Muon Acceleration with FFAG

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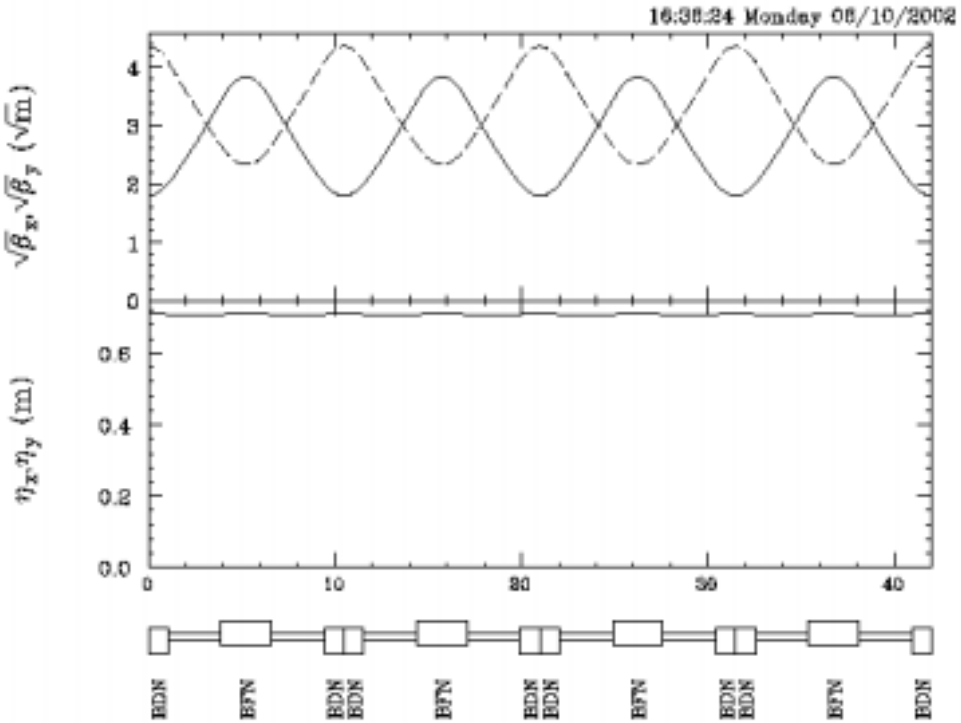
FFAG Parameters

momentum(GeV/c)	0.3~1	1~3	3~10	10~20
number of sector	16	32	64	120
k number	15	63	220	280
average radius(m)	10	30	90	200
max. B field(T)	2.8	3.6	5.4	6.0
tune	5.826	13.704	27.911	22.333
	4.590	4.048	4.089	6.333
drift length(m)	2.120	3.299	5.046	5.668
BF length(m)	1.065	1.575	2.169	2.685
BD length(m)	0.367	0.544	0.813	1.062
orbit excursion(m)	0.77	0.52	0.813	0.49
transition γ	4	8	14.9	16.8

10-20GeV FFAG , singlet FODO new version

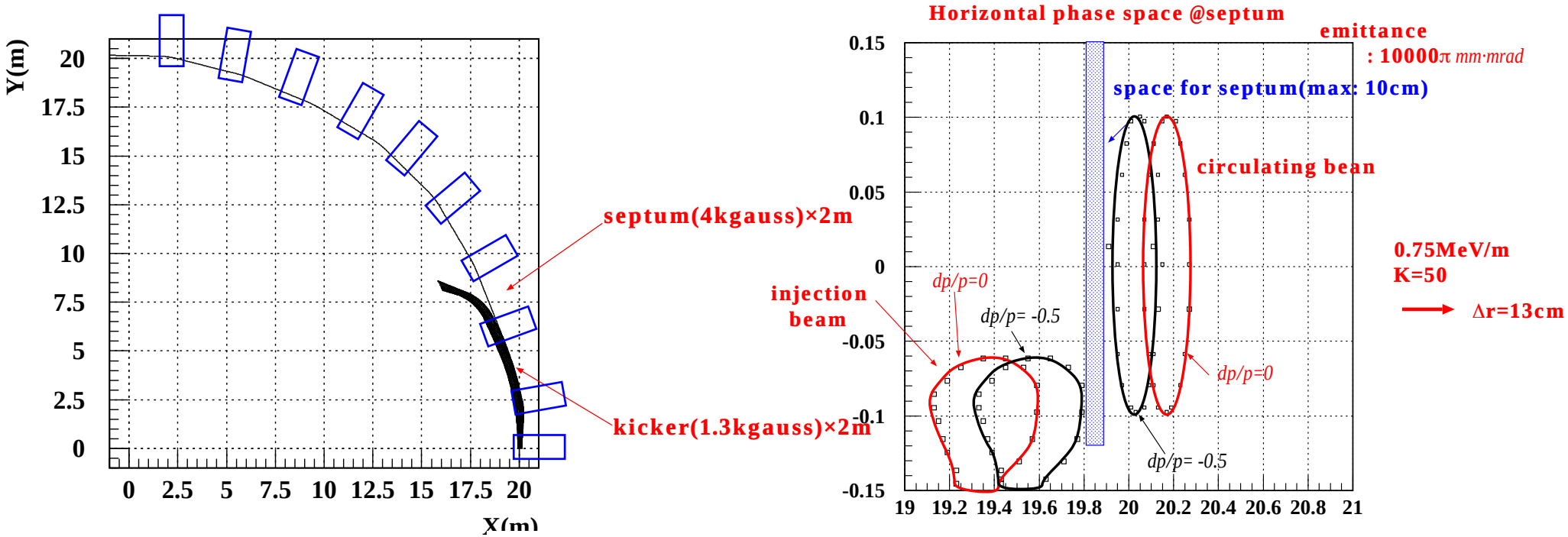
k=280, N=200



Beam Injection

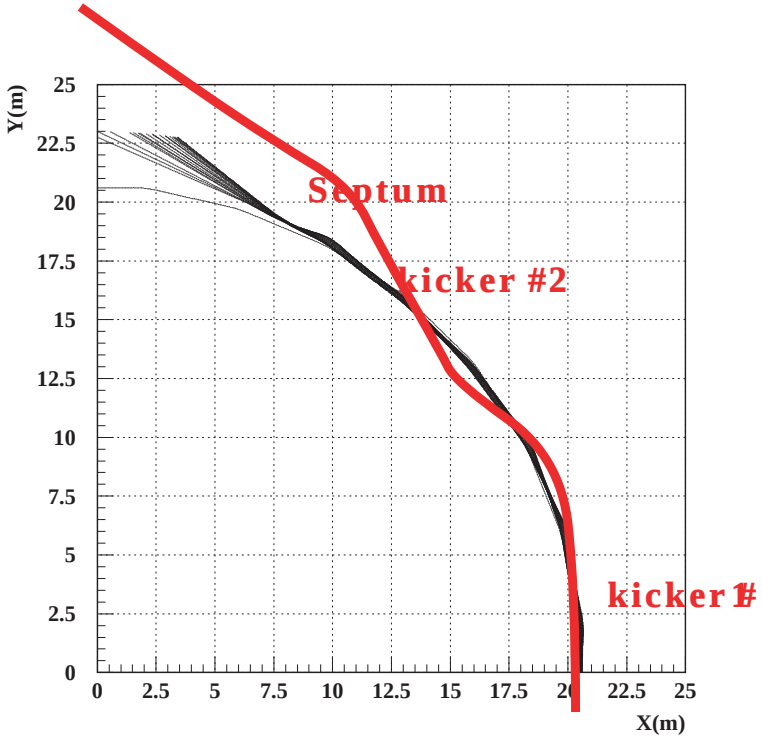
cf. 1GeV ring : ε_n=0.03πm.rad, dp/p=+-50%

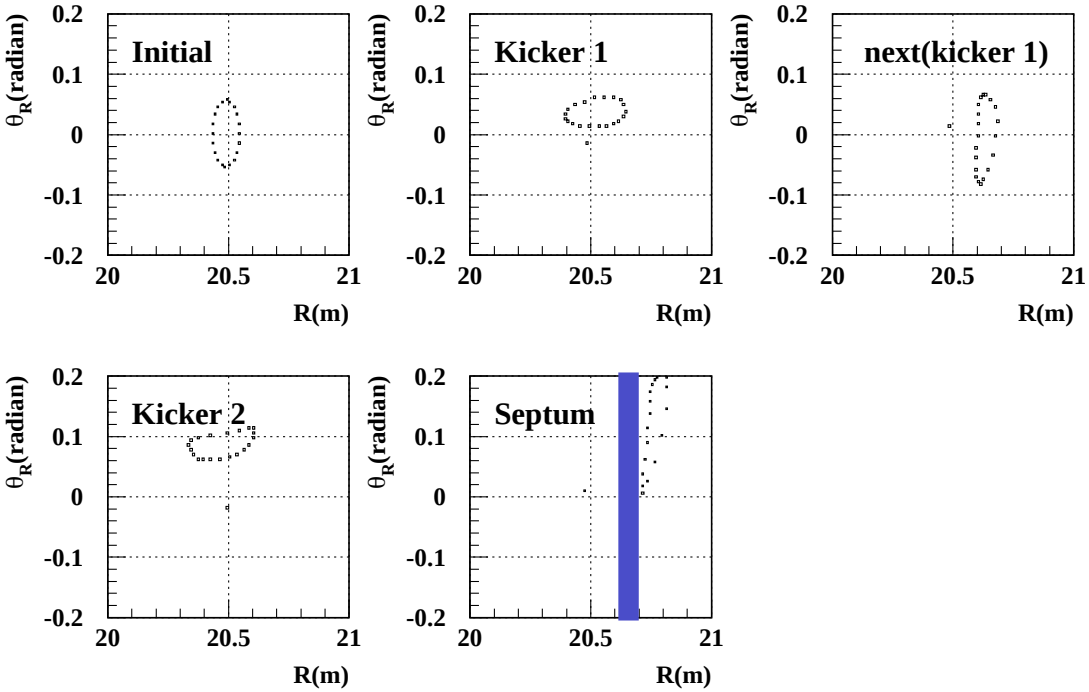
kicker magnet : 1.5kG, septum magnet : 1.5T



Beam Extraction-1

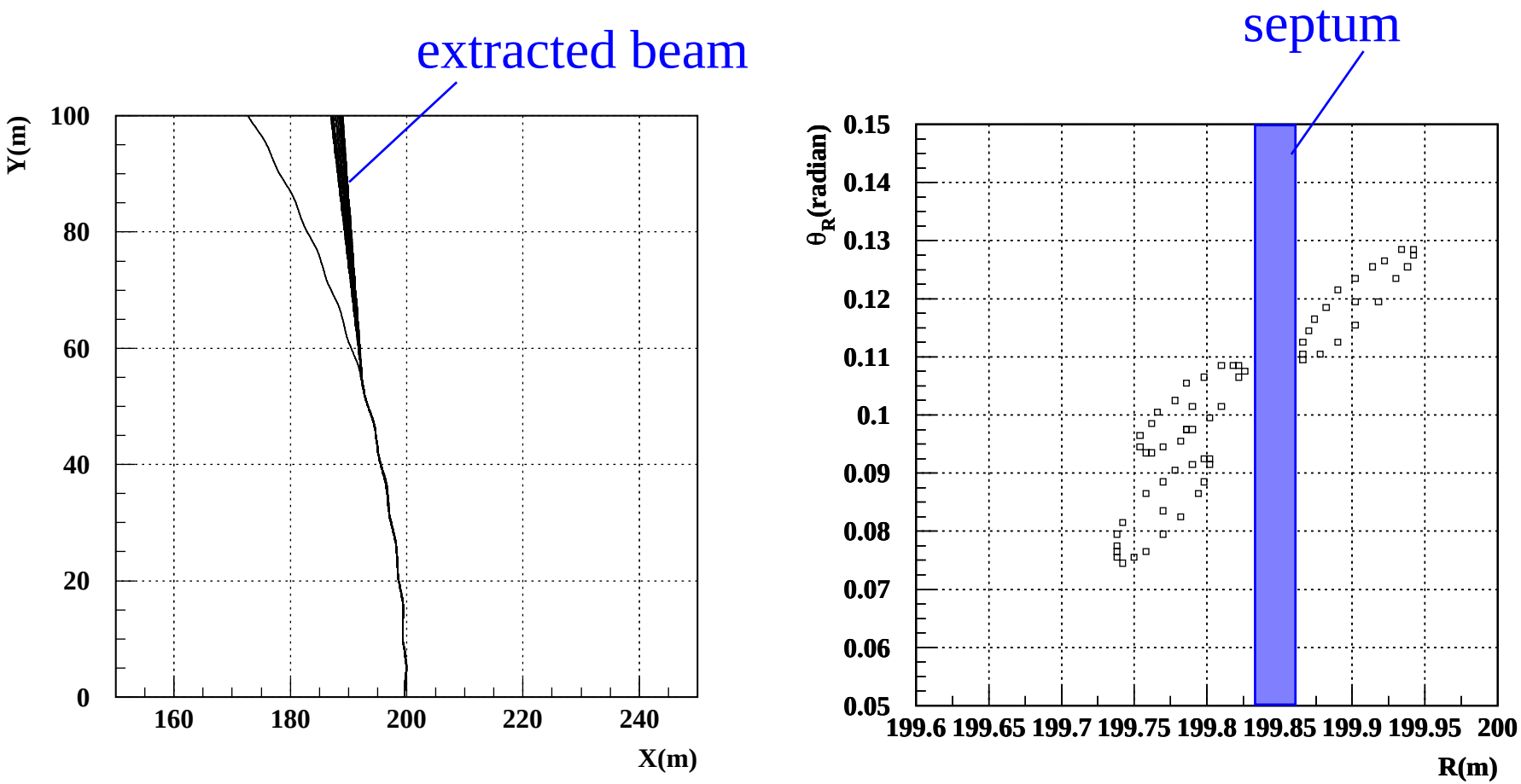
cf. 1 GeV ring





Beam Extraction-2

cf. 10-20GeV ring



Scaling FFAG

Momentum compaction factor : $\alpha = \frac{1}{1+k}$ & No higher orders.

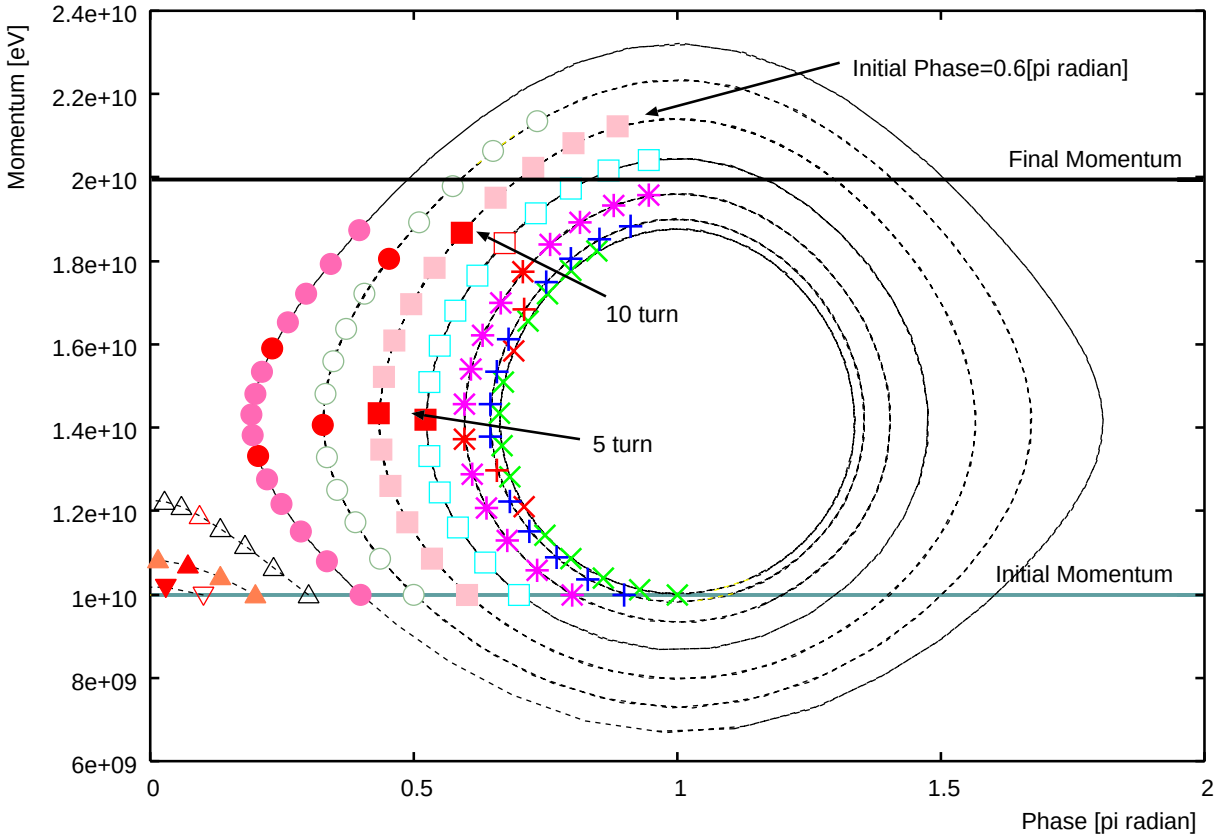
----> No bucket distortion even at large momentum spread.

cf.

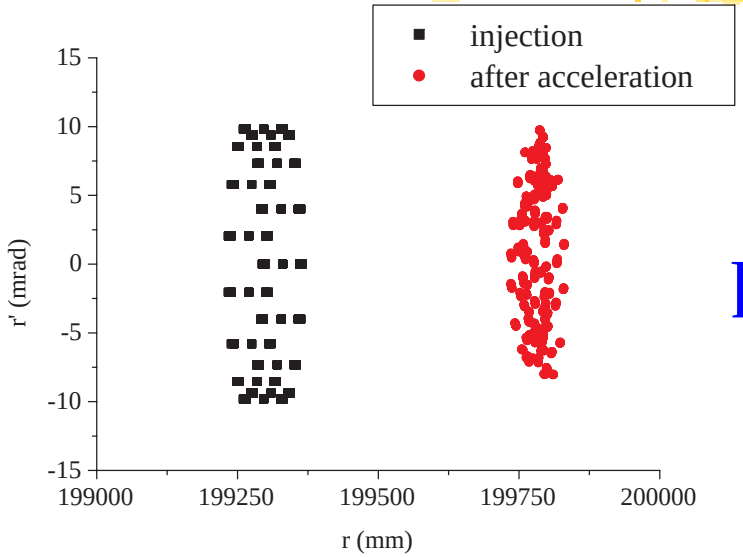
FFAG Muon Accelerator

10-20GeV

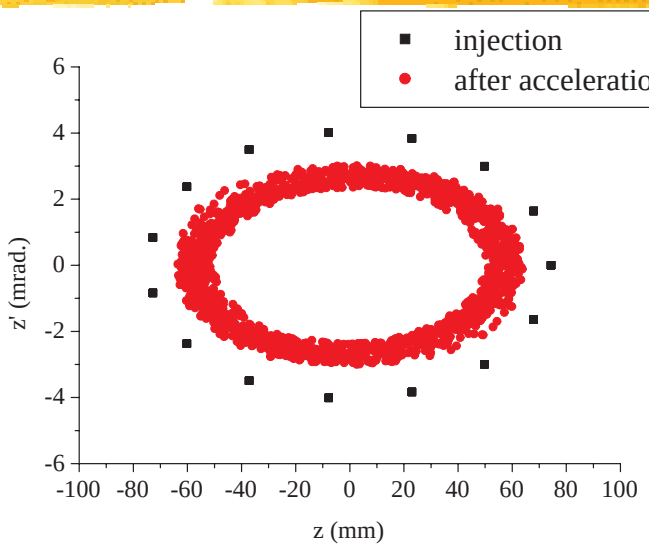
eV'=0.7MeV/m



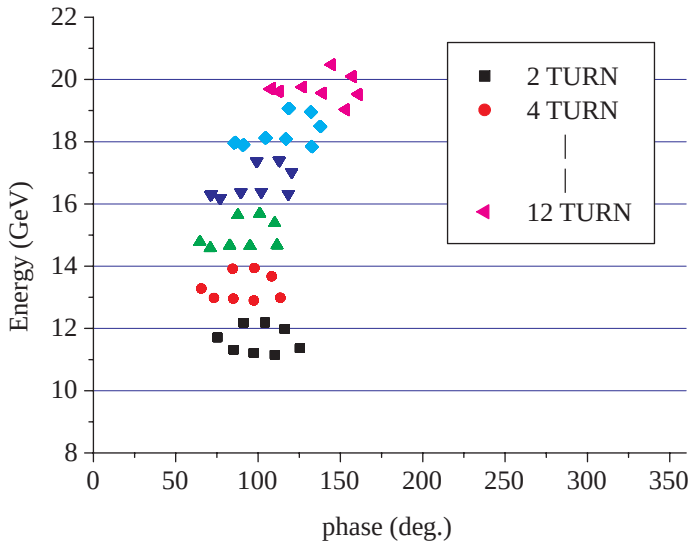
Beam tracking -3D 10-20 GeV ring



hor.



ver.



ε^{T}_{N}=0.03πm.rad, ε^{L}_{N}=5eV.sec

magnet: multi-pole model

rf freq.=7MHz, eV'=0.7MeV/m

long.