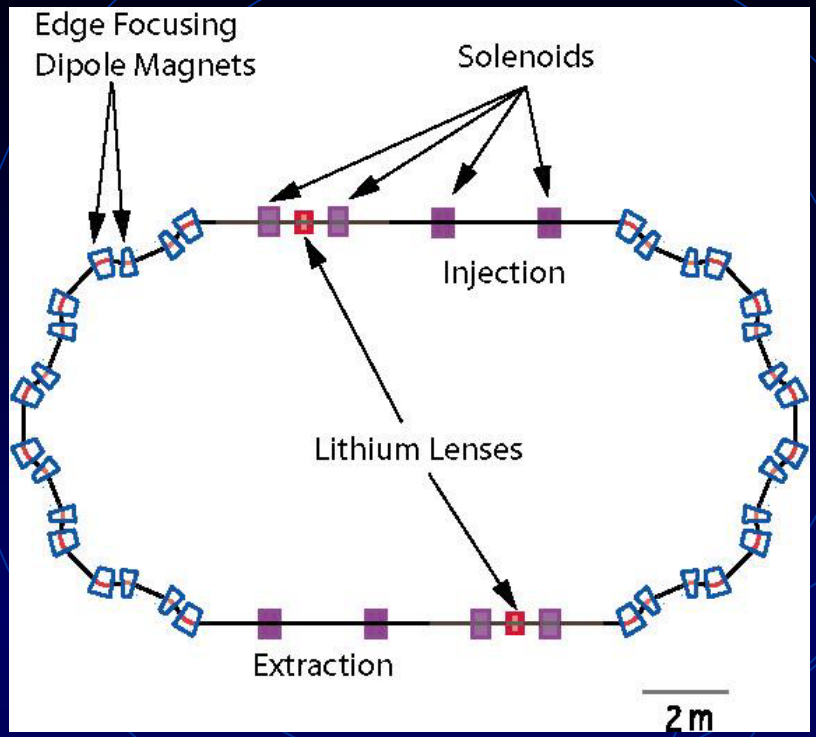
Lithium Lens Ring Cooler

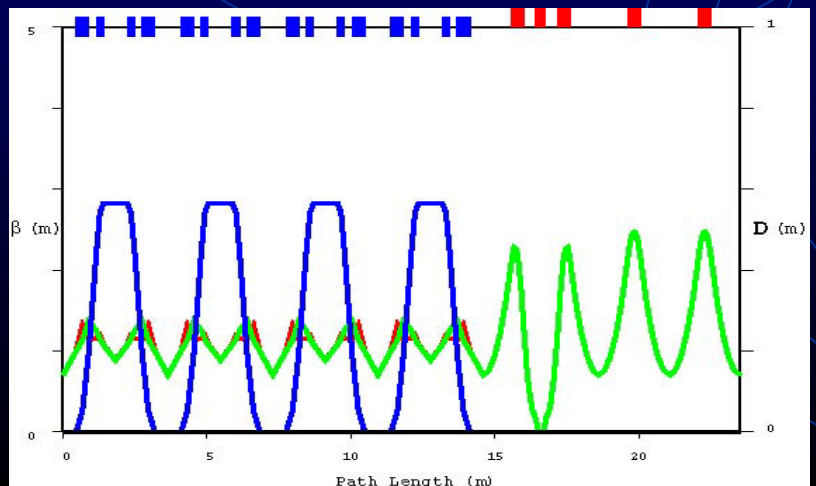
Yasuo Fukui (UCLA)

- Linear(the lowest order) model works fine, with SYNCH + ICOOL.
  Shows good quality transverse cooling.
- Reality check brings challenges.
- Straight section seems to work with current sheet model of matching solenoids.

Lithium Lens Ring Cooler

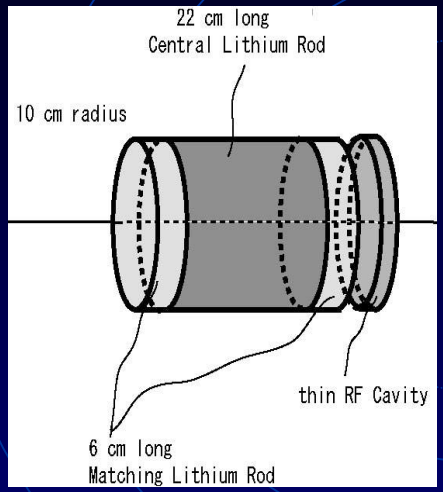


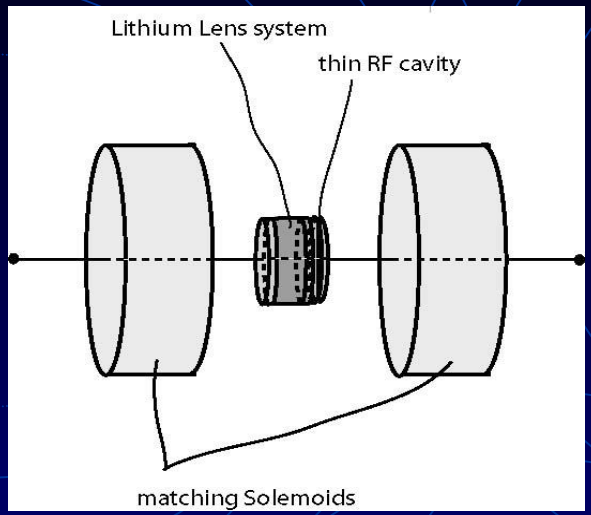
Al Garren

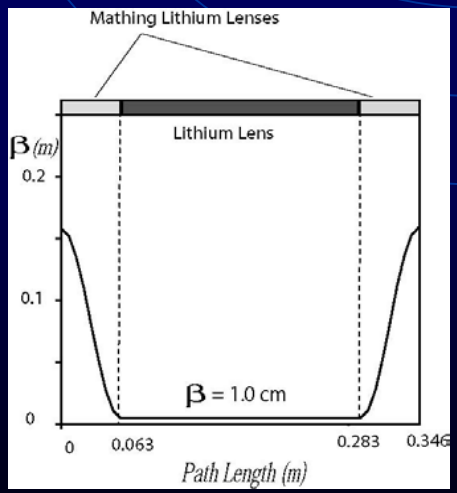


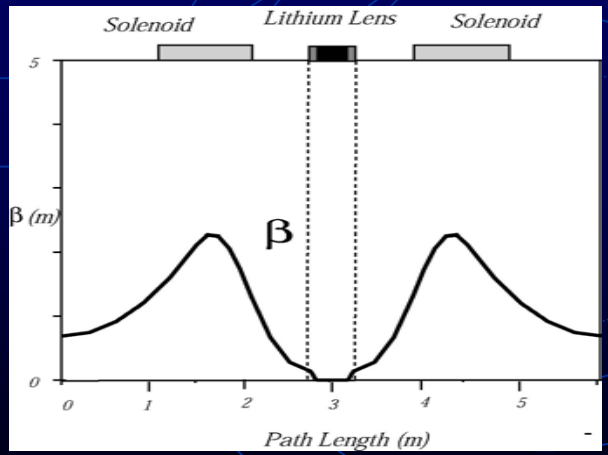
muon momentum	250 MeV/c
Circumference	42.1 m
straight section length	5.9 m (x 2)
Structure of half cell	2 dipoles with edges
number of bending cells	8
bend cell length	3.6 m
length of Lithium lens	34.5 cm (x 2)
Lowest/highest β in Li	1.0 cm /16 cm
dE/dx	35 MeV/turn (x 2)
dipole bend angles	44.2, -21.7 degree
dipole edge angles	30/-3, -11/-11 degree
dipole magnetic field	6.5, -3.2 tesla
Cell tunes bend cell	0.72/0.70
Cell tunes straight cell	4.0

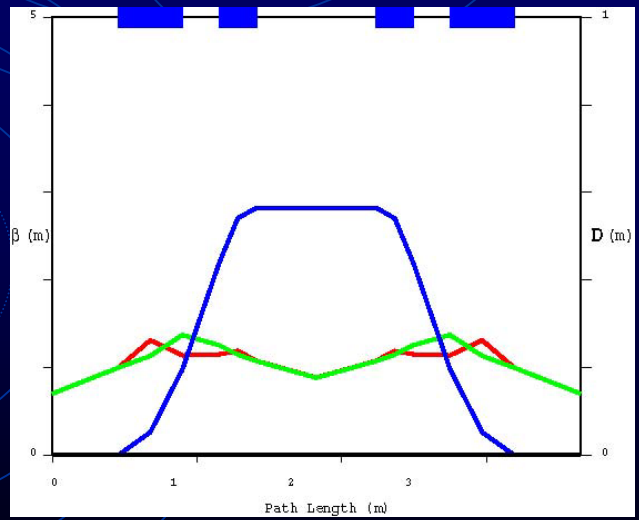
Lithium Lens Ring Cooler



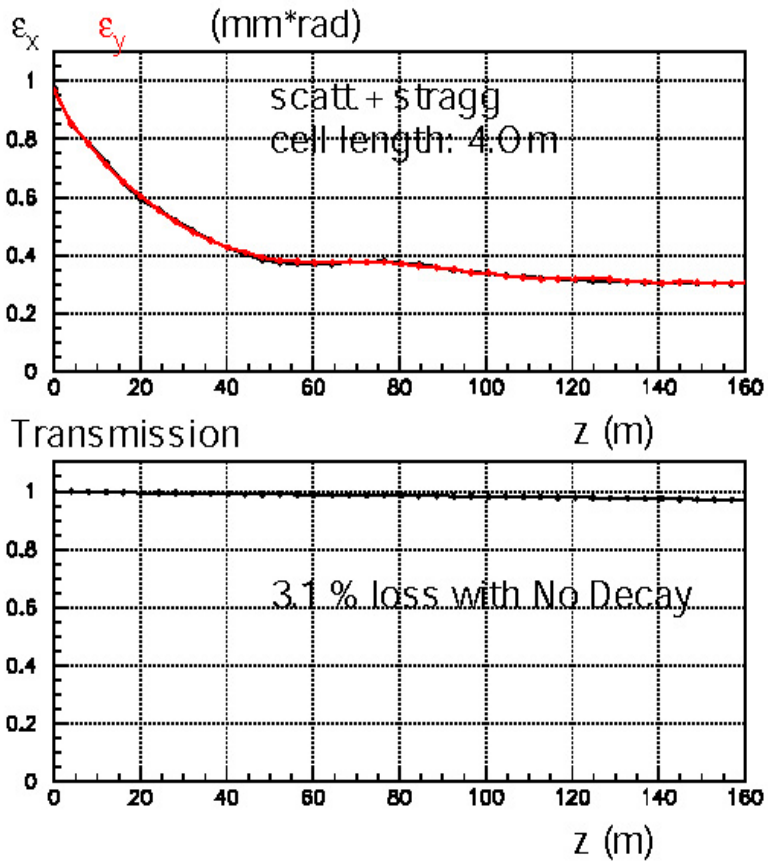


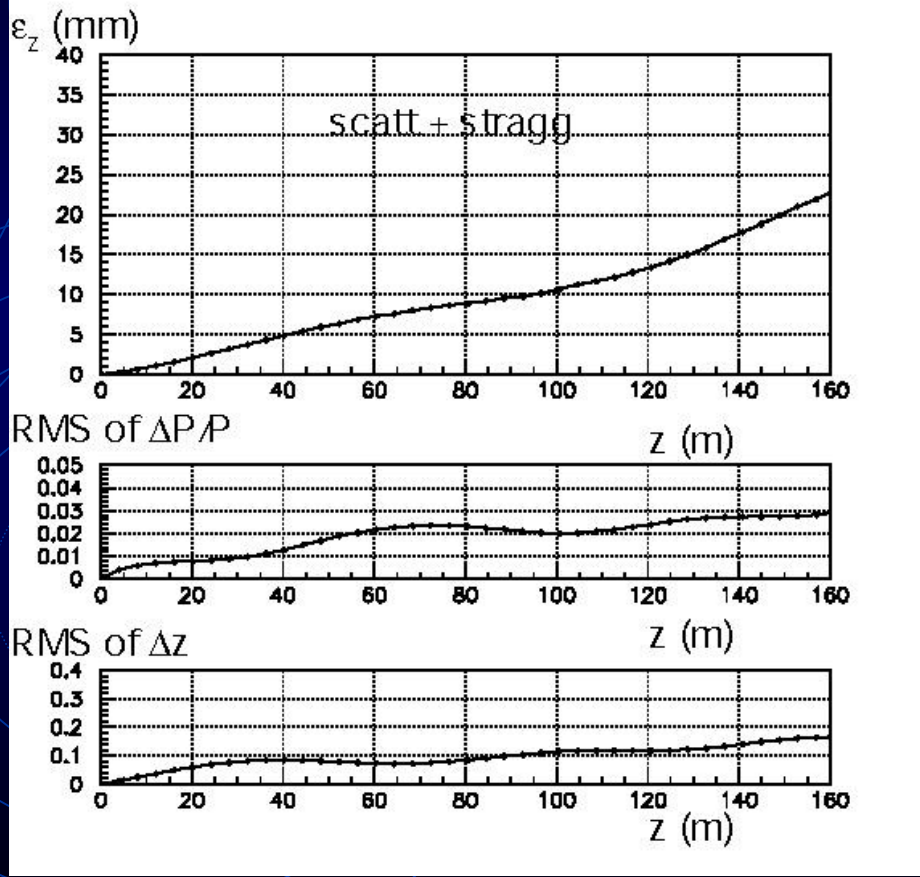




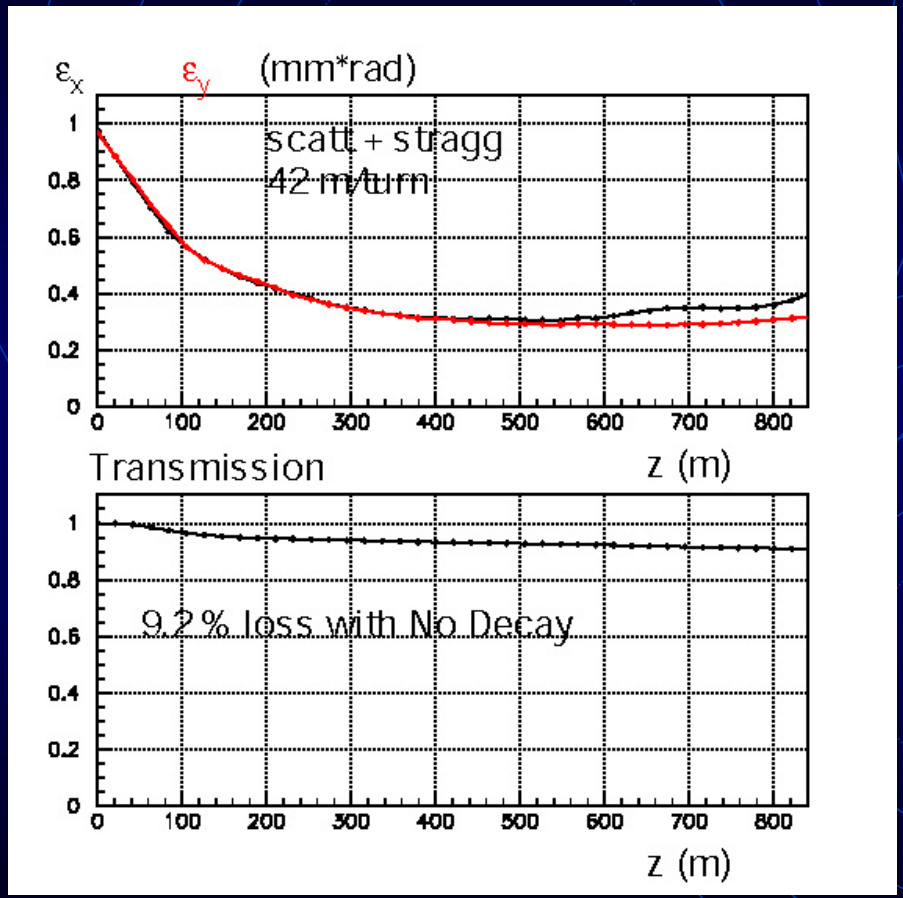


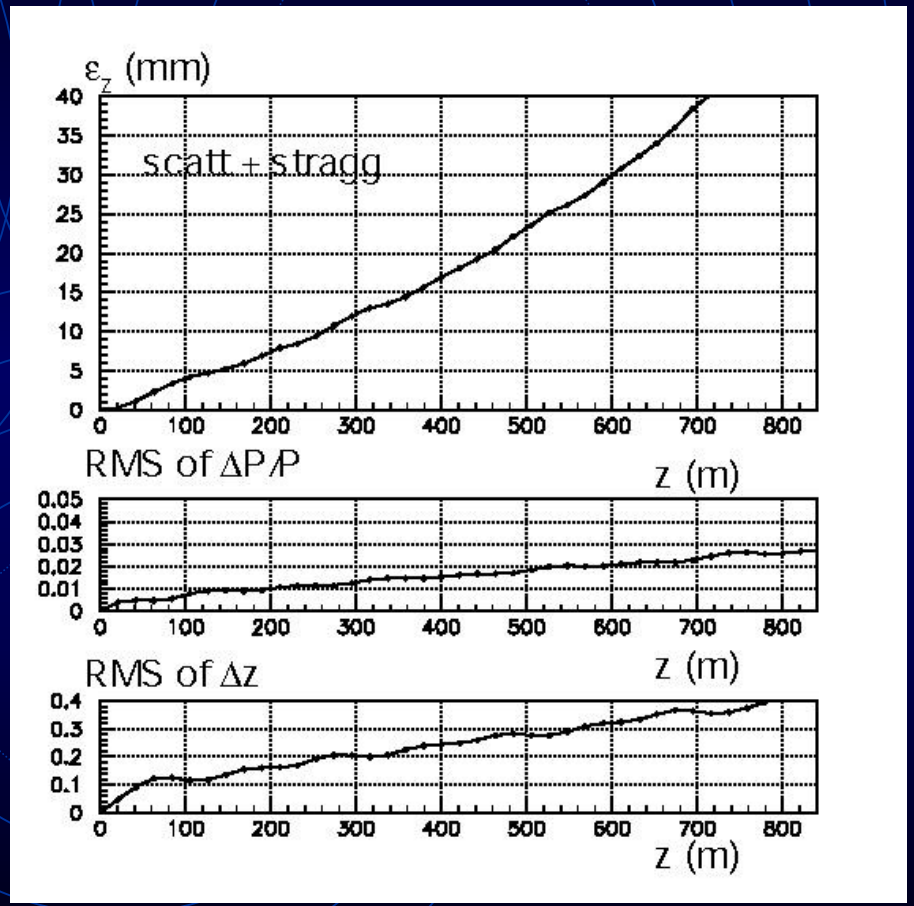
Straight channel with solenoid matrix



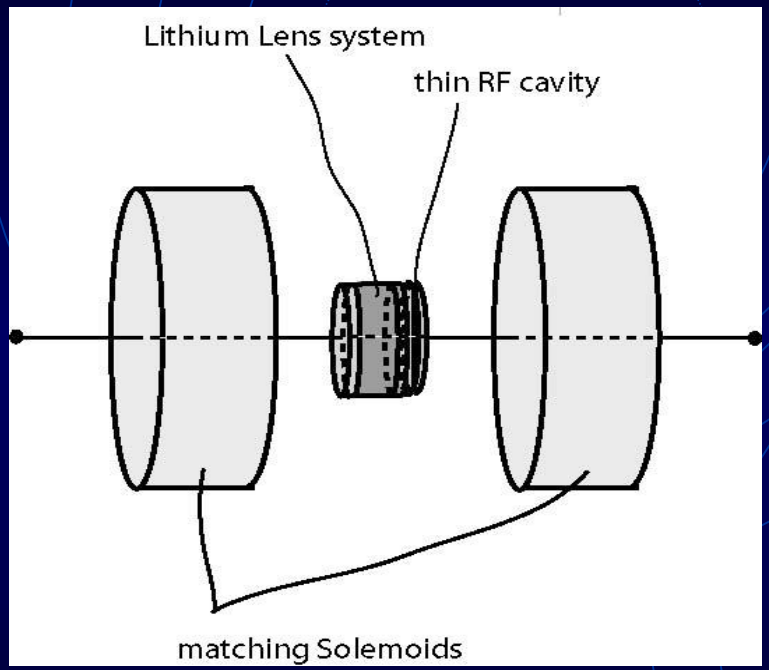


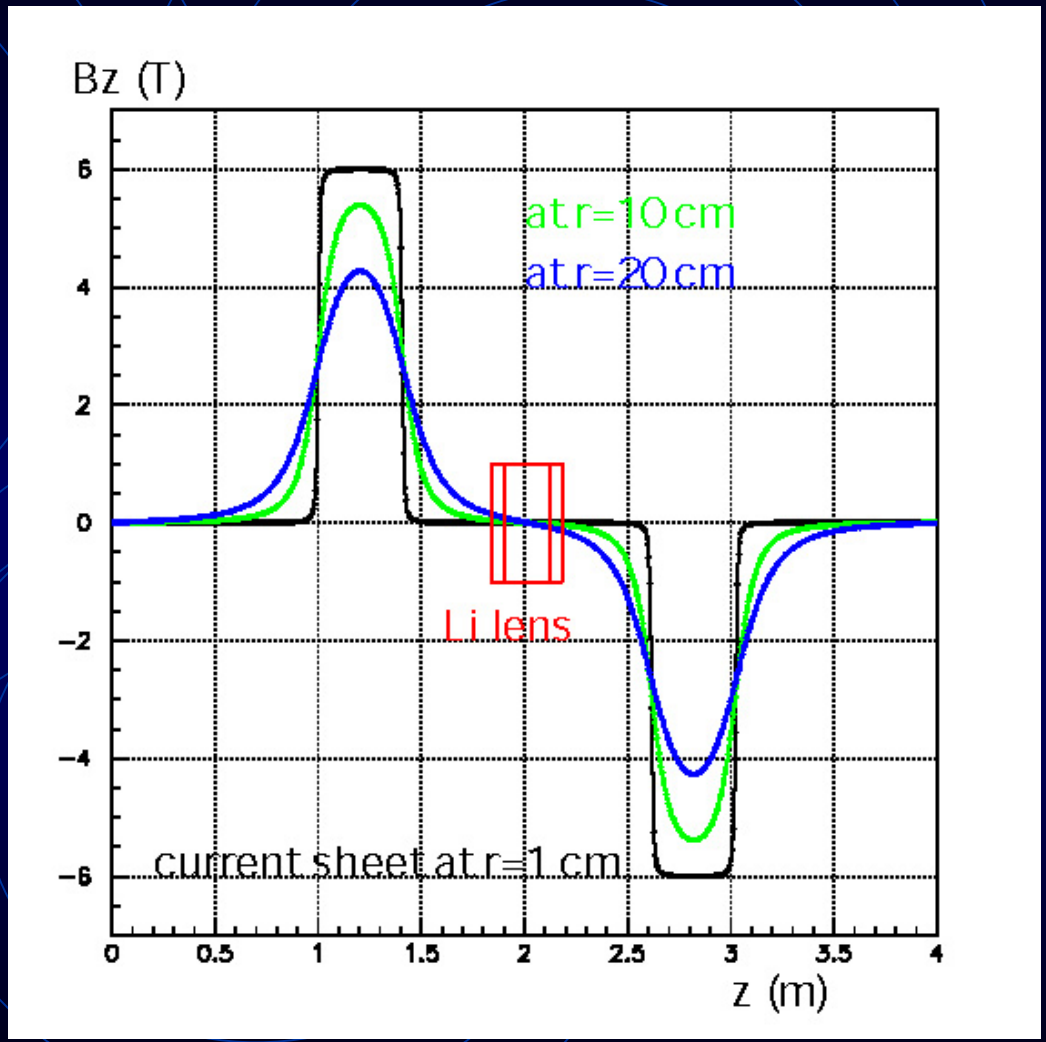
Li lens Ring Cooler with matrix solenoid, matrix pole face rotation



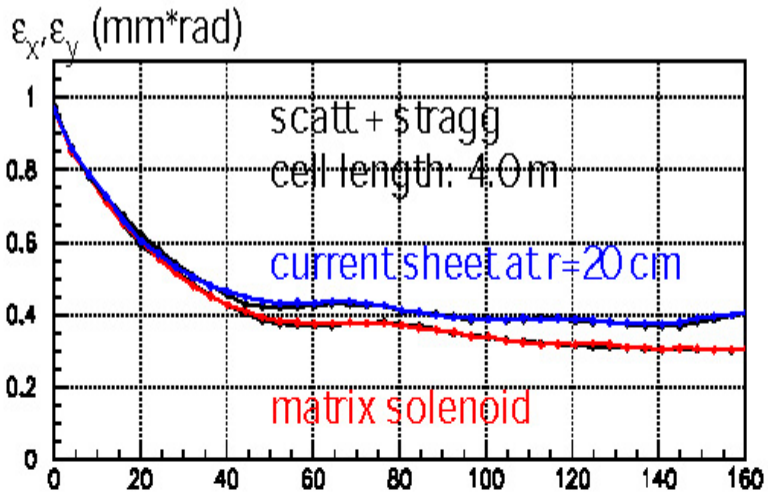


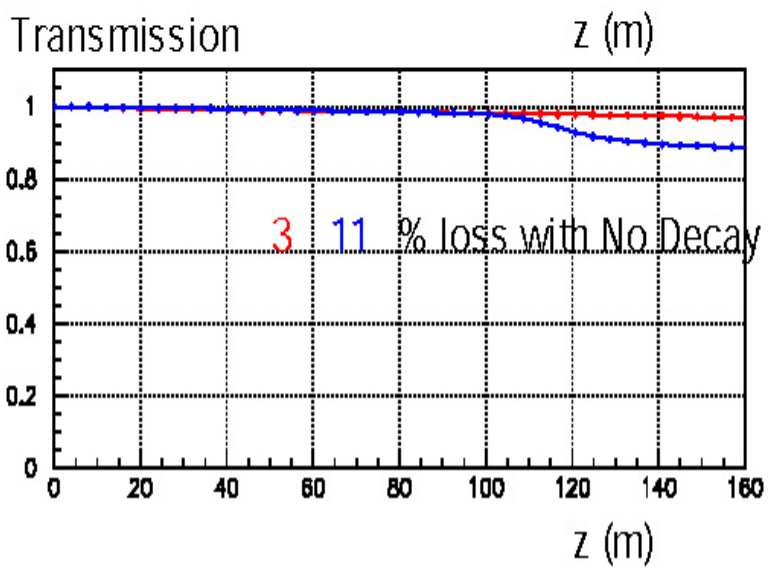
solenoid current sheet

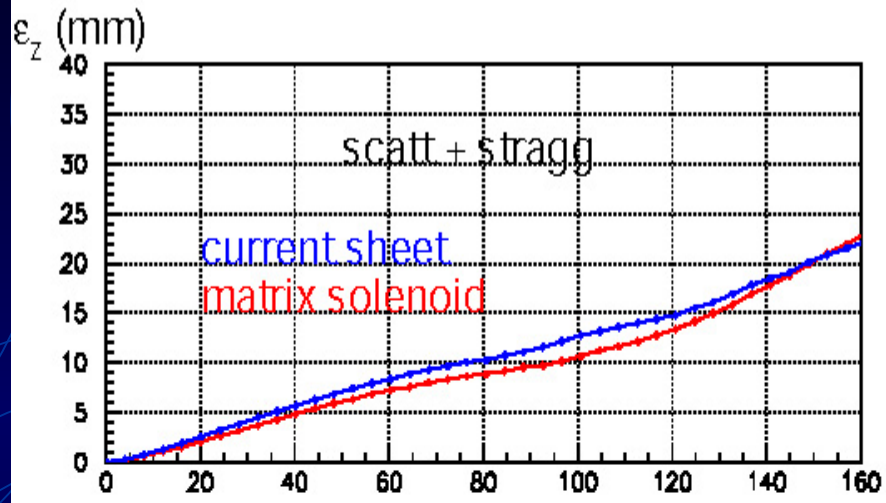


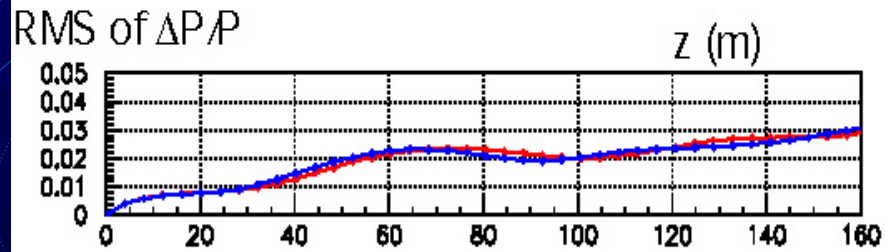


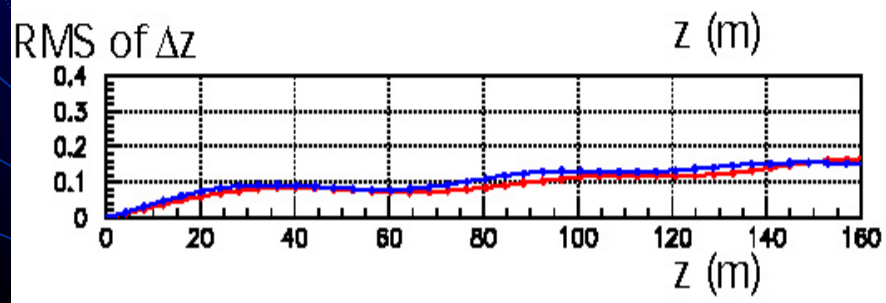
Straight channel with current sheet solenoid











Summary

- Transverse normalized emittance can be cooled down to 0.3 mm*rad in a Ring cooler with Lithium lenses in the lowest order model.
- matching solenoid with the current sheet model works fine in a straight channel.
- next is to test in more realistic muon cooling ring with Li lenses with fringe fields of the bending magnets.