Shinji Machida simulations of e and 10-20 GeV FFAG's

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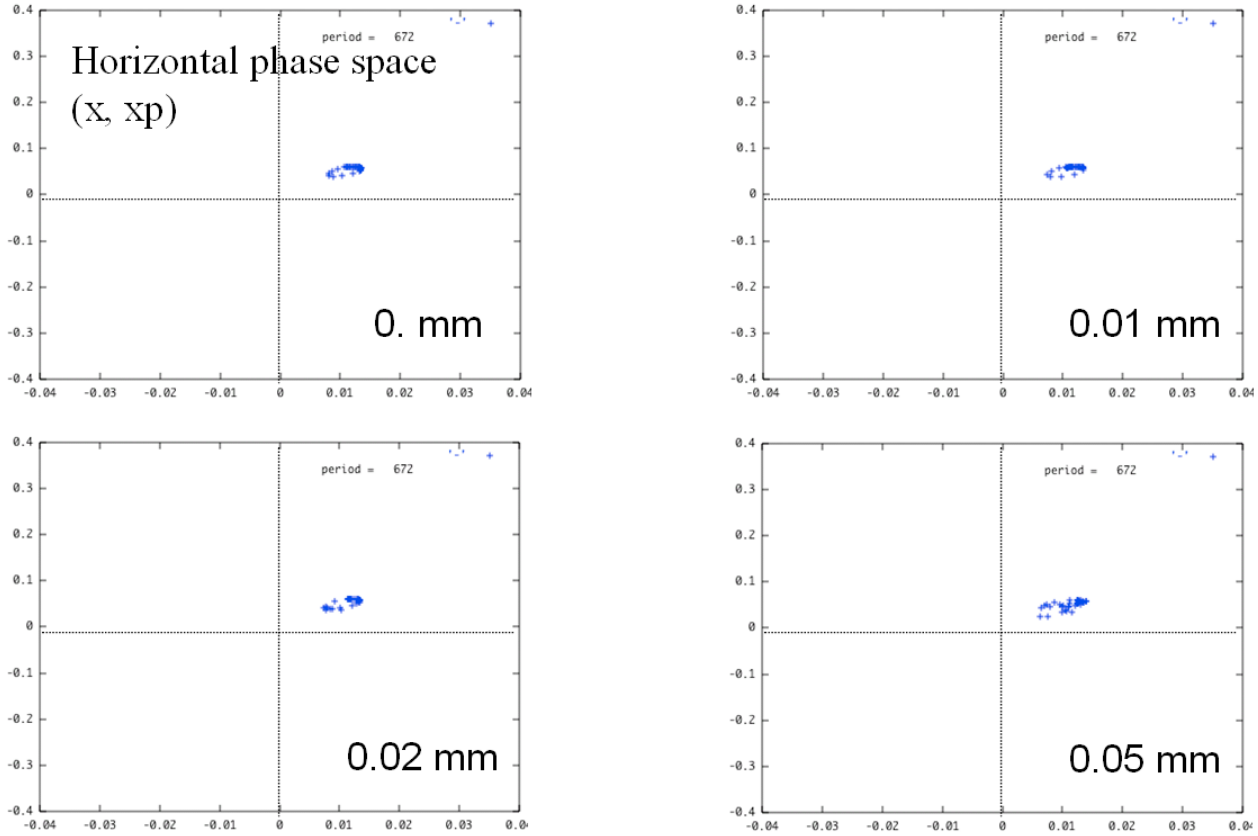
Acceptance of e ring with errors

Resonance crossing with acceleration

- Horizontal is 1000 π mm-mrad, normalized, zero vertical emittance.
- Errors of 0, 0.01, 0.02, 0.05 mm (rms), only one error seed.



1 pi mm has equivalent angles to

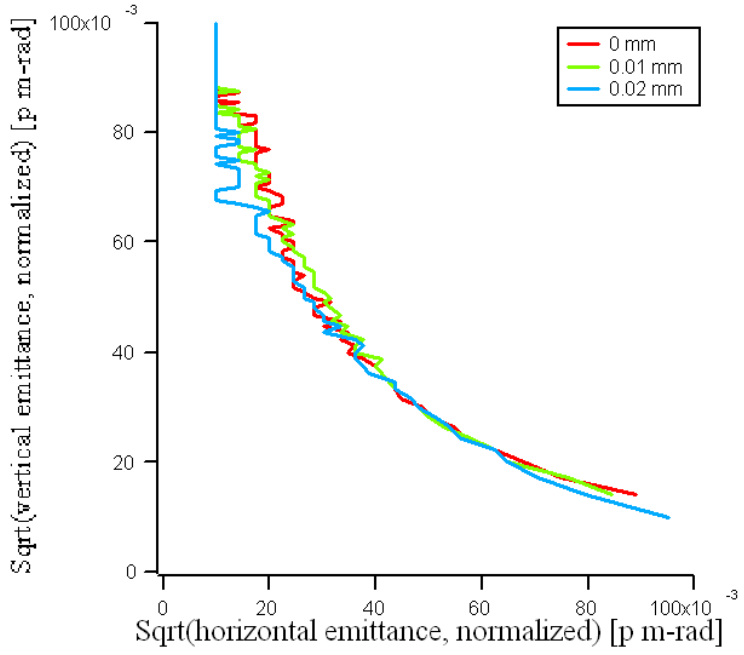
$$\frac{5/.105}{10/.51}\,\frac{4.43}{.35} \times 1 \;=\; 31.6 \quad \pi \text{ mm}$$

ok up to errors of 0.02 mm eqivalent to 5/.35 x .02 = 0.3 mm

Acceptance of e ring

Dynamic aperture without acceleration.

- Without acceleration. Kinetic energy is 10 MeV. 16 turns.
- Errors of 0, 0.01, 0.02 mm (rms), with only one error seed.



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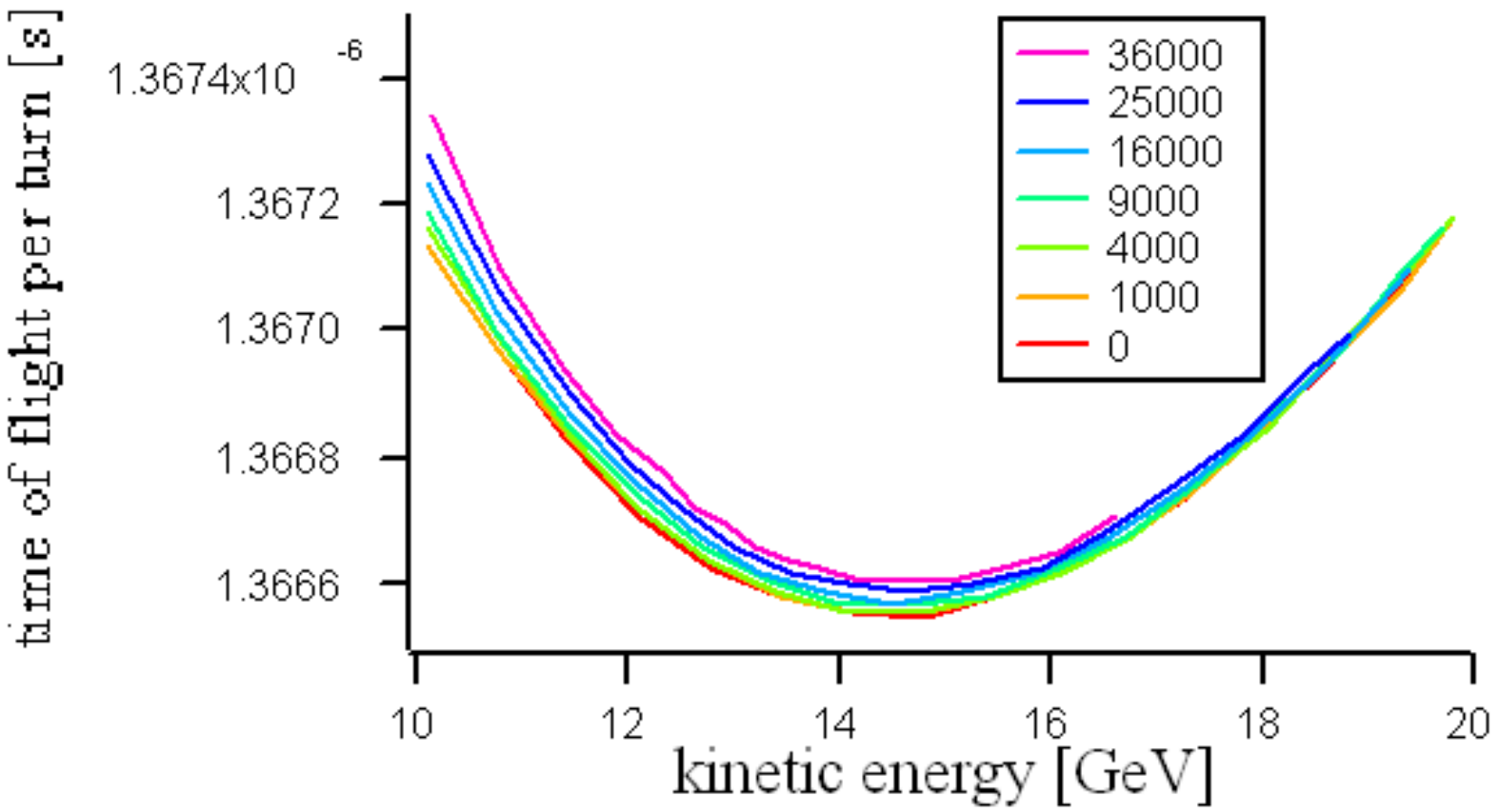
$$(40\ 10^{-3})^2 \ = \ 1.6\pi \ \text{mm}$$

equivalent to 49 pi mm in 5-10 GeV Muons good

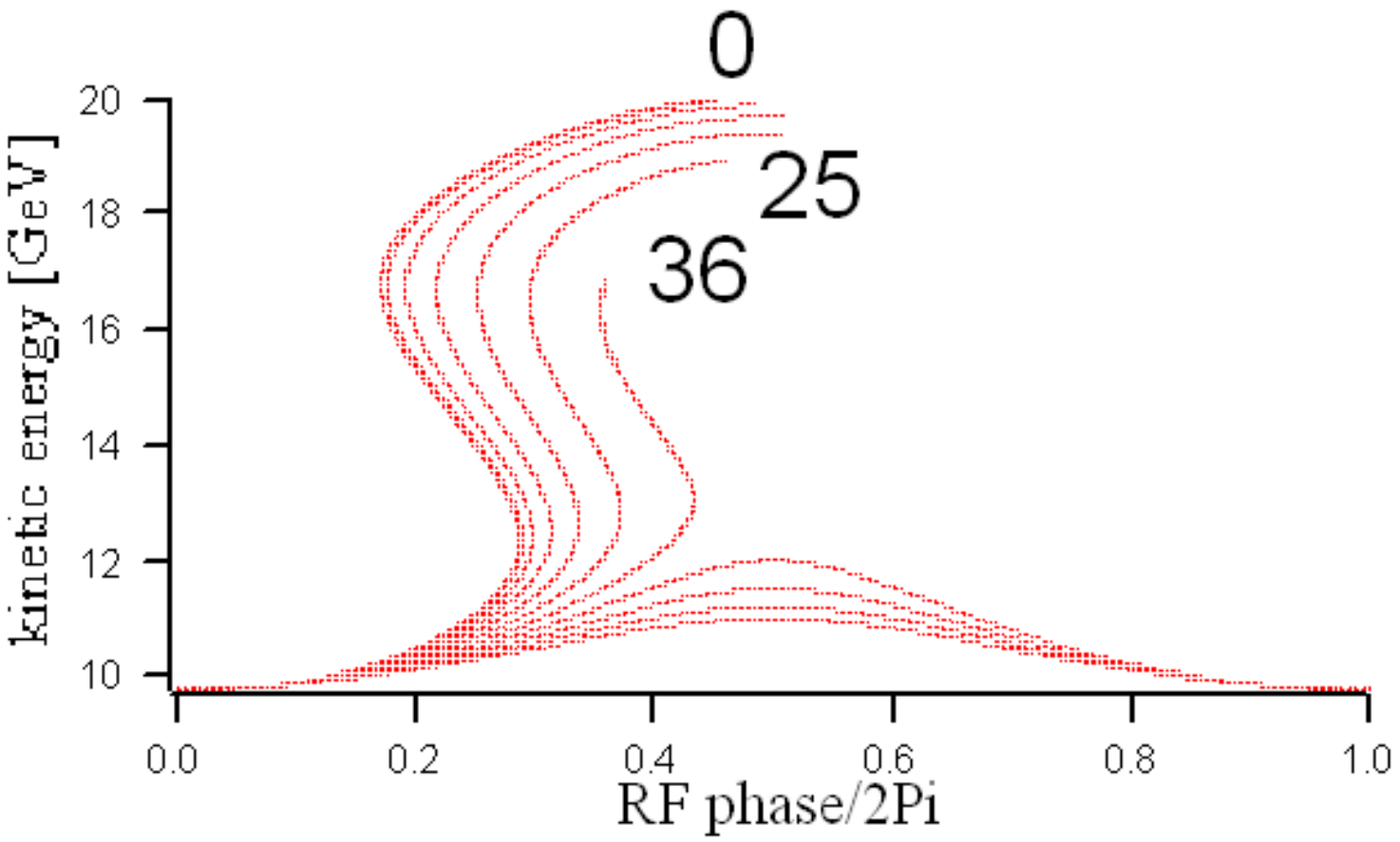
Issochronicity vs amplitude of 10-20 GeV Muon Ring



fromBerg $$\frac{dT}{d\epsilon} = \frac{\pi}{c}\frac{d\nu}{d\gamma}$$

Perfect in Scaling FFAG
Not perfect in Linac, but pretty good

Acceleration in 10-20 GeV Muon Ring



- At 30 pi mm particles are just not lost
- But ellipse distortion severe
- Some optimizations will probably help
- But it will be worse for 5-10 GeV
- Needs some hard study