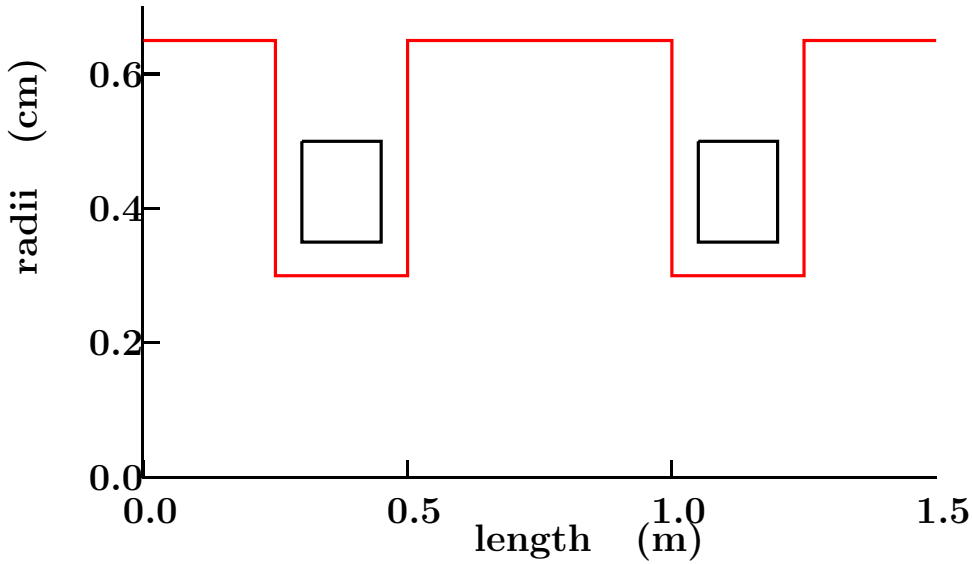
Gas Filled Pre-Cooler

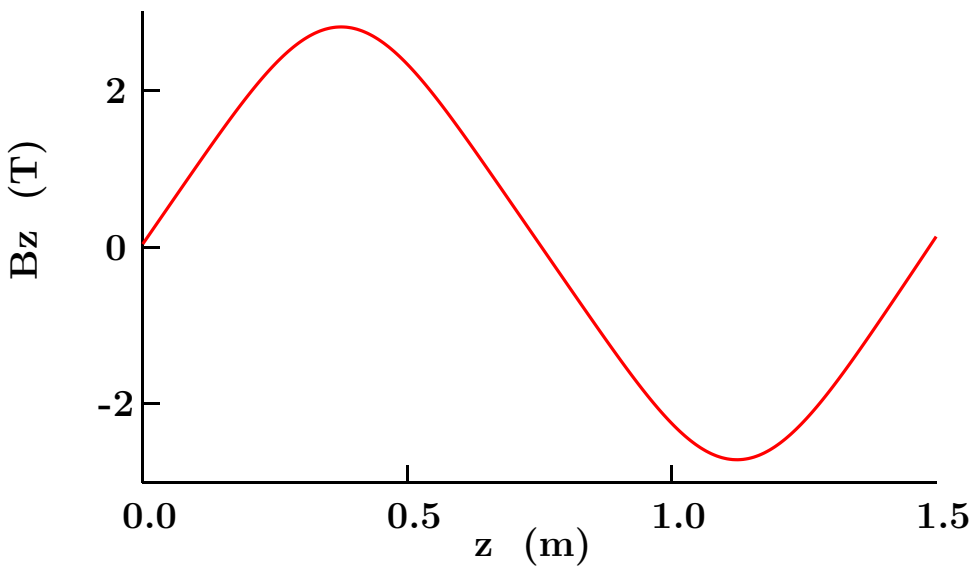
Bob Palmer

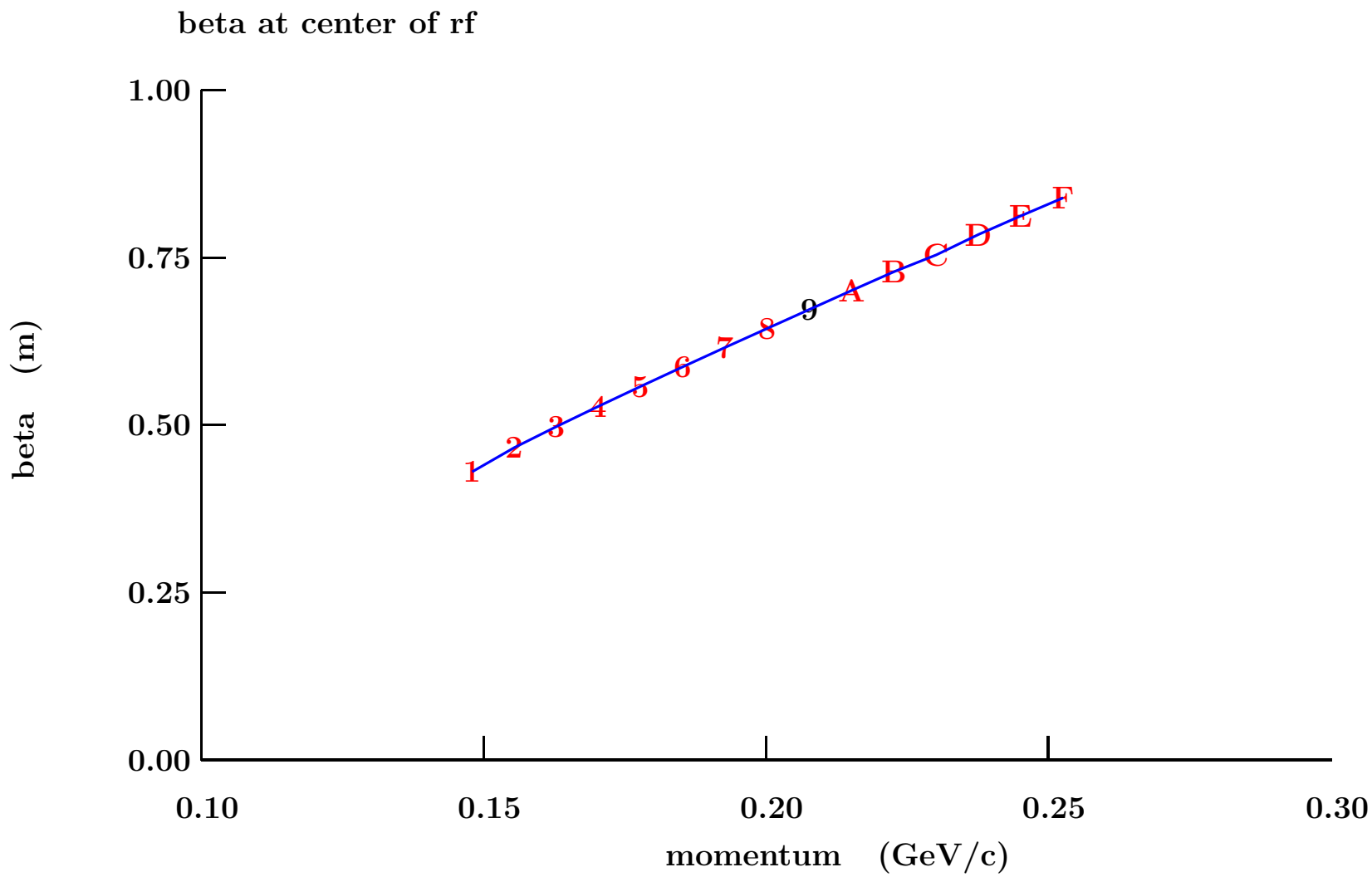
8/26/03 Fermilab

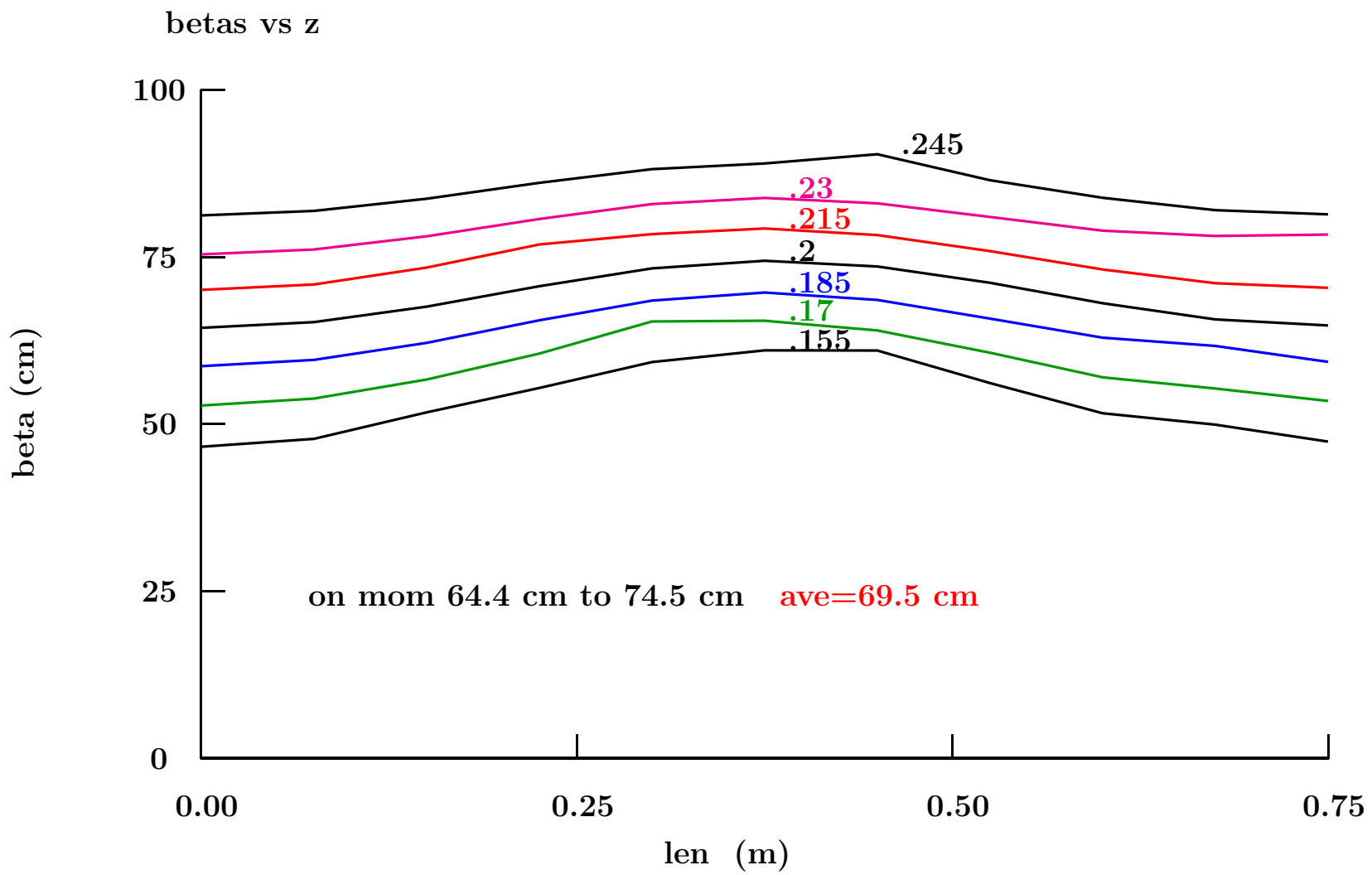
len1 m	gap m	dl m	rad m	dr m	I/A A/mm^2	n I A	n I l A m
0.300	0.300	0.150	0.350	0.150	106.67	2.40	6.41

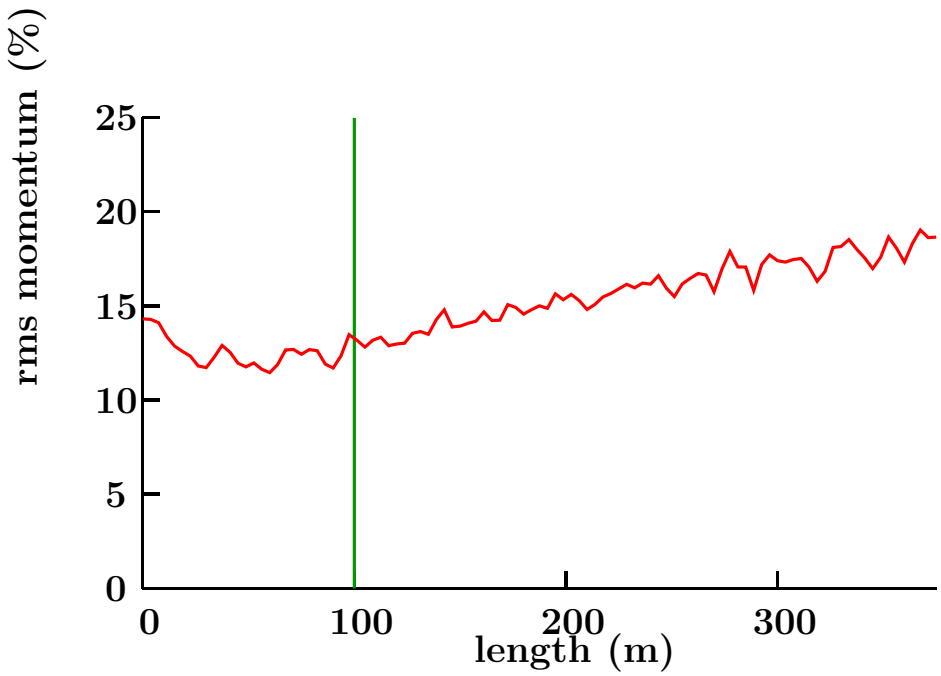
RF gradient	MV/m	16
H2 gas pressure	atm	300

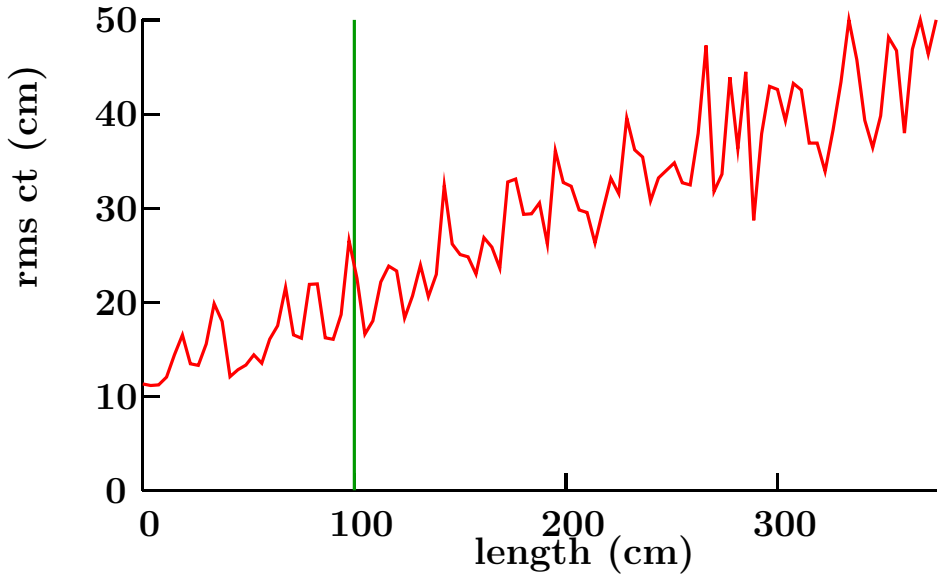

radii (cm)
0.6
0.4
0.2
0.0
0.0
0.5
1.0
1.5
length (m)

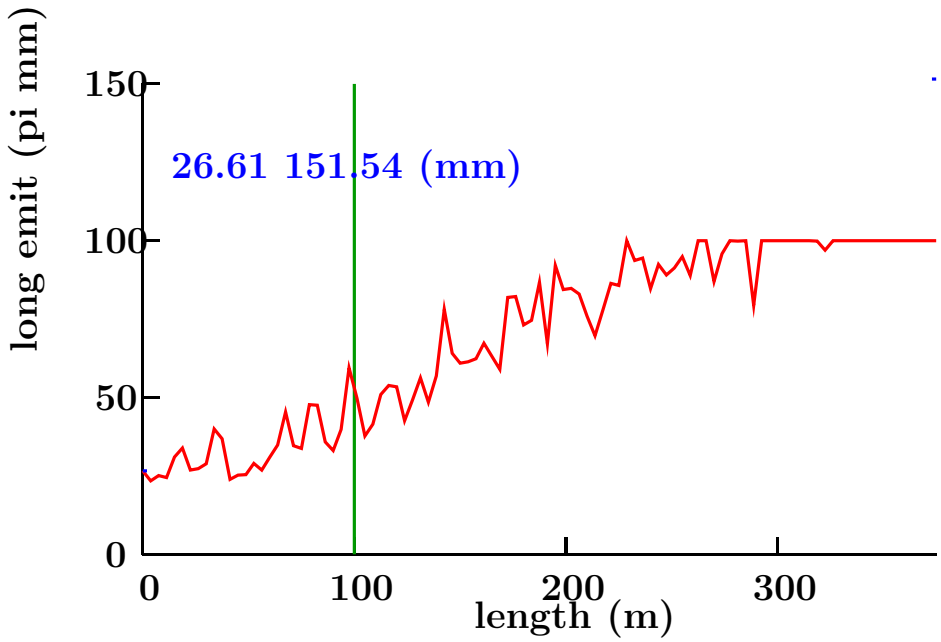

Bz (T)
2
0
-2
0.0
0.5
1.0
1.5
z (m)

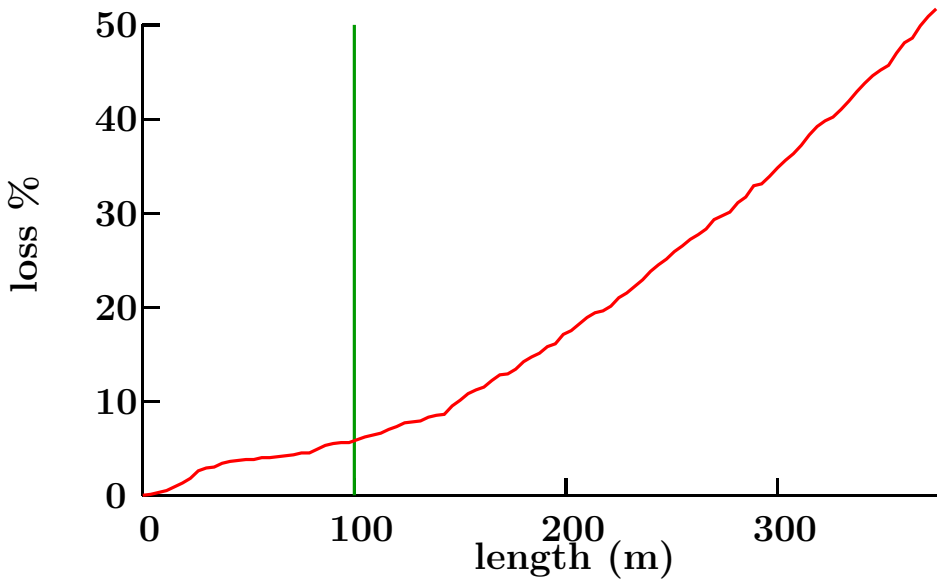

beta at center of rf
1.00
0.75
0.50
0.25
0.00
beta (m)
0.10
0.15
0.20
0.25
0.30
momentum (GeV/c)
1
2
3
4
5
6
7
8
9
A
B
C
D
E
F

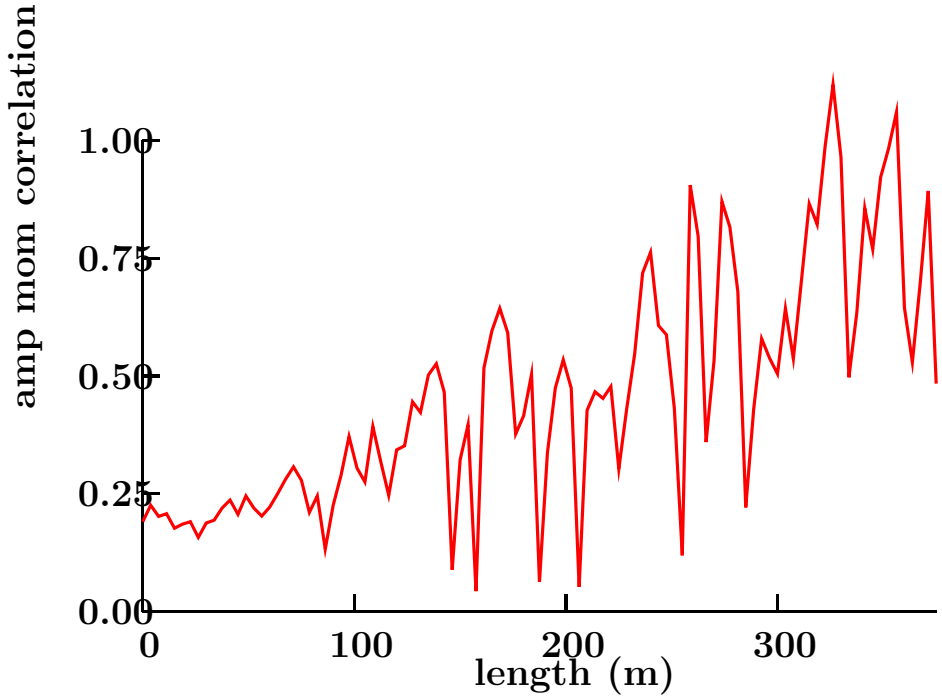

betas vs z
100
75
50
25
0
beta (cm)
.245
.23
.215
.2
.185
.17
.155
on mom 64.4 cm to 74.5 cm
ave=69.5 cm
0.00
0.25
0.50
0.75
len (m)

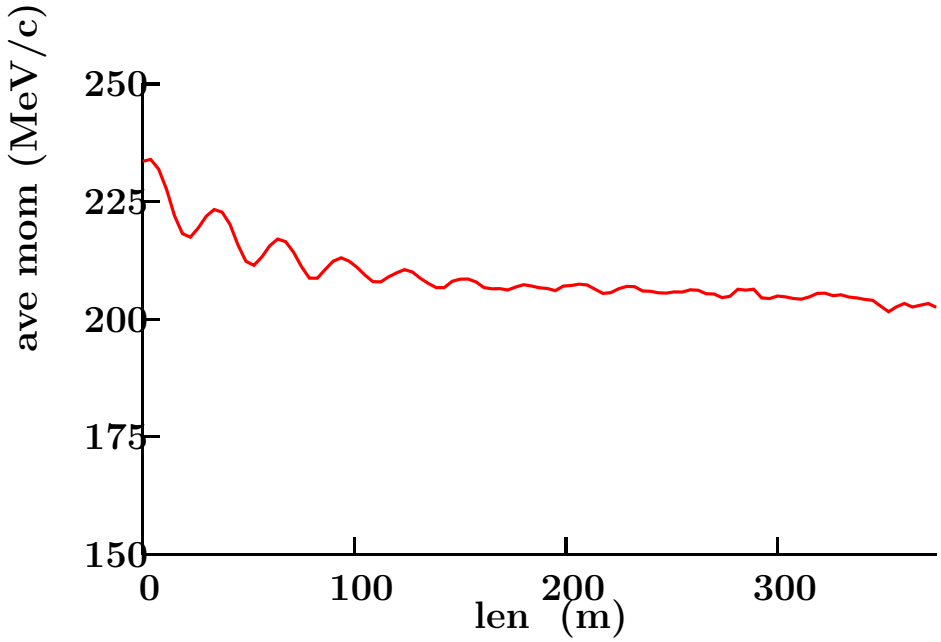

rms momentum (%)
25
20
15
10
5
0
0
100
200
300
length (m)

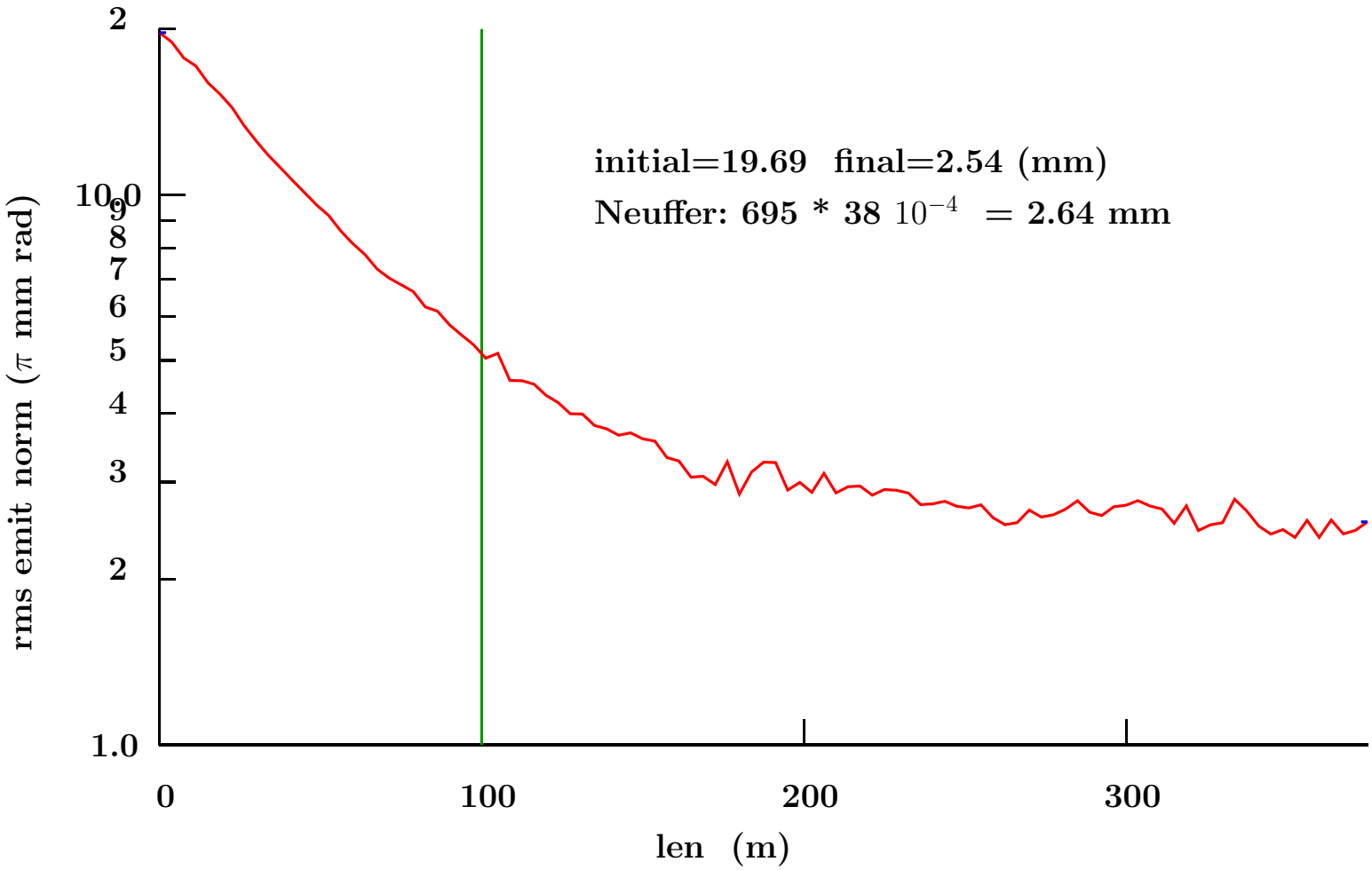

rms ct (cm)
50
40
30
20
10
0
0
100
200
300
length (cm)

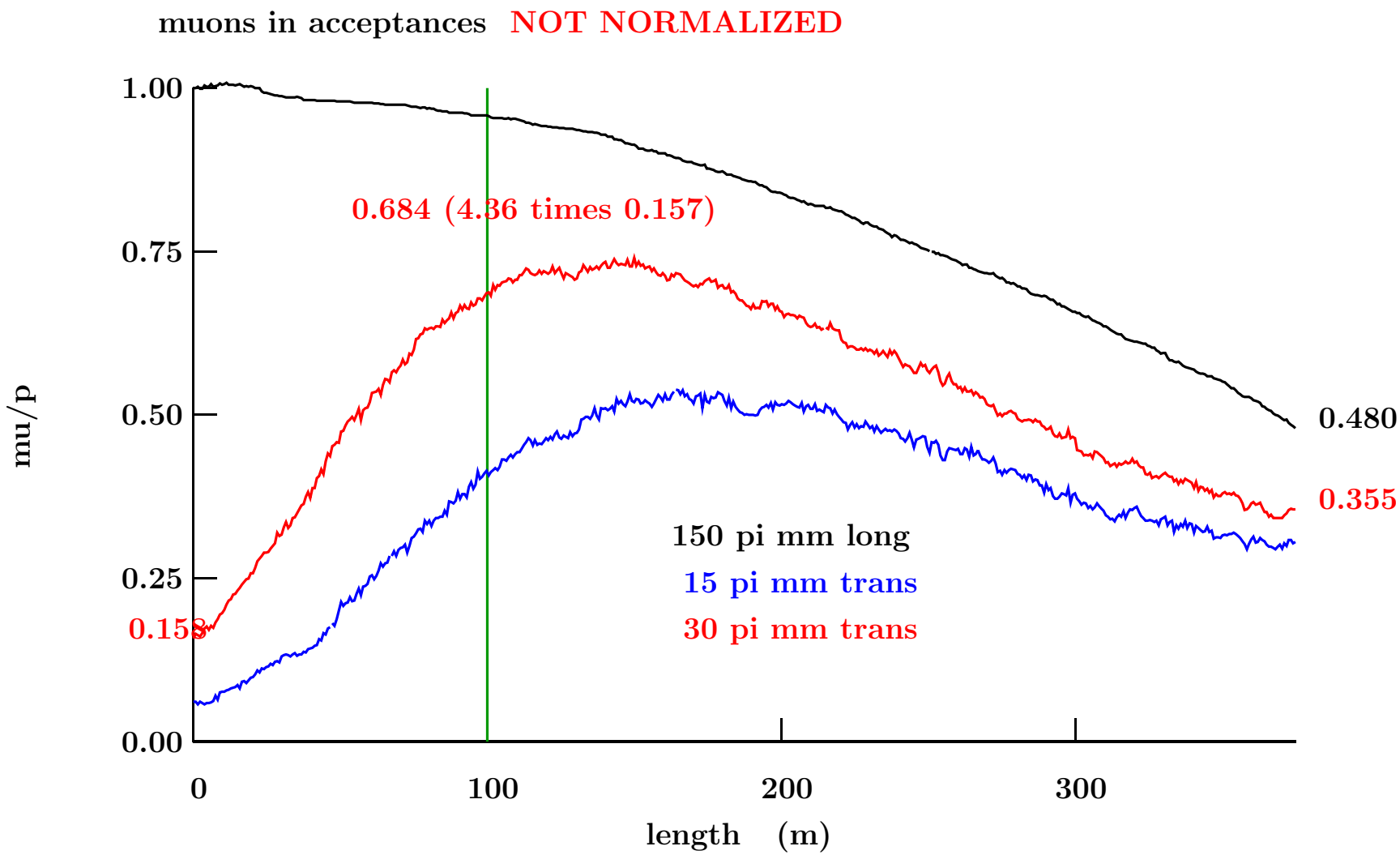

long emit (pi mm)
150
100
50
0
26.61 151.54 (mm)
0
100
200
300
length (m)

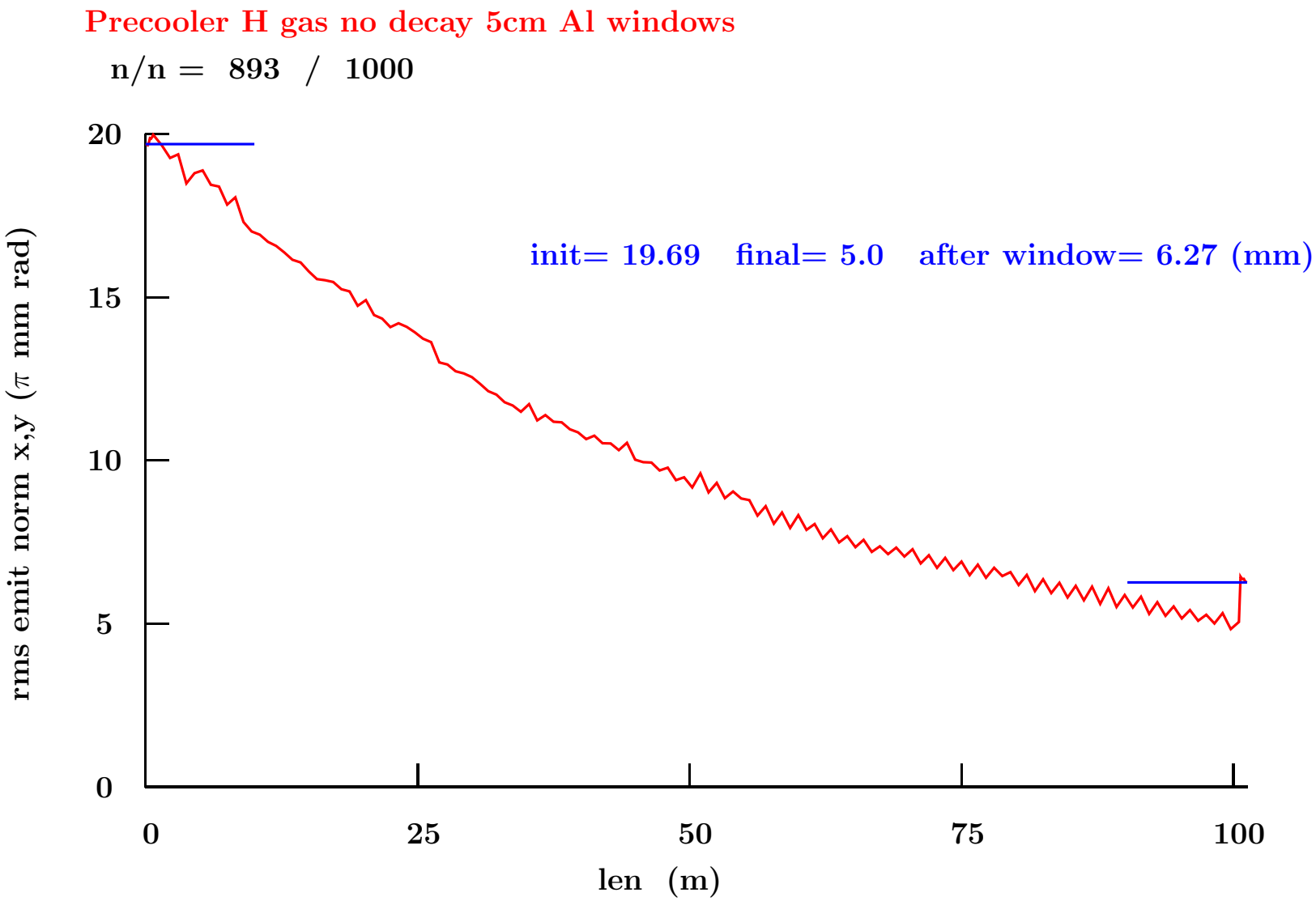

loss %
50
40
30
20
10
0
0
100
200
300
length (m)


amp mom correlation
1.00
0.75
0.50
0.25
0.00
0
100
200
300
length (m)


ave mom (MeV/c)
250
225
200
175
150
0
100
200
300
len (m)


initial=19.69 final=2.54 (mm)
Neuffer: 695 * 38 10^{-4} = 2.64 mm
rms emit norm (π mm rad)
2
10.0
9
8
7
6
5
4
3
2
1.0
0
100
200
300
len (m)


muons in acceptances NOT NORMALIZED
1.00
0.75
0.50
0.25
0.00
mu/p
0.684 (4.36 times 0.157)
0.158
0.480
0.355
150 pi mm long
15 pi mm trans
30 pi mm trans
0
100
200
300
length (m)


Precooler H gas no decay 5cm Al windows
n/n = 893 / 1000
init= 19.69 final= 5.0 after window= 6.27 (mm)
rms emit norm x,y (π mm rad)
20
15
10
5
0
0
25
50
75
100
len (m)