

Injection into RFFAG

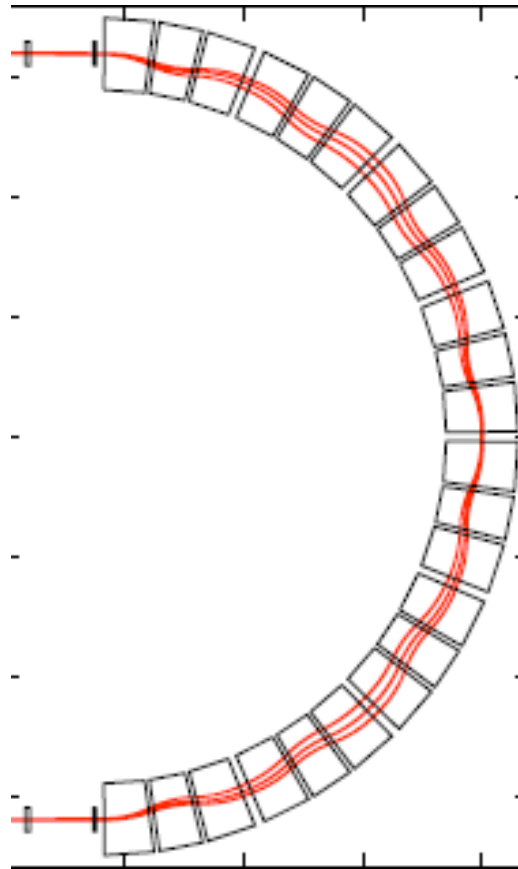
First Preliminary Ideas

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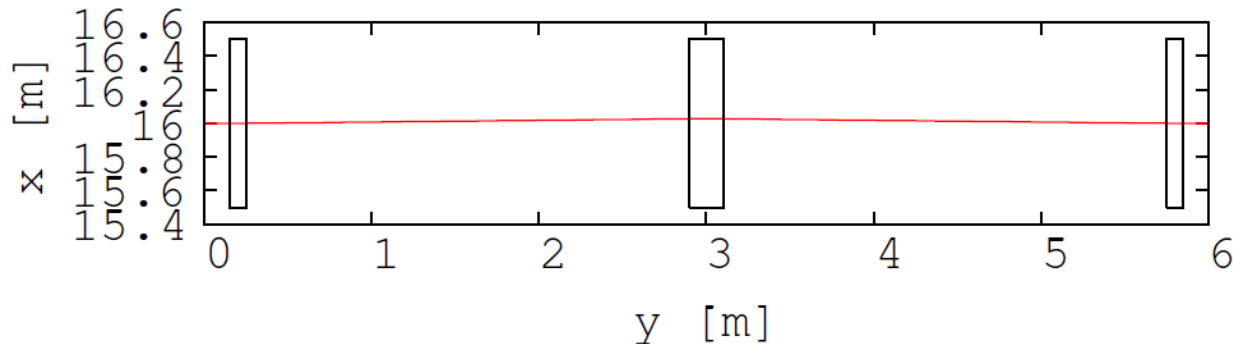
Assumptions and observations (1)

- The RFFAG ring by J-B. Lagrange and Mori-san is designed for muons:
 - magnetic fields are for $\pm 20\%$ momentum deviation,
 - betatron functions at mean value of 27 m in the drift are set to maximise the neutrino efficiency (decreasing the muon production efficiency from pion decay).
- The drift lengths in the arcs are very small.



Assumptions and observations (2)

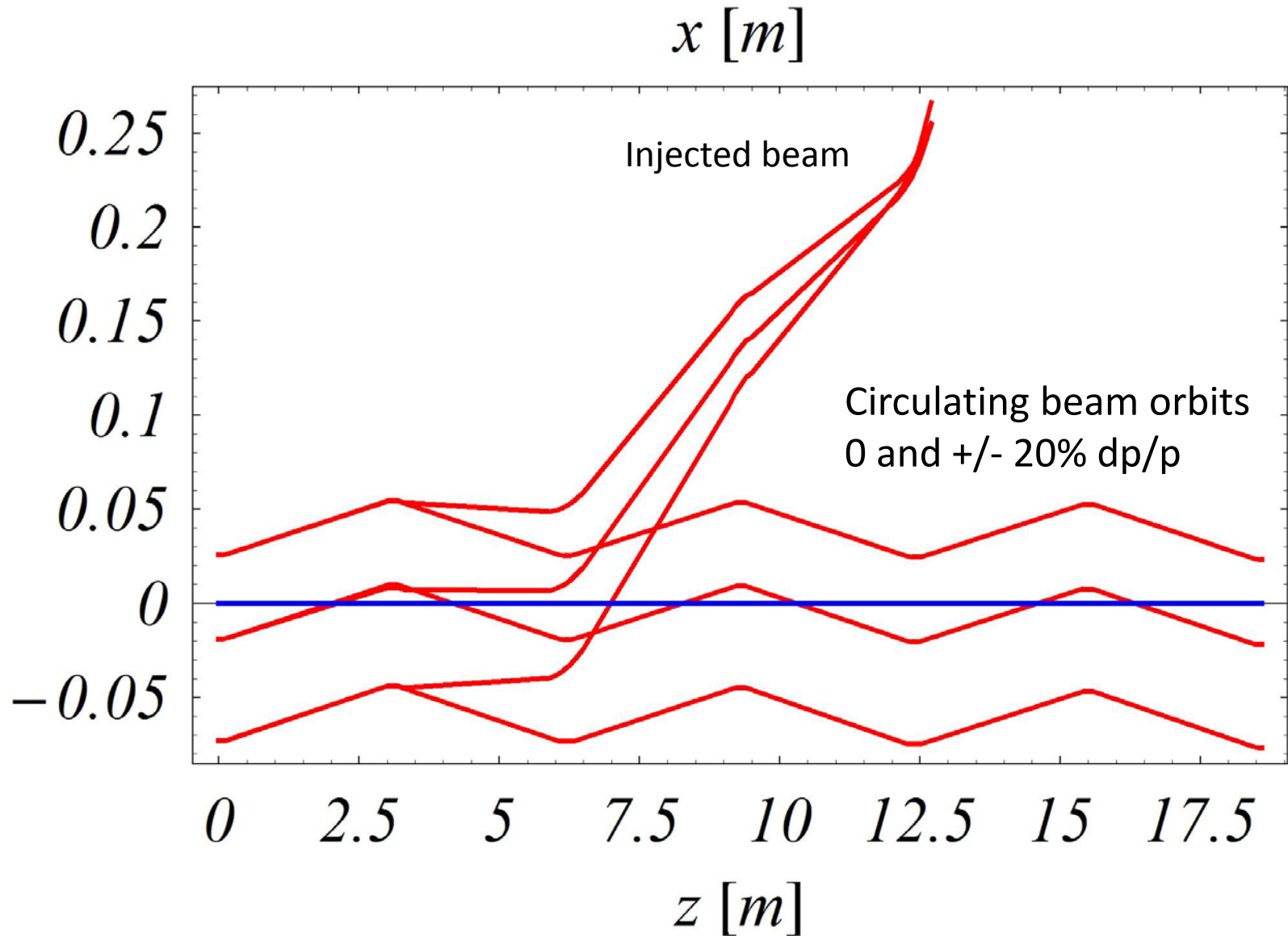
- The drift length in the straights are long (about 2.8 m)!
- In this short talk I make the first attempt to estimate the kicker/septum parameters for this ring assuming 2 GeV/c muon injection.



Preliminary injection (1)

- The long drifts are the natural place for septum and kickers.
- Kickers must be distributed in a few cells (the more the weaker they are).
- Optics of the drift has been reproduced and zero chromaticity condition confirmed.
- Closed orbits have been calculated.
- The septum was assumed to be located downstream the D magnet.
- The needed orbit separation was estimated based on the acceptance plots in the RFFAG paper (by J-B and Mori-san) and is about $12\text{cm}^2 + 1\text{cm} \sim 25\text{ cm}$.
- The additional separation to clear the magnet was assumed to be about 30 cm.

Preliminary injection (2)



Preliminary injection - parameters

- Number of kickers 3
- Kicker B field 0.05 T
- Kicker length 2.6 m
- Kicker aperture 60x30 cm
- Septum B field 0.6 T
- Septum length 2.6 m in length and
- Septum aperture 30x30 cm

Summary and future plans

- Single turn 2 GeV/c muon injection into RFFAG is possible.
- If more kickers would be used weaker strength could be obtained.
- This scheme requires a relatively long decay channel in order to generate the muon beam from the pion decay before the injection into the RFFAG. Is this possible and acceptable?
- The multi-turn muon injection could be an option.
- The pion decay into the RFFAG-type ring should also be studied. This is almost certainly possible! -> Next task...

From Mori-san

Beam Injection: VLENF ring

straight section

kicker
 $B=0.1\text{T}$
 $l=1.5\text{m}$
 $\theta_{\text{kick}}=22\text{mrad}$

$p=2\text{GeV}/c$
 $B\rho=6.8\text{Tm}$

optics
 $\beta_H\sim 25\text{m}$

