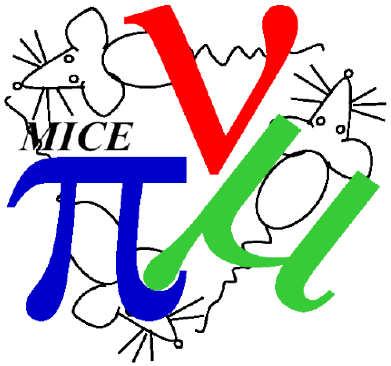
Tracking through Measured Misalignments



Chris Rogers,
ASTeC,
Rutherford Appleton Laboratory

Geometry as per 2015-04-22

21/04/2015

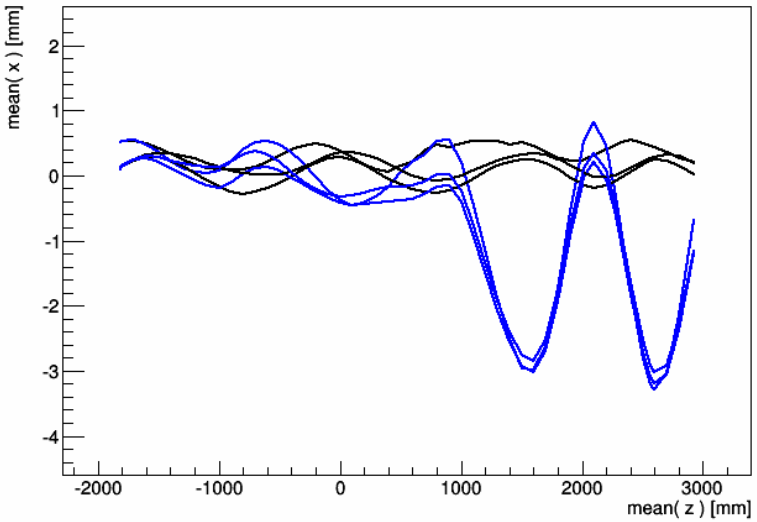
NOT final magnetic axis positions

	Z (local)	Z (global)	x0	y0	theta_x [rad]	theta_y [rad]
SSU						
Upstream Flange	-3256	-3956	0.09	-0.36		
Centre Centre coil	-1750	-2450	0.317856	-0.8974	0.0001512989	-0.000356837
Downstream Flange	247	-453	0.62	-1.61		
FC						
Upstream	-422	-422	0.588	-0.730		
Centre	0	0	0.431	-0.3385	-0.0003720379	0.0009277249
Downstream	422	422	0.274	0.053		
SSD						
Upstream Flange	853	453	0.8	-3.9		
Centre centre coil	2850	2450	0.609693	7.610529	-9.529664896E-005	0.0057638464
Downstream Flange	4106	3706	0.49	14.85		

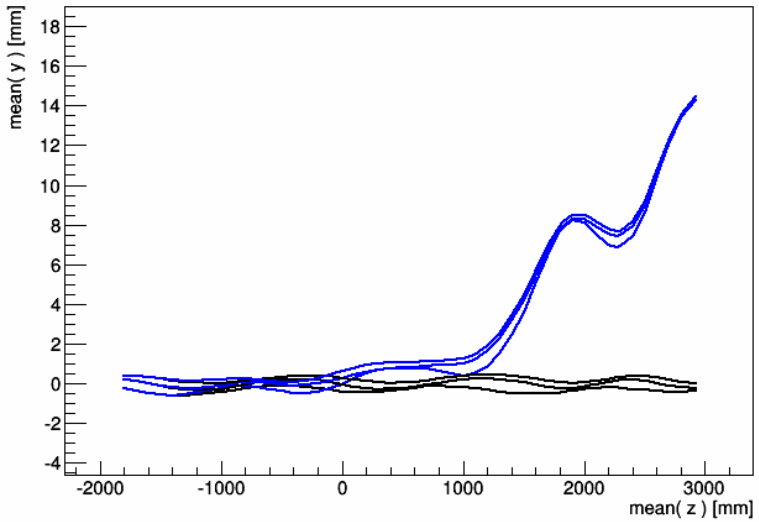
- Blue numbers are Rogers calculated position/alignment
- I insert test volumes, at the flange position, into my geometry and check that they return appropriate position rotation

Beam centroid

10k muons



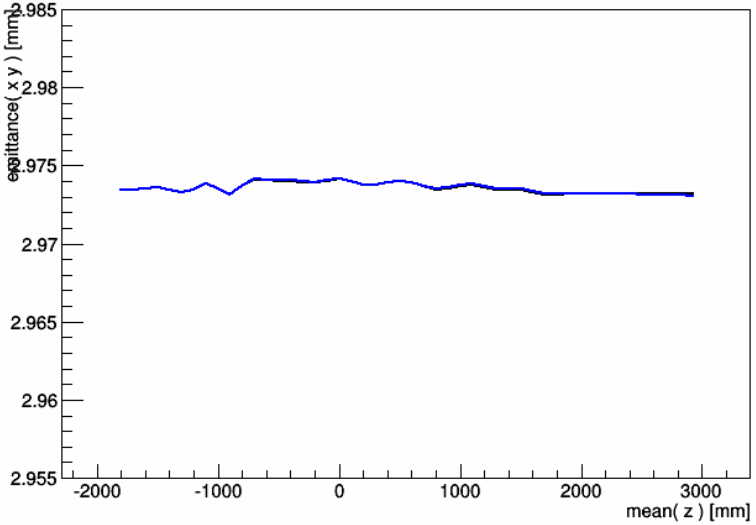
10k muons



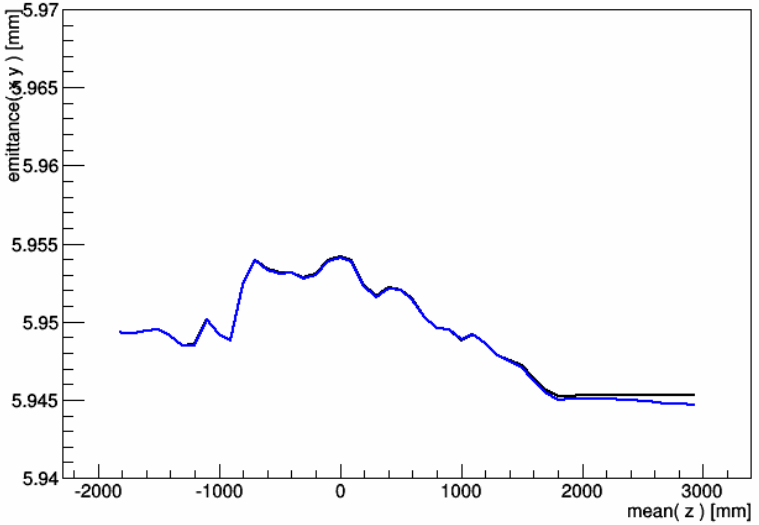
- Now track sample of particles through the cooling channel
  - All magnets powered
  - Random seed = initial emittance
- BLACK: magnets with perfect alignment (3, 6, 12 mm emittance)
- BLUE: magnets with measured alignment (3, 6, 12 mm emittance)

Beam emittance

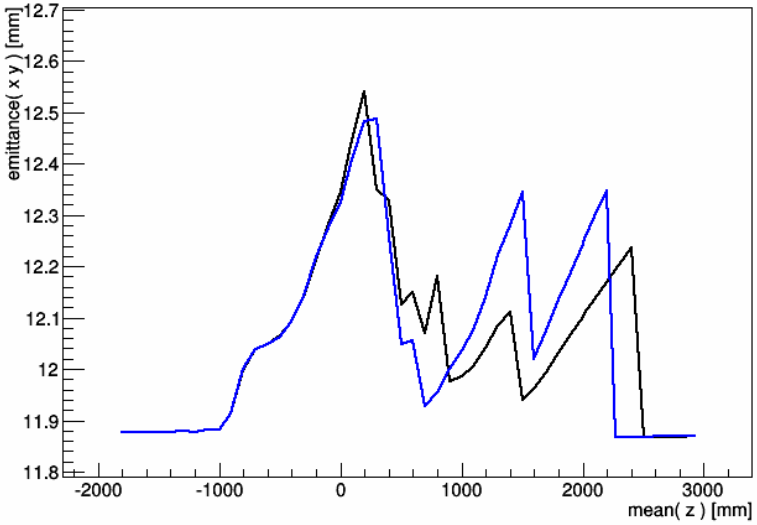
10k muons



10k muons



10k muons



- How does the emittance respond?
  - BLACK: magnets with perfect alignment
  - BLUE: magnets with measured alignment
  - Small increase in emittance