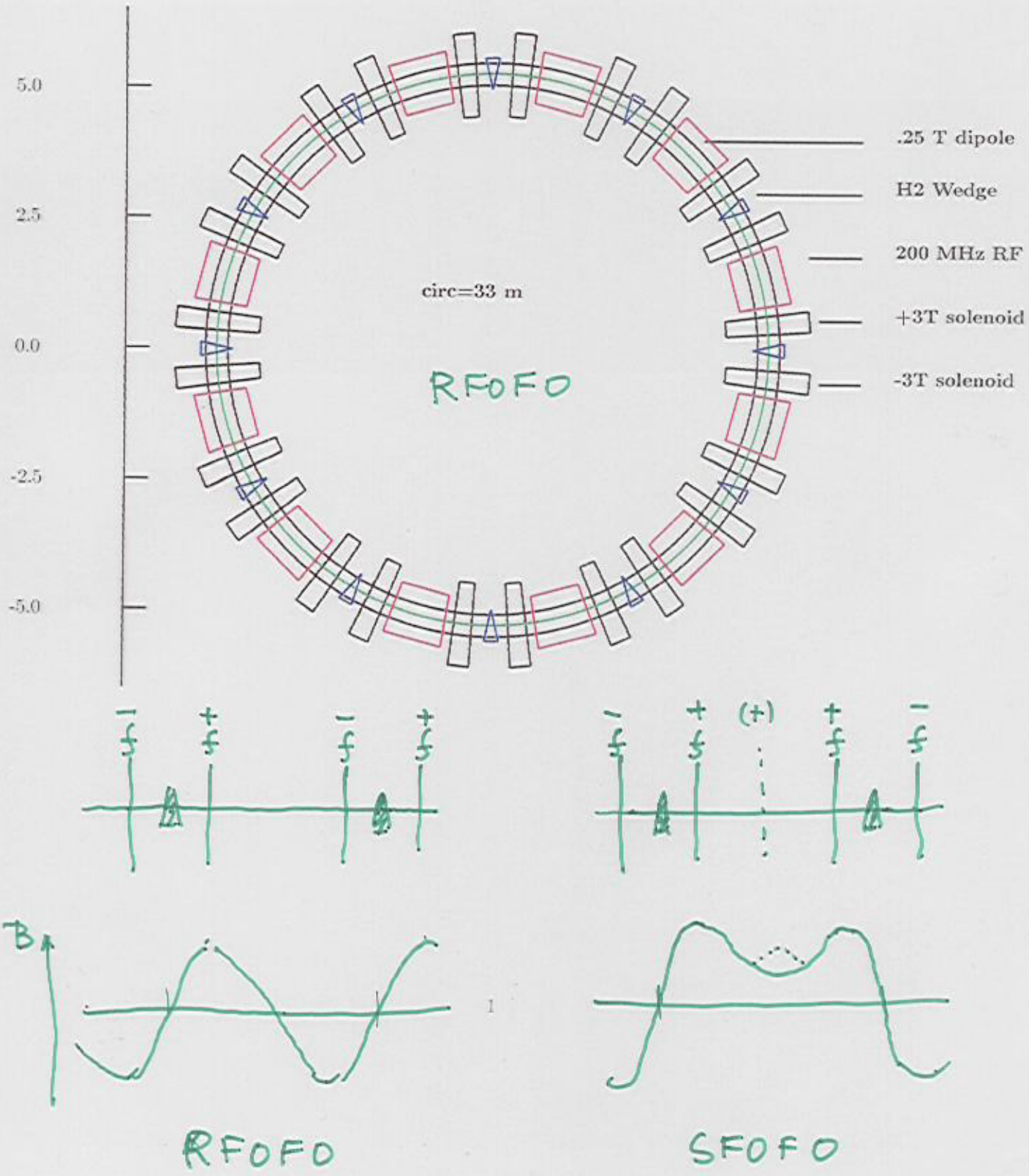
same lattice differing currents

matching yet to be tried
may prefer higher B sol.



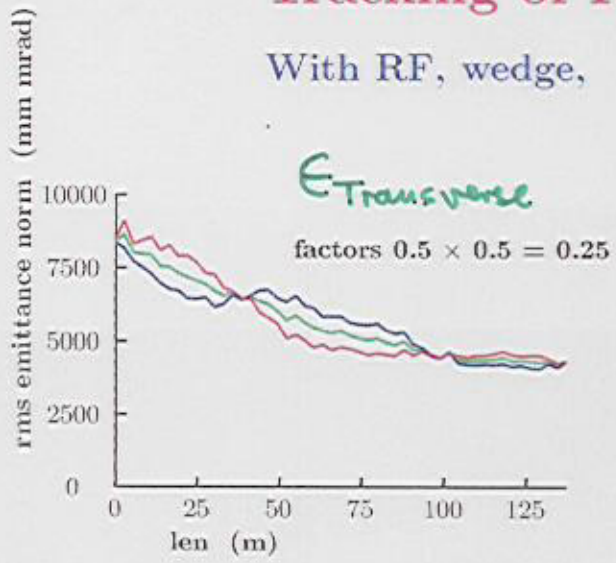
Simulations of RFOFO Ring Emittance Exchange

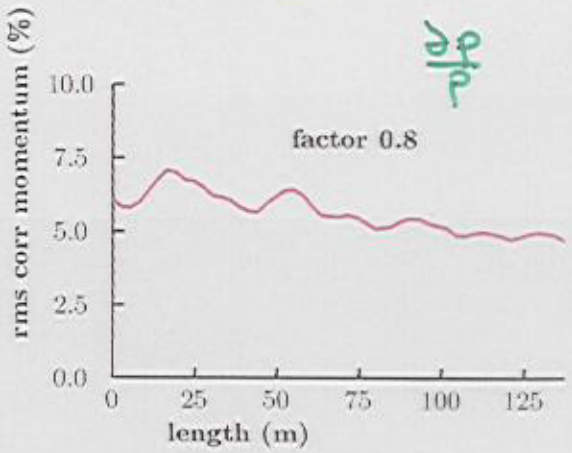
Palmer Fernow Berg (Oct 01 LBL)

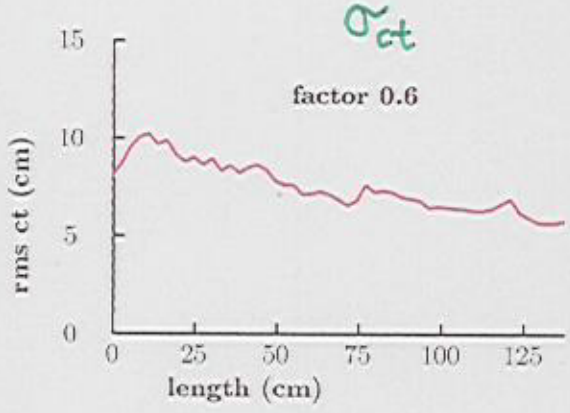


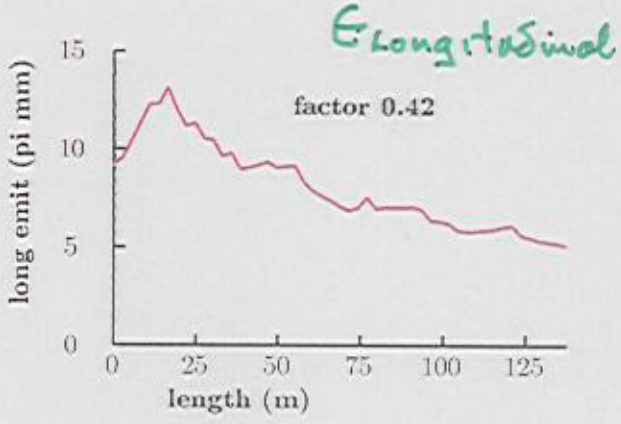
Tracking of Ring from Gaussian

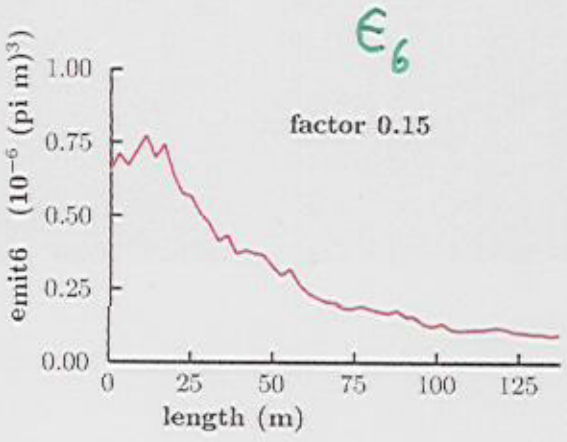
With RF, wedge, scatter and straggle

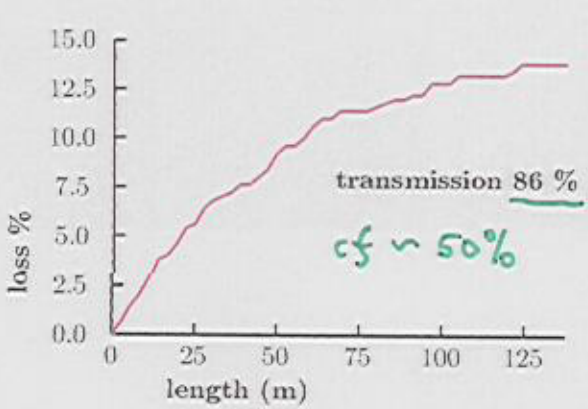




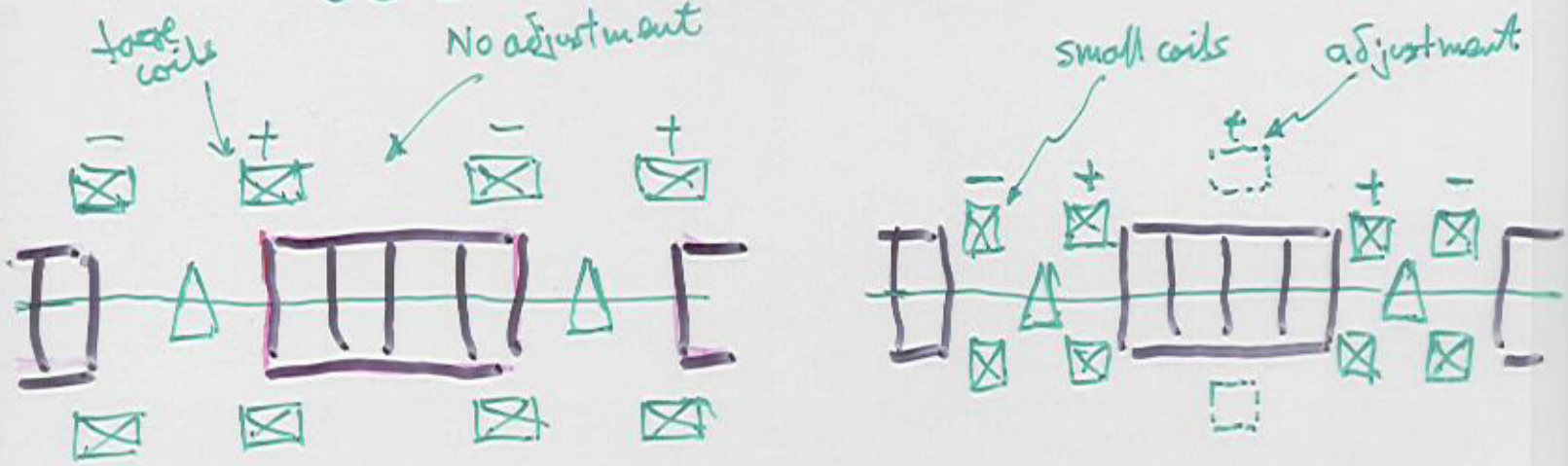








RFOFO vs SFOFO



RFOFO
every cell the same

SFOFO
B_z alternates cell-cell

S. Berg analysis (linear) →

1) we CAN used SFOFO
2) B_y can be local

e.g. it could be: