RF system of 150MeV FFAG

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contents

1. rf parameters
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accelerator parameters

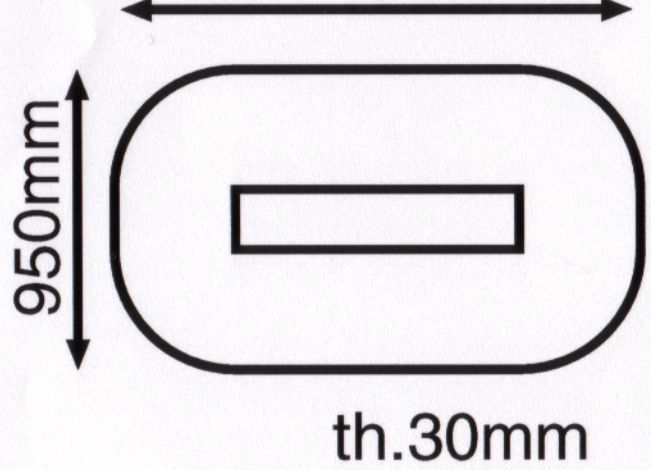
kinetic energy	10MeV	125MeV
revolution frequency	1.52MHz	4.24MHz
momentum compaction$(K+1)^{-1}$	8.65^{-1}	

rf voltage

length of rf section 528.83mm

chamber cross section 820mm X 70mm

core (FINEMET)

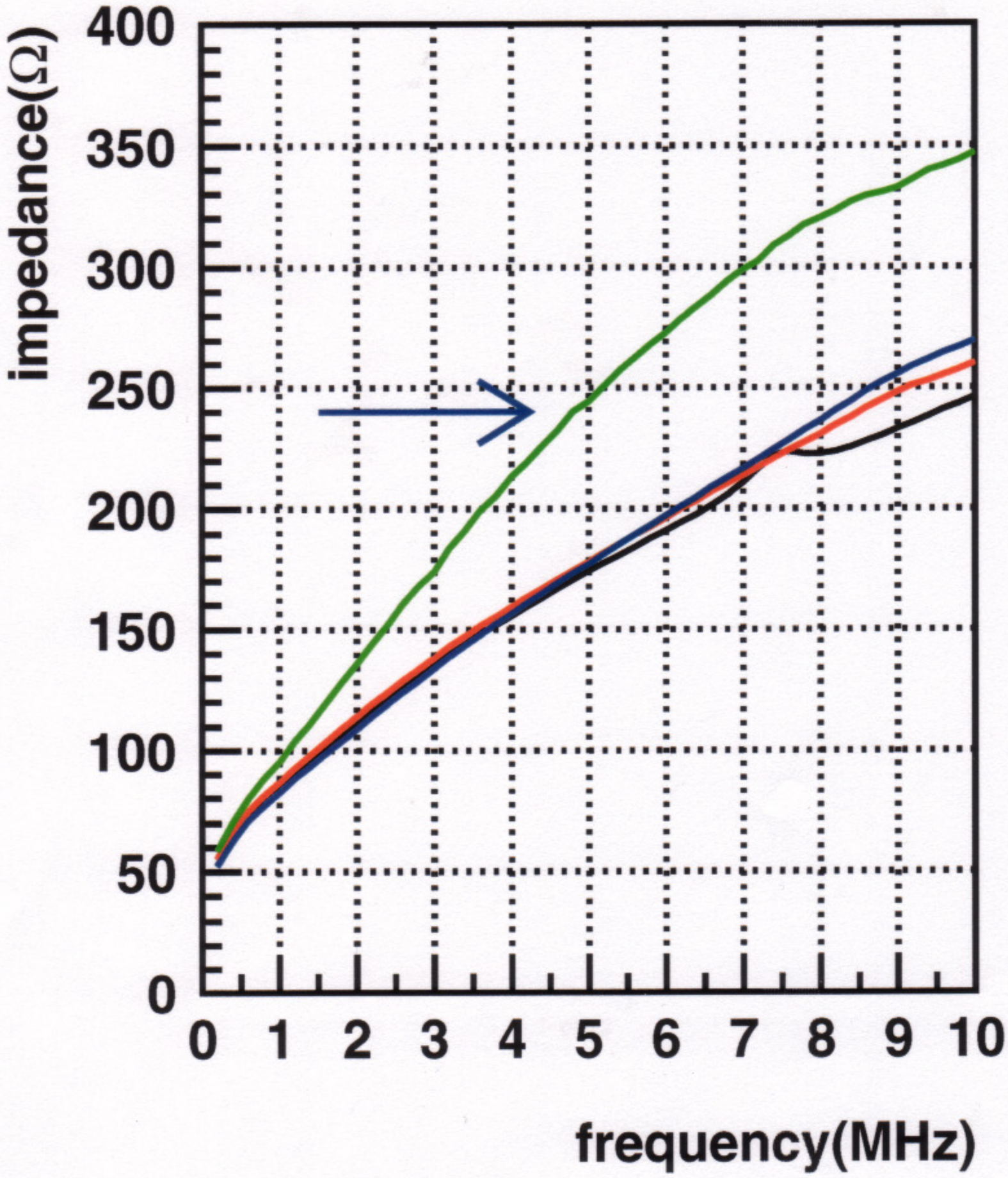


impedance
about 520Ω /4pieces @3MHz

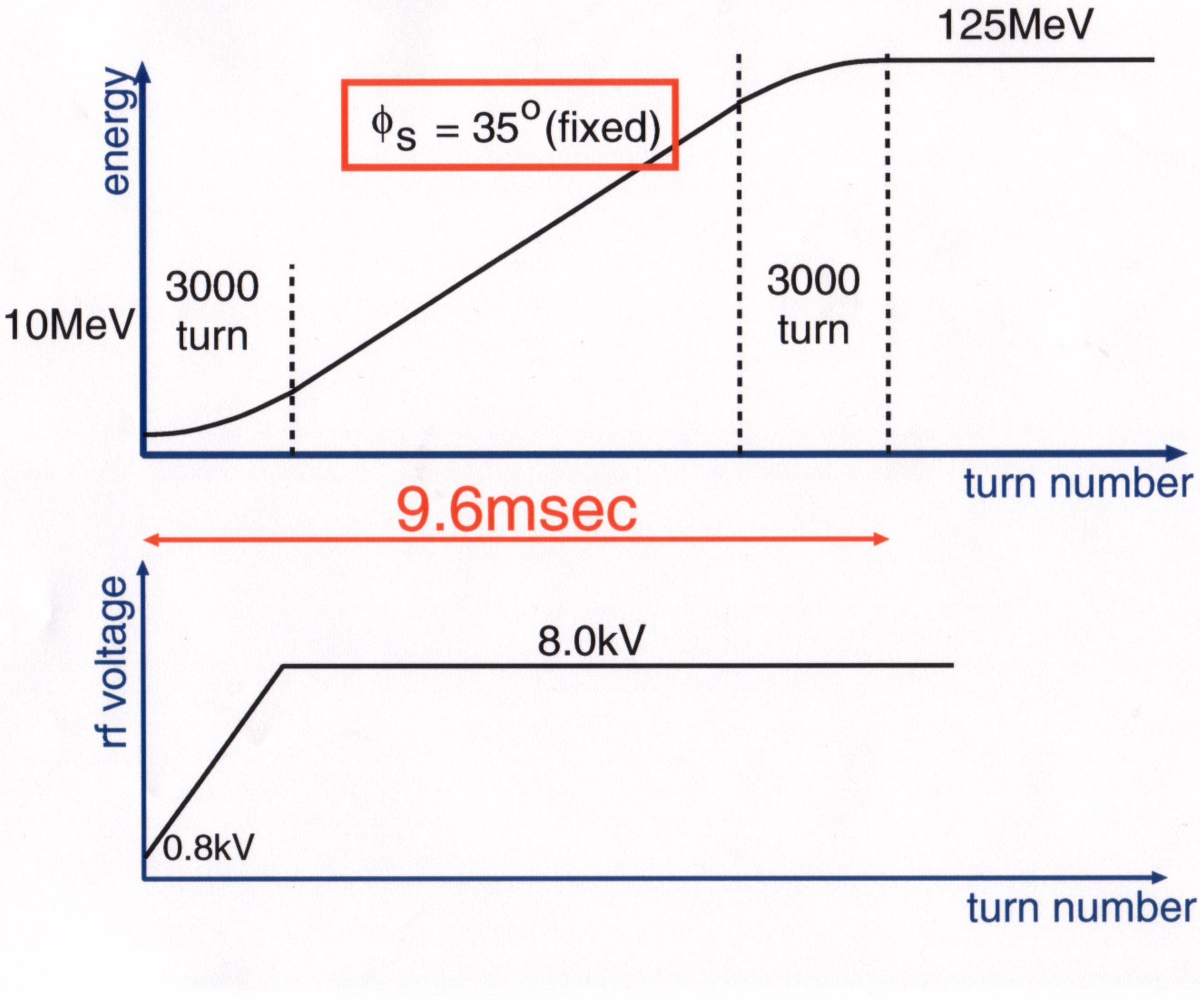
with 60kW amplifier,

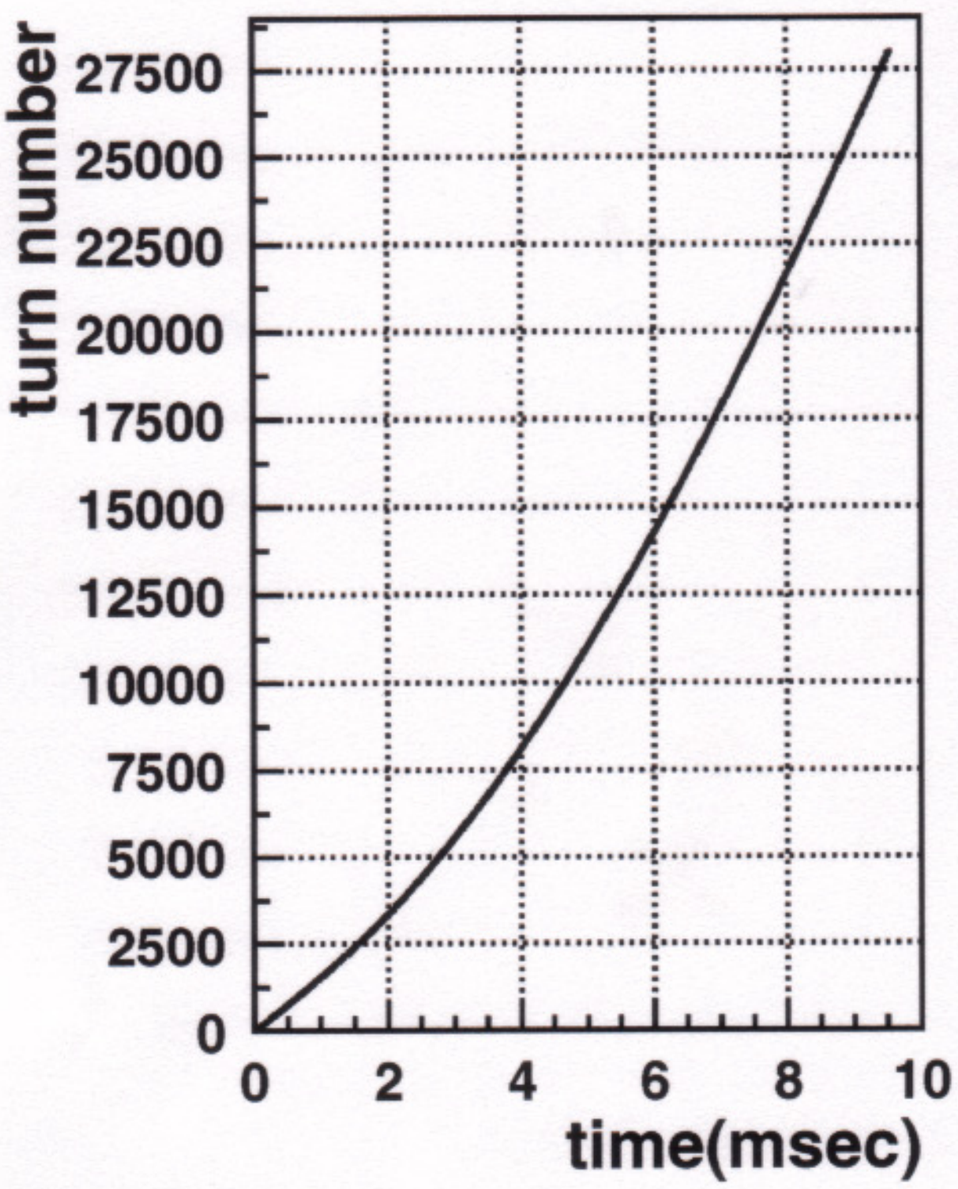
Vrf = 8kV is expected

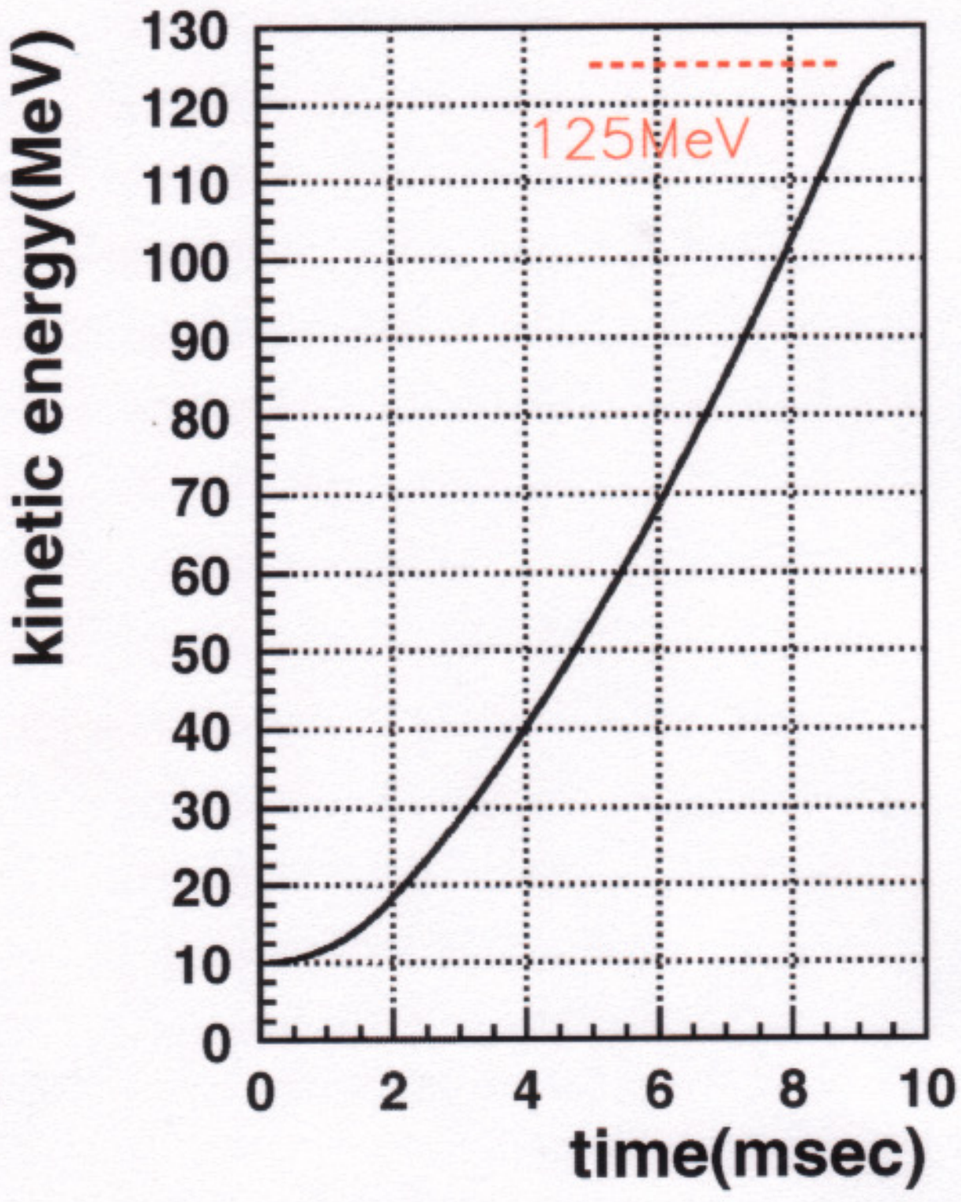
impedance measurement

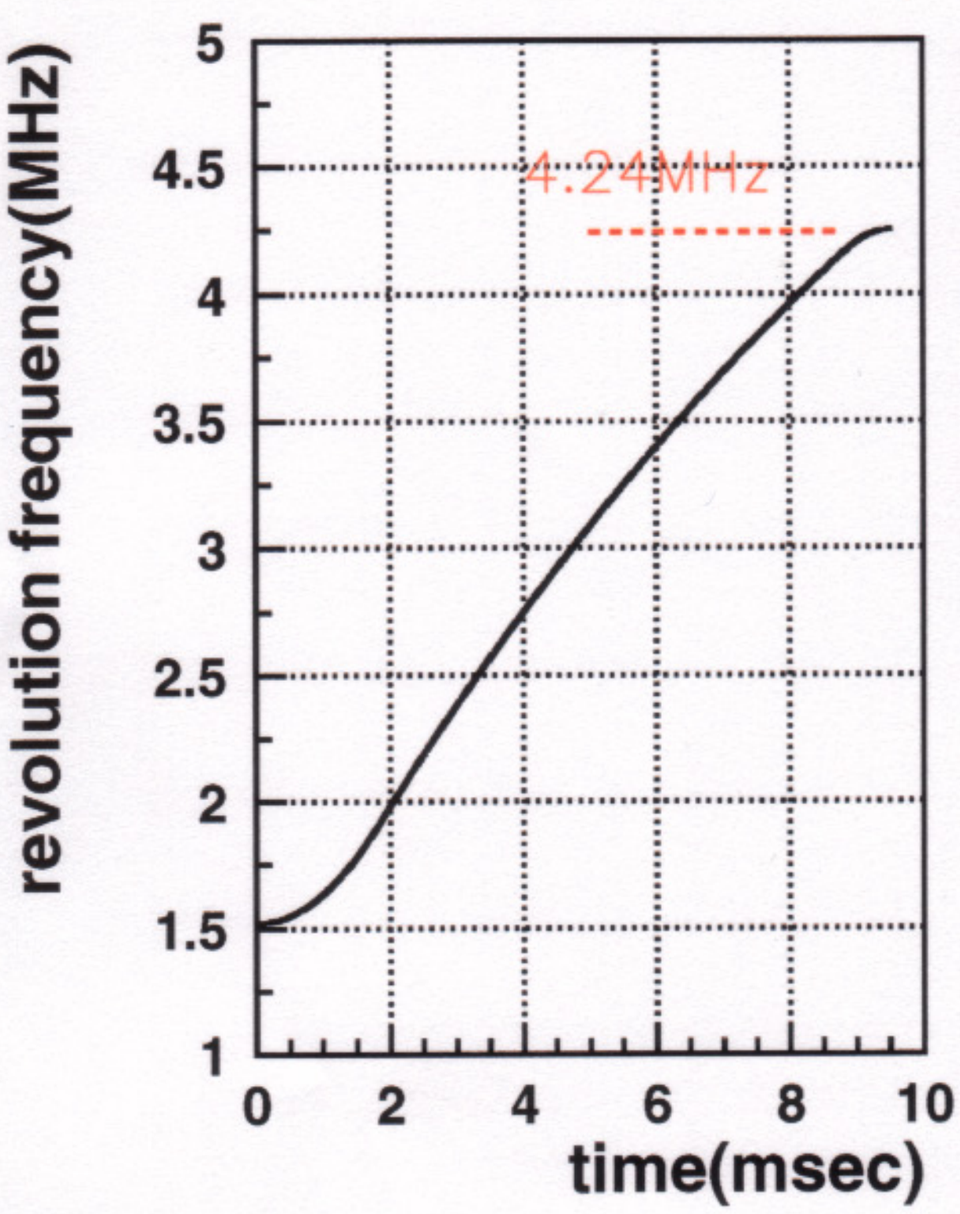


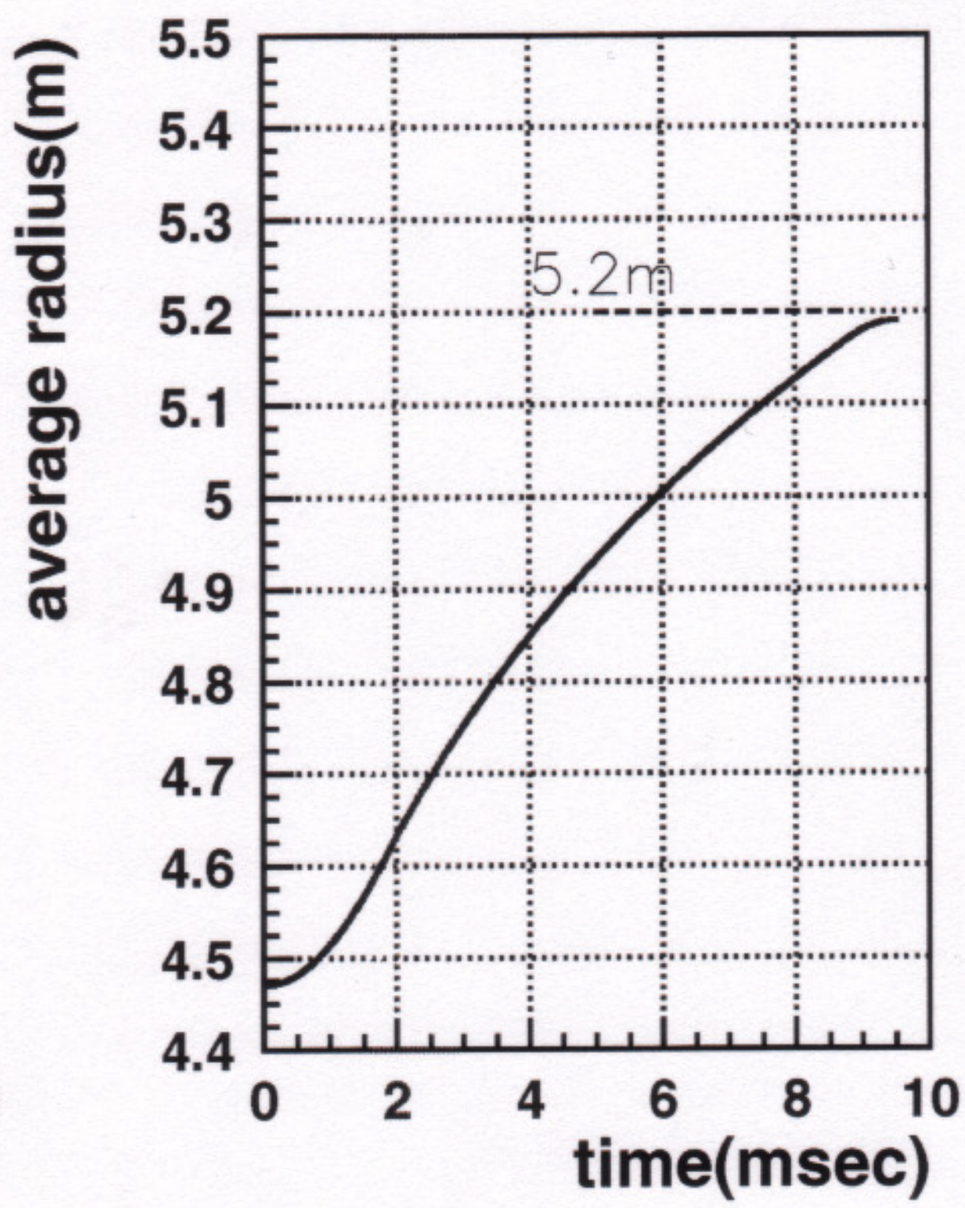
simulation condition



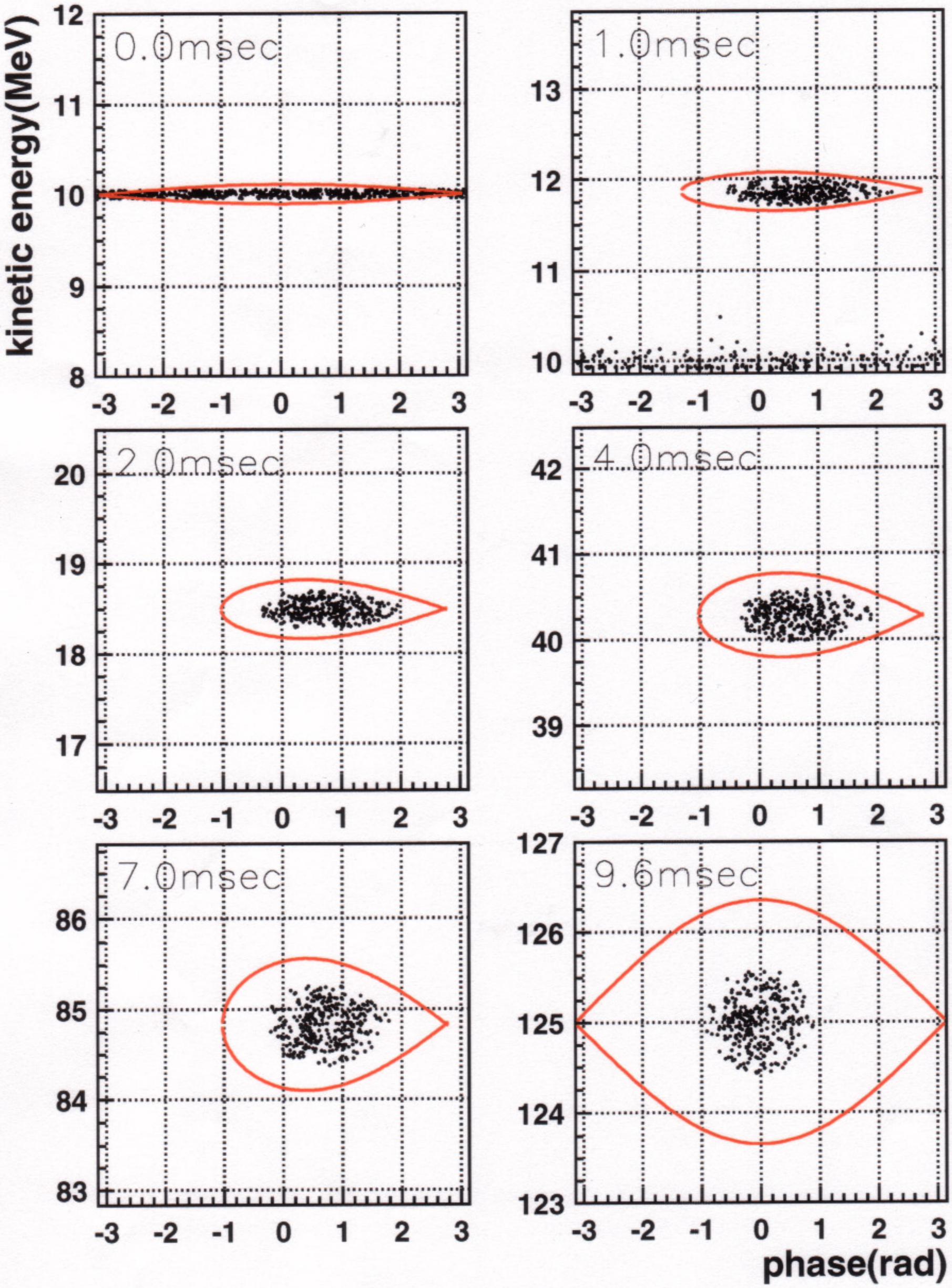

turn number
27500
25000
22500
20000
17500
15000
12500
10000
7500
5000
2500
0
0
2
4
6
8
10
time(msec)


kinetic energy(MeV)
130
120
110
100
90
80
70
60
50
40
30
20
10
0
125MeV
0
2
4
6
8
10
time(msec)


revolution frequency(MHz)
5
4.5
4
3.5
3
2.5
2
1.5
1
4.24MHz
0
2
4
6
8
10
time(msec)

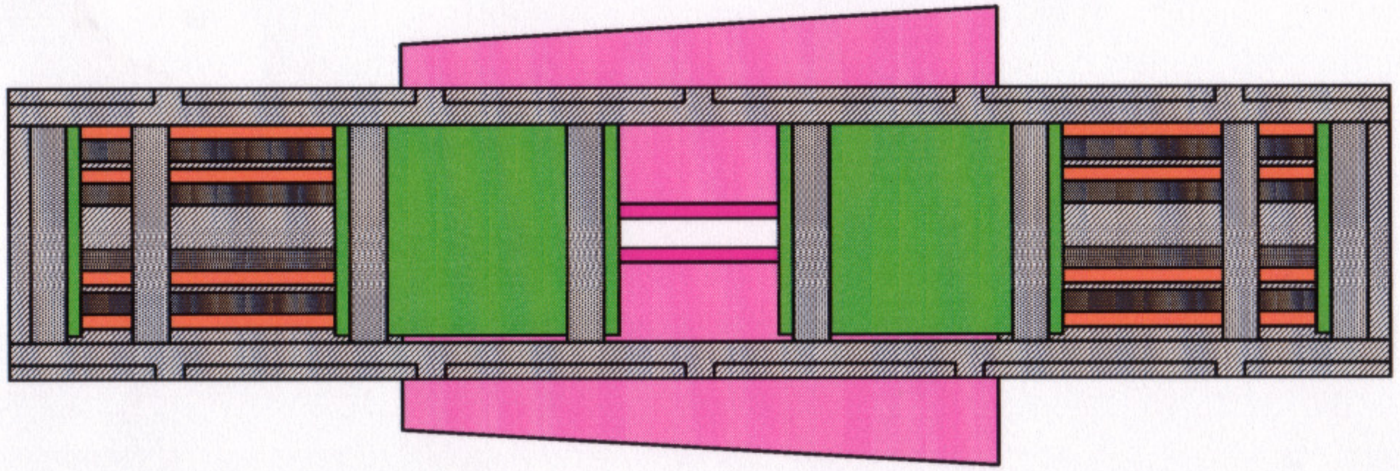

average radius(m)
5.5
5.4
5.3
5.2
5.1
5
4.9
4.8
4.7
4.6
4.5
4.4
5.2m
0
2
4
6
8
10
time(msec)

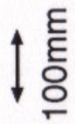
simulation result



62% of the particles are accelerated

cavity design
(temporary)

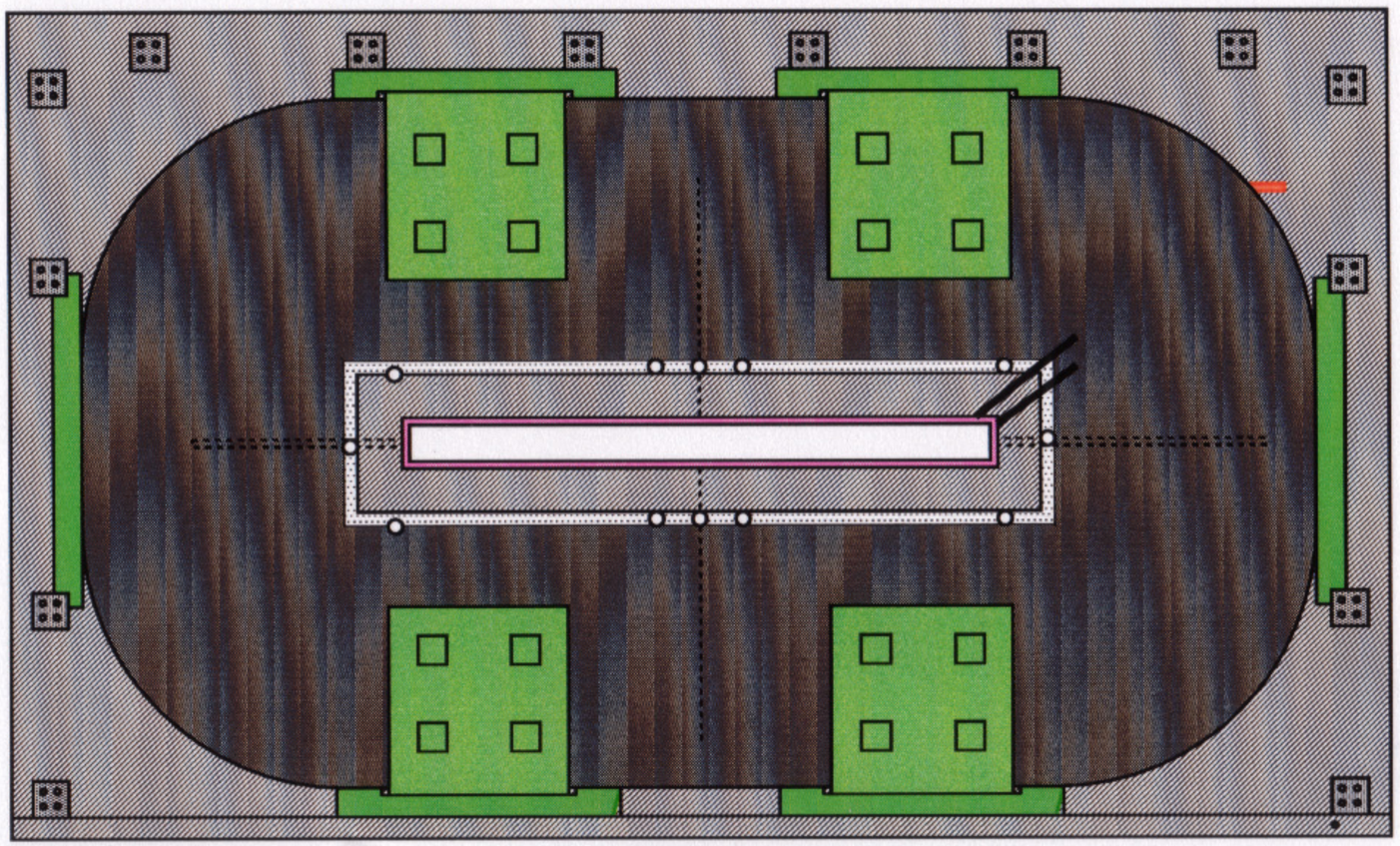


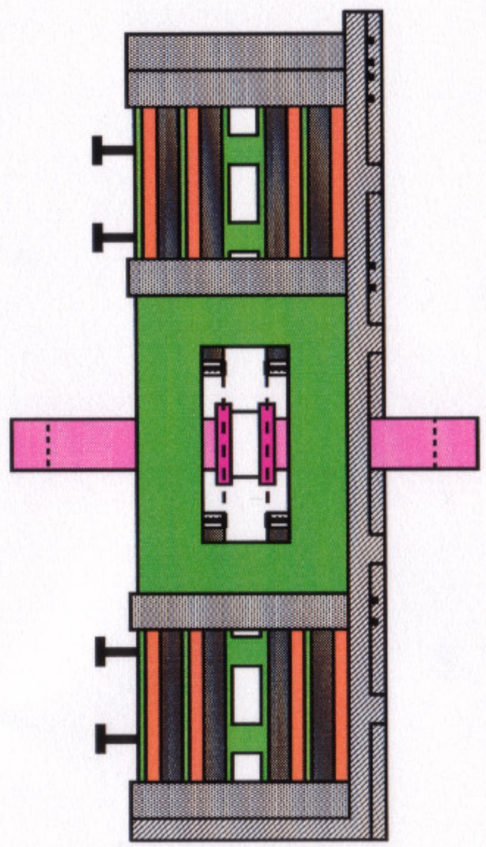


cavity body

cooling plate

spacer



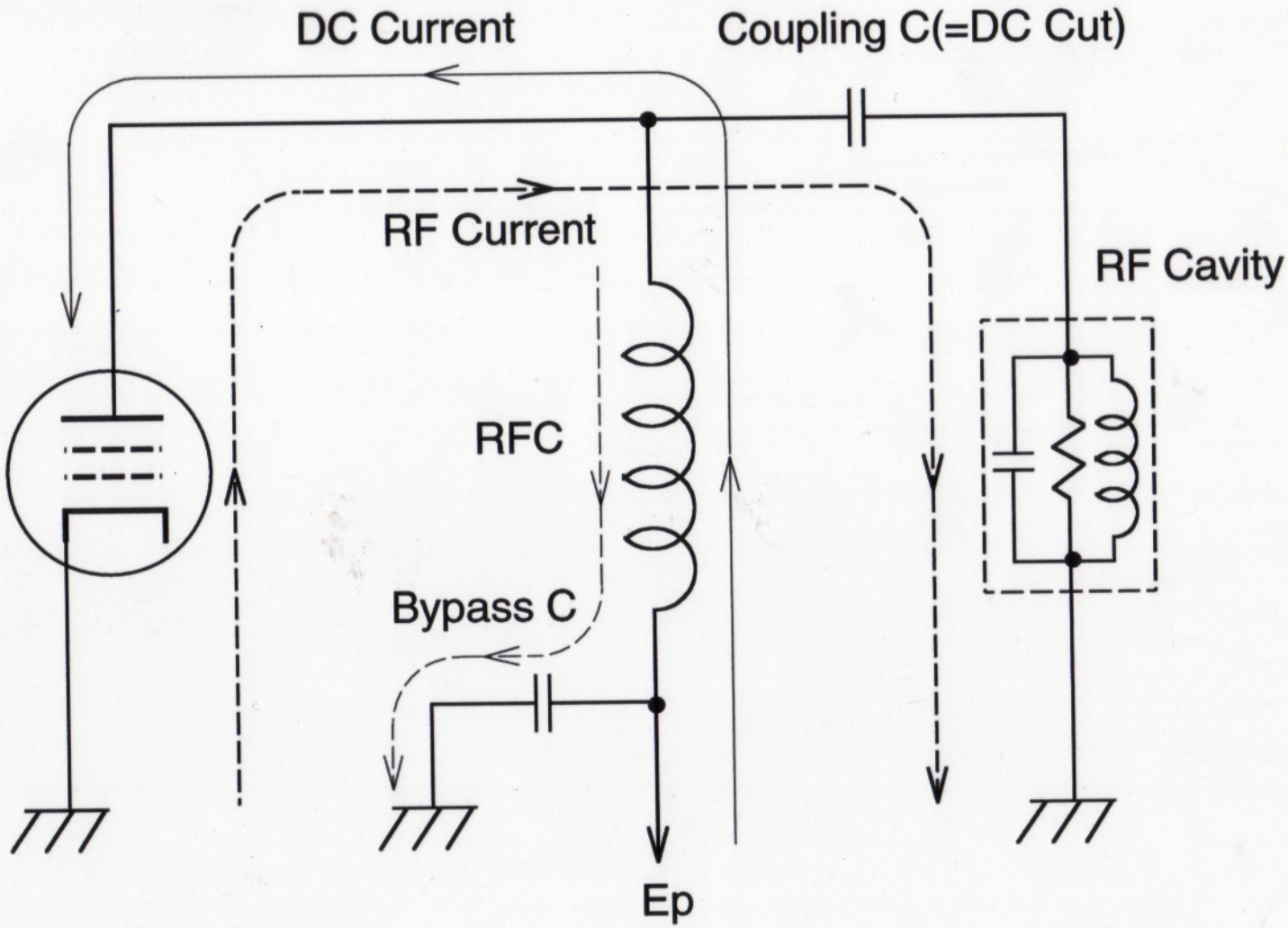


Summary

1. The RF cavity will be constructed with 4 FINEMET cores. The RF voltage of about 8kV is expected.

2. A beam energy of 125MeV will be reached in 9.6msec.

3. Cavity design is undergoing


DC Current
Coupling C(=DC Cut)
RF Current
RF Cavity
RFC
Bypass C
Ep