

# Acceleration of Muon-Beam with Harmonic-Number Jump

===== 10 GeV --> 20 GeV =====

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# Requirements

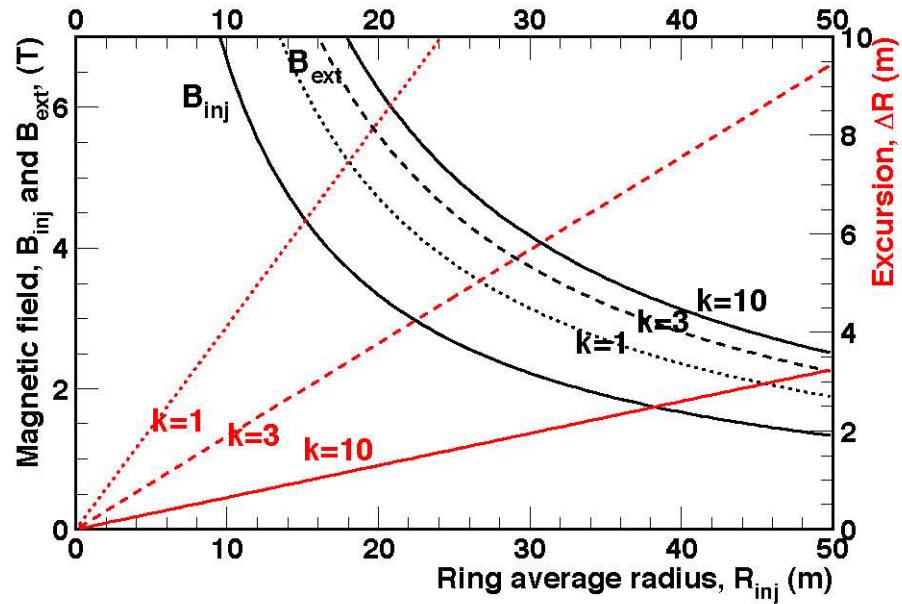
- Matching with extracted beam from 10GeV-ring

$\pm 0.1\text{GeV}$ ,  $\pm 0.5\text{nsec}$

- Fast acceleration compared to muon life

$\sim 20\mu\text{s}$  at 10 GeV

# Accelerator design

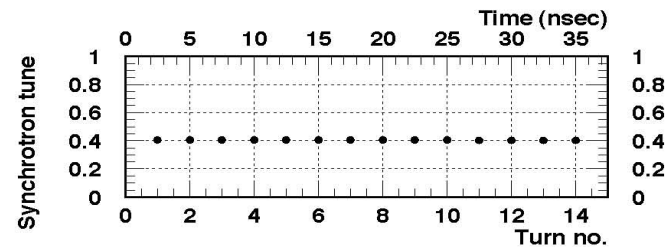
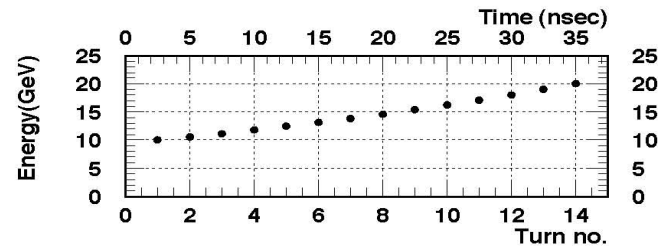
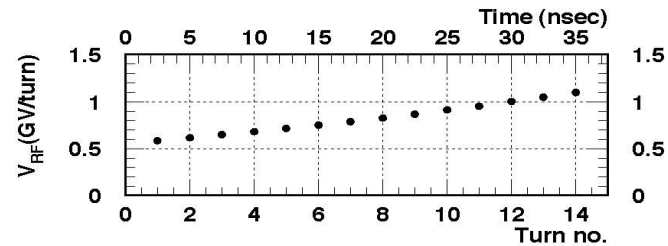
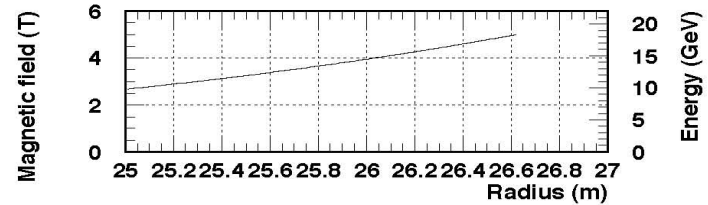


# Simulated parameters (1)

	Injection	Top
	Scaling	
Energy (GeV)	10.	20.
Radius (m)	25.00	26.62
k	10	
Rev. freq (MHz)	1.909	1.792
Mag field (T)	2.669	5.011
RF freq. (MHz)	381.7	
RF Harmonic	200	214
Voltage (GV/turn)	0.59	1.10
Phi_s (rad)	$0.59 \pi$	

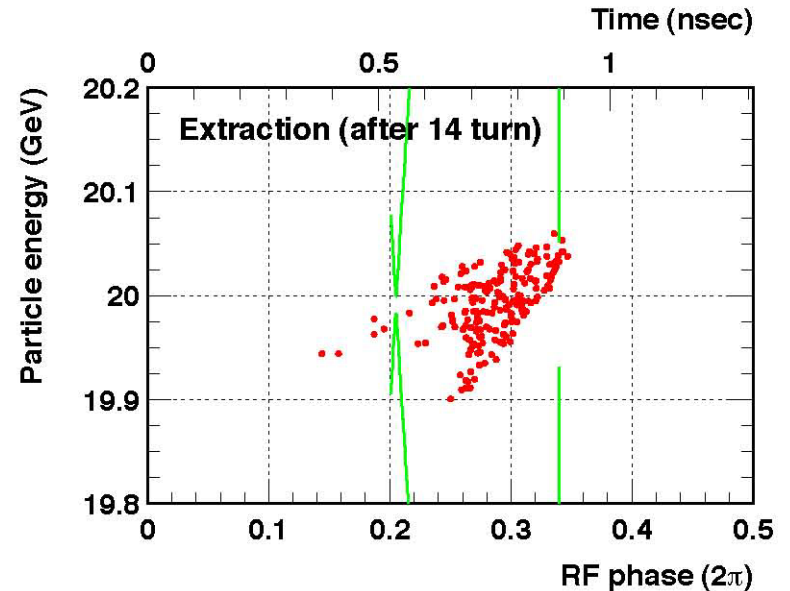
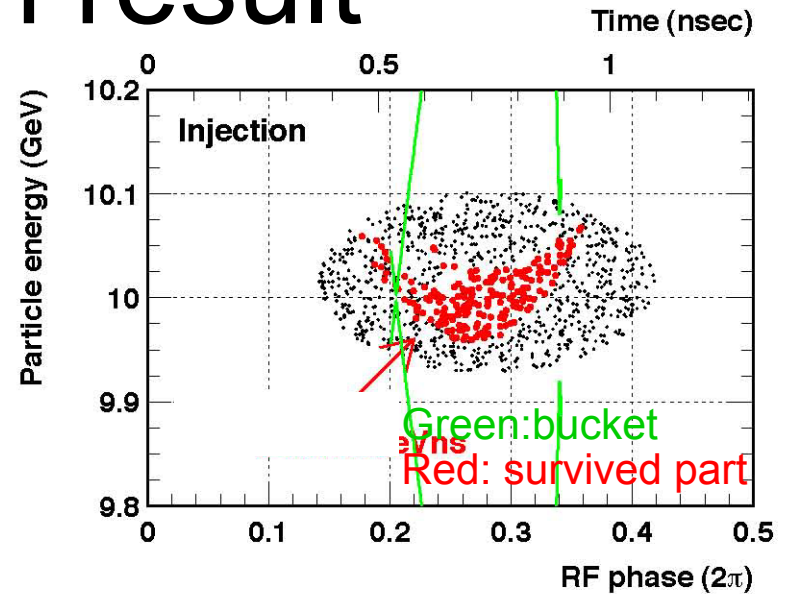
# Simulated parameters (2)

- $B=2.66\sim 5.01$  T  
(pack-fac 0.5)
- $V=0.5\sim 1$  GV/turn  
= 3~7 MV/m
- $\nu_s = 0.4$



# Simulation result

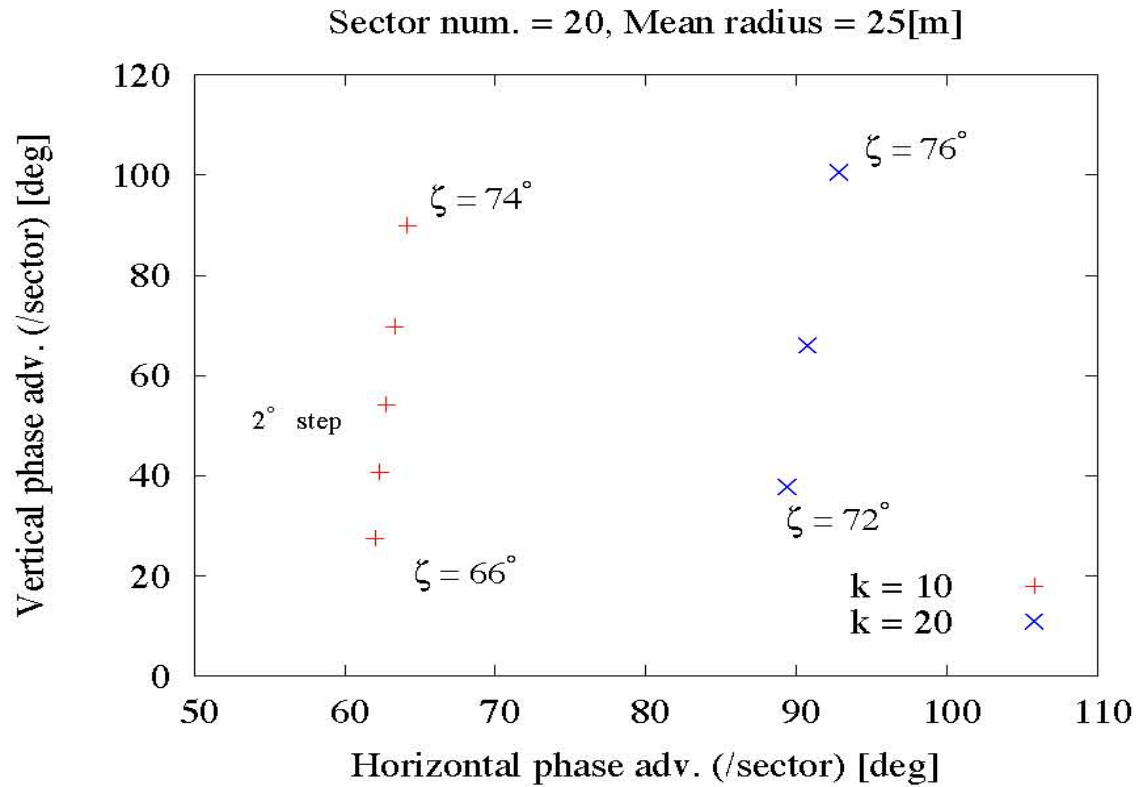
- Reached 20GeV after 14 turn
- Acceptance, (+-0.25ns, +-0.05GeV)



# Equivalent design

Energy (GeV)	10 ~ 20	10 ~ 20
Radius (m)	25.0 ~ 26.6	100 ~ 101.6
Field index, k	10	40
Mag field (T)	2.7 ~ 5.0	0.6 ~ 1.3
RF freq. (MHz)	381.7	95.4
RF Harmonic	200 ~ 214	200 ~ 214
Voltage (GV/turn)	0.59 ~ 1.10	0.59 ~ 1.10
$\Phi_s$ (rad)	$0.59 \pi$	$0.59 \pi$

# Spiral-Angle vs tune





# Transverse lattice-function

