

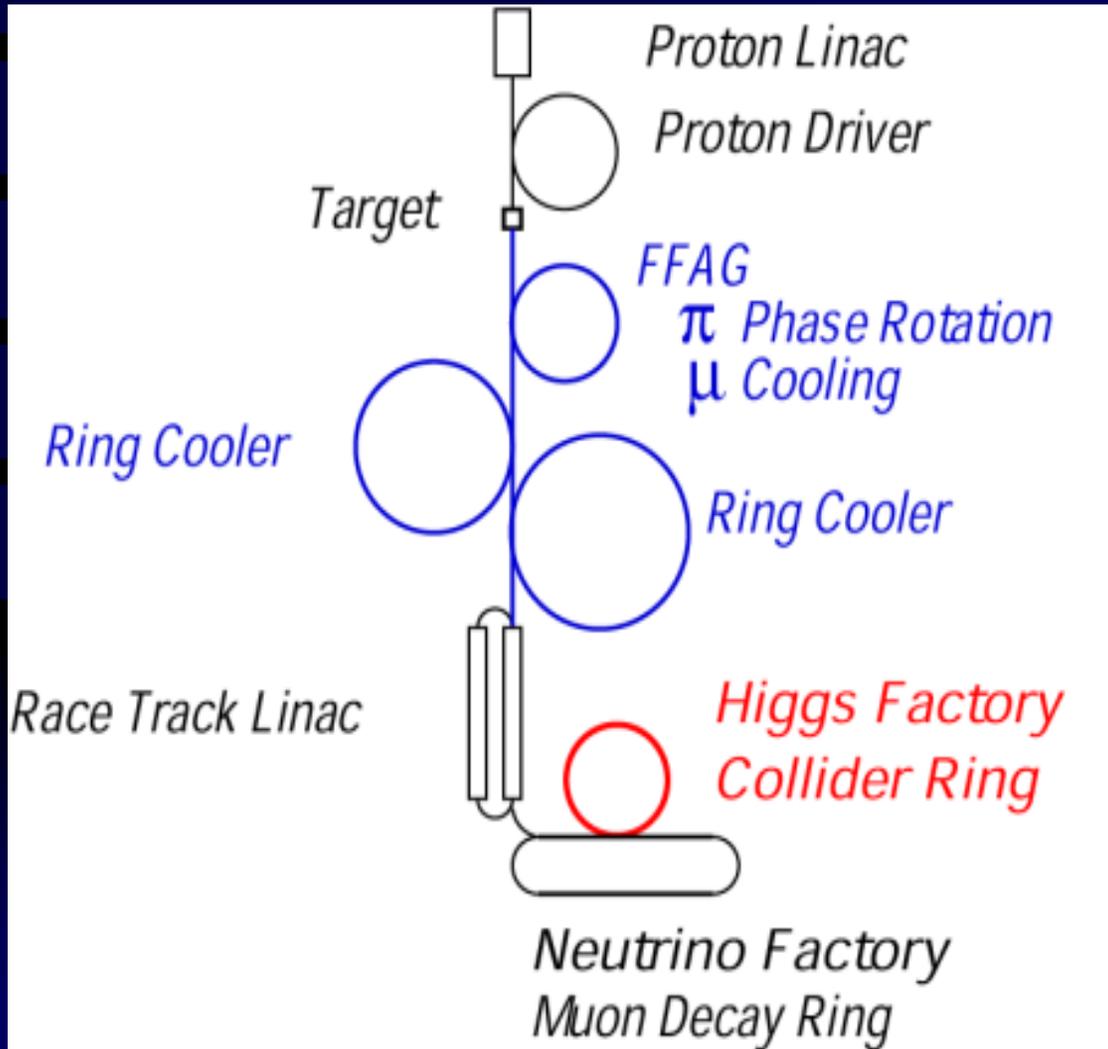
Ring Cooler with Lithium Lenses

Yasuo Fukui (UCLA)

(working with D. Cline, A. Garren, H. Kirk)

- AI designed a SYNCH model of a Cooling Ring with a 1.25 m Lithium Lens with β at 1 cm.
- Work is in progress in doing tracking simulation with ICOOL
- Track-simulated a cooling ring with Lithium Lens with β at 30 cm

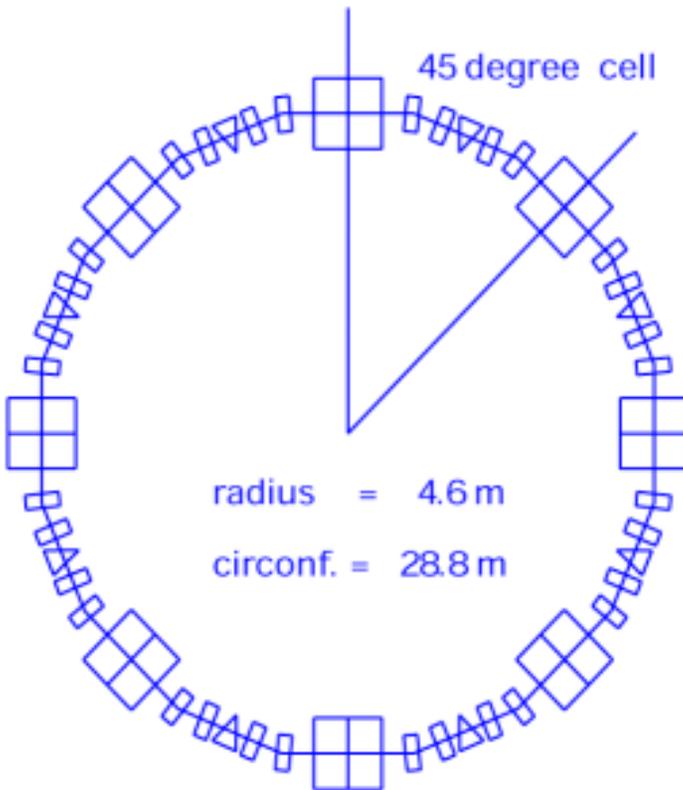
Ring Cooler Scheme



- Multiple Ring Coolers
- Use wedge absorbers and Lithium lenses

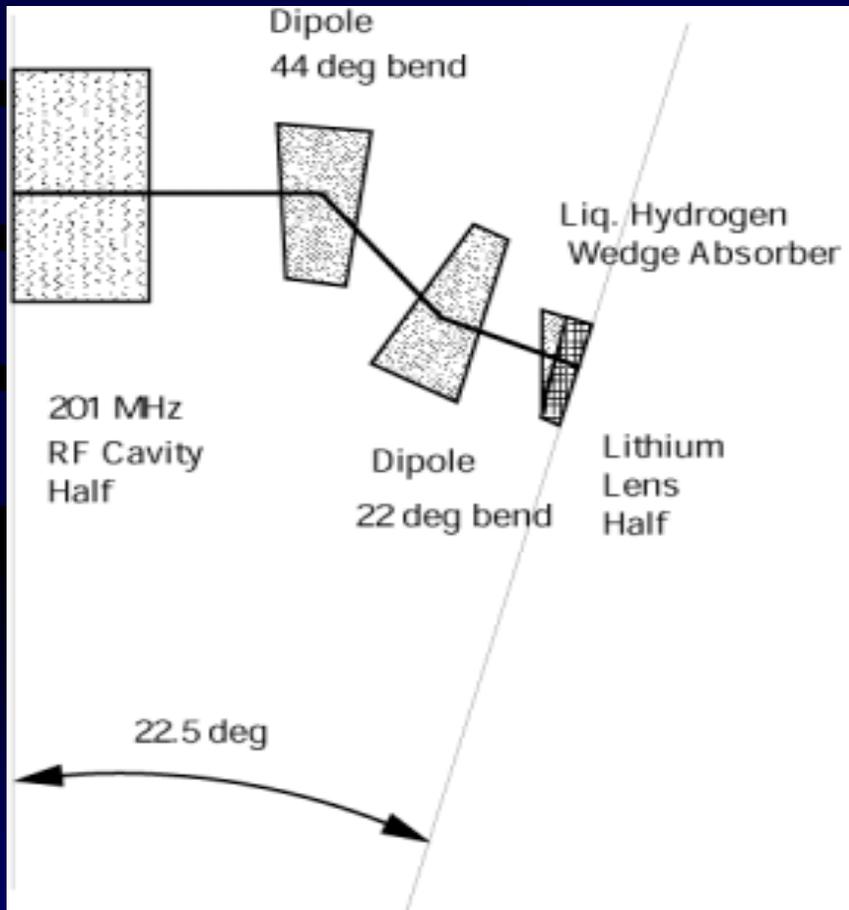
for $\epsilon_{eq \perp} \sim 100$
mm*mrad

8 cell Cooling Ring



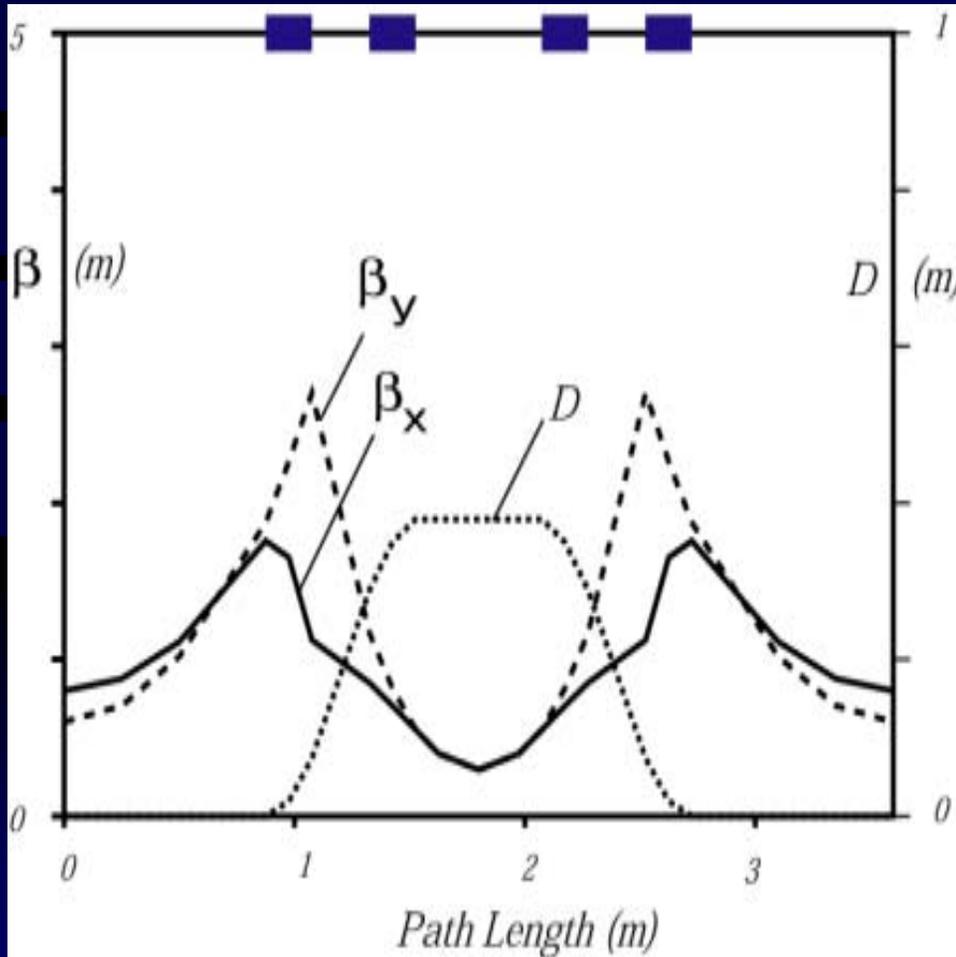
- 500 MeV/c muon
- 8 Lithium Lenses with β at 30 cm
- liq. H₂ Wedges

Half Cell (1/16 of a Ring)



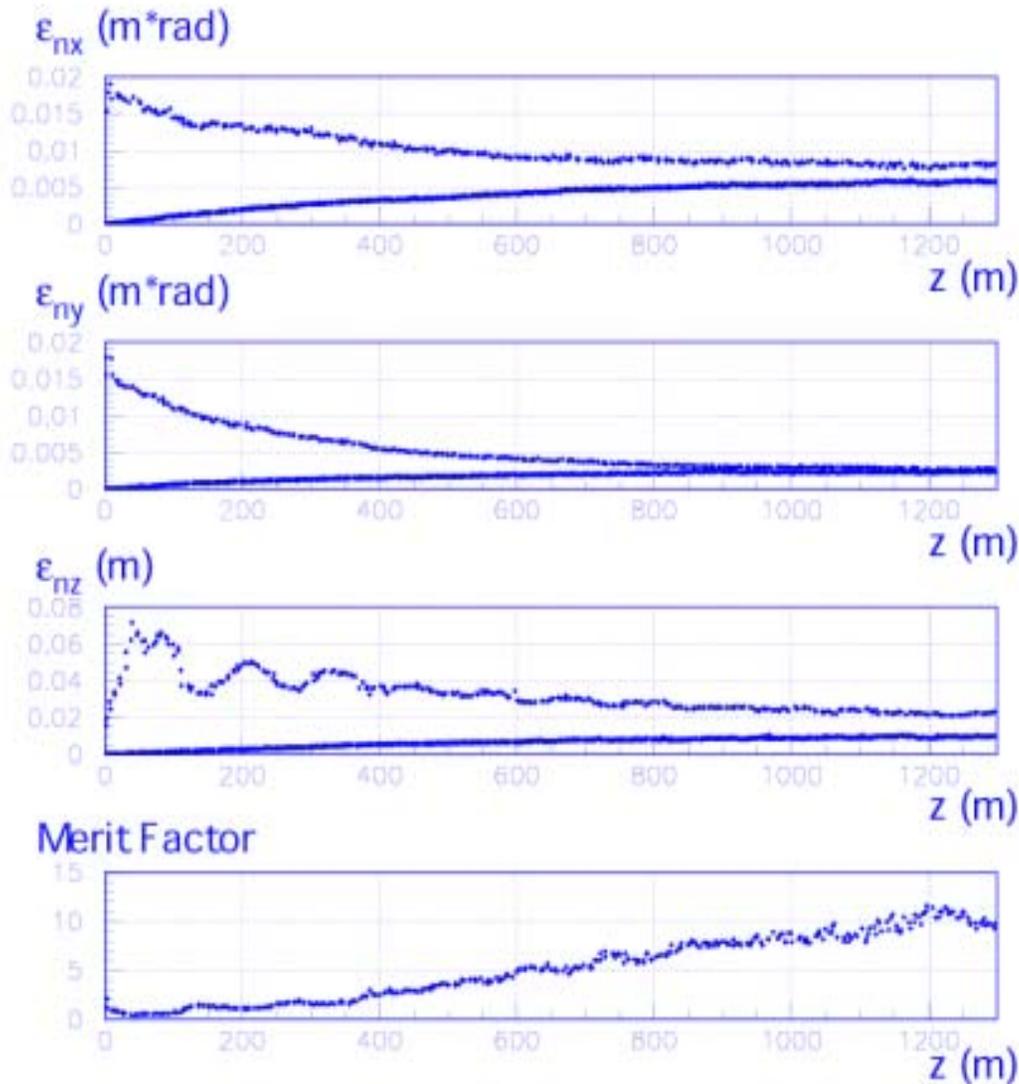
- Edge focusing
Dipoles, 20 cm long
- 7 cm long Lithium
lens with β at 30 cm
 $\Delta E=6.4$ MeV(80%)
- 20 deg liq. H_2 wedge
absorbers, 5 cm
deep $\Delta E=1.4$ MeV

45 deg. Bending Cell



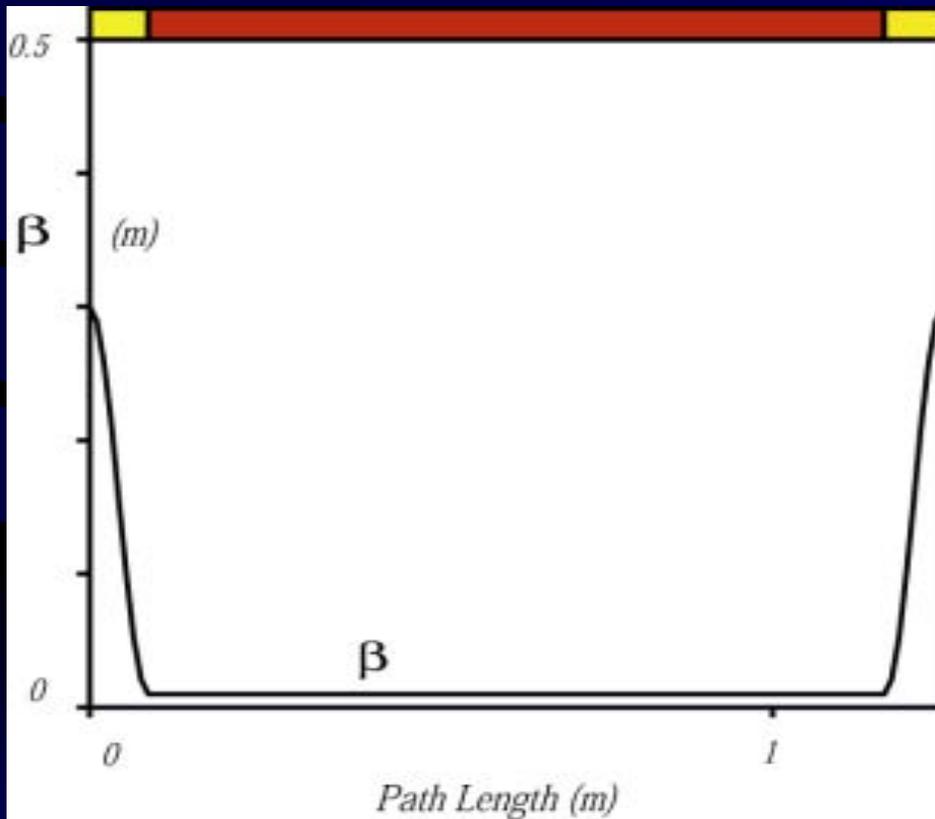
- Insert 7 cm long Lithium lens with β at 30 cm at low β
- 1/8 Ring

Tracking with ICOOL



- No muon decay
- Start with cold beam and hot beam

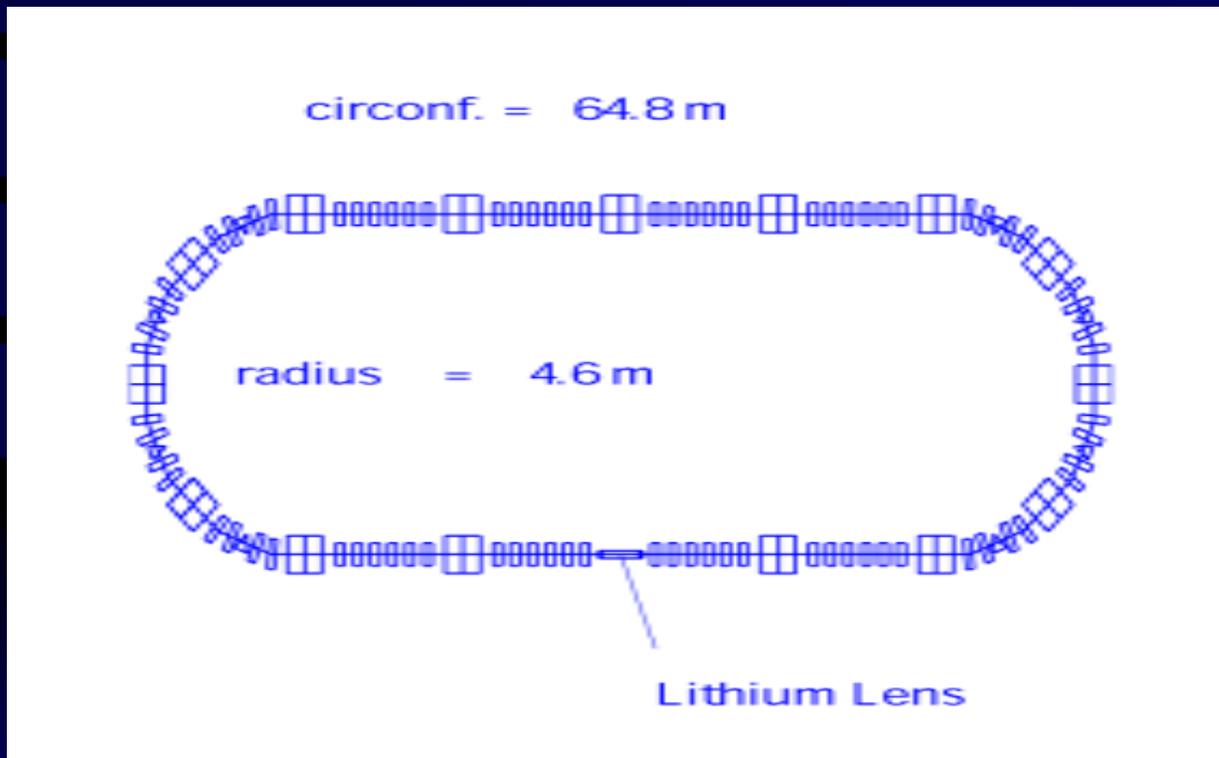
a Lithium lens



- 1.25 m Lithium lens
min. β at 1 cm
- 8.6 cm*2 matching
Lithium lens
 β at 5 cm

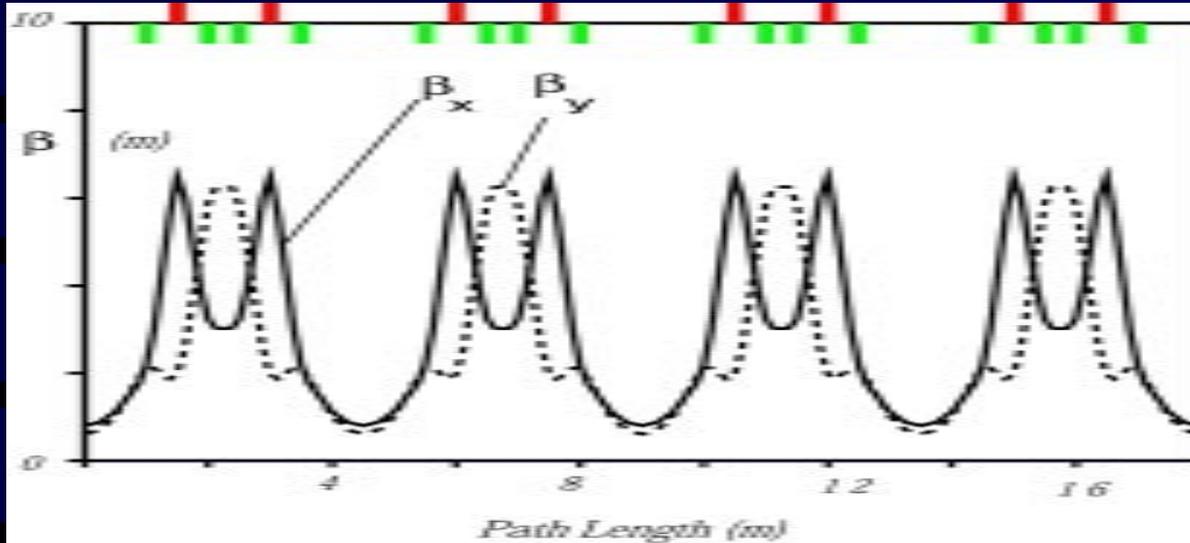
$$\Delta E = 117 \text{ MeV}$$

Lithium lens Race track ring

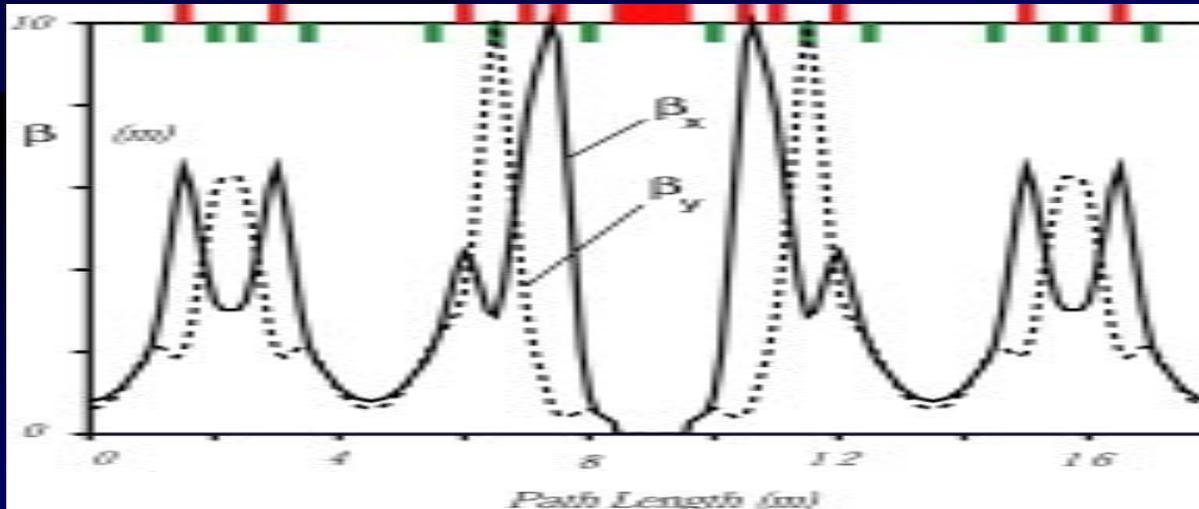


- 1.25 m
Lithium lens
- 8.6 cm²
matching
Lithium lens
 $\Delta E = 117 \text{ MeV}$
in a Lithium lens
- Liq.H2
wedges in
bending cells

Straight Section

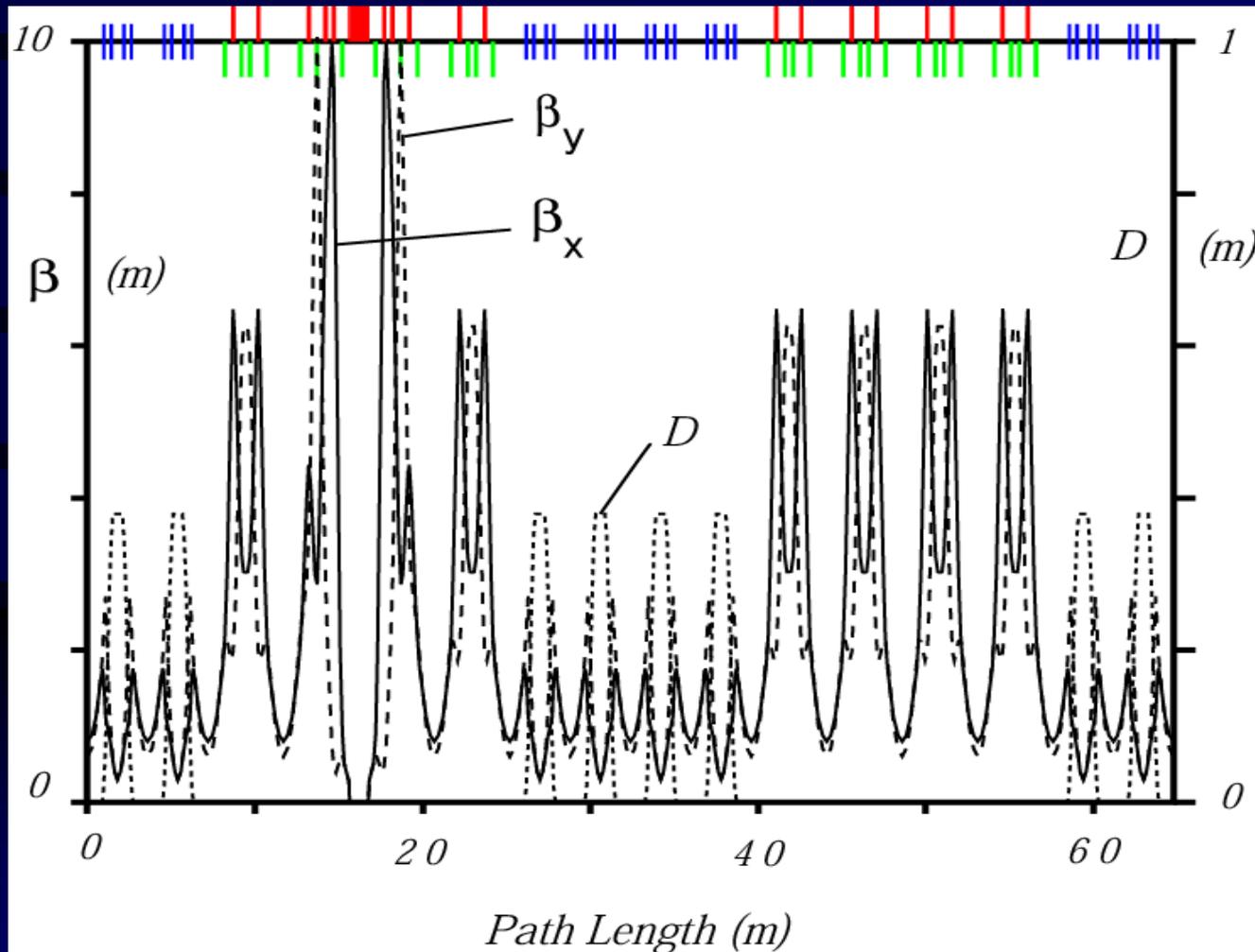


- 36 m in two straights

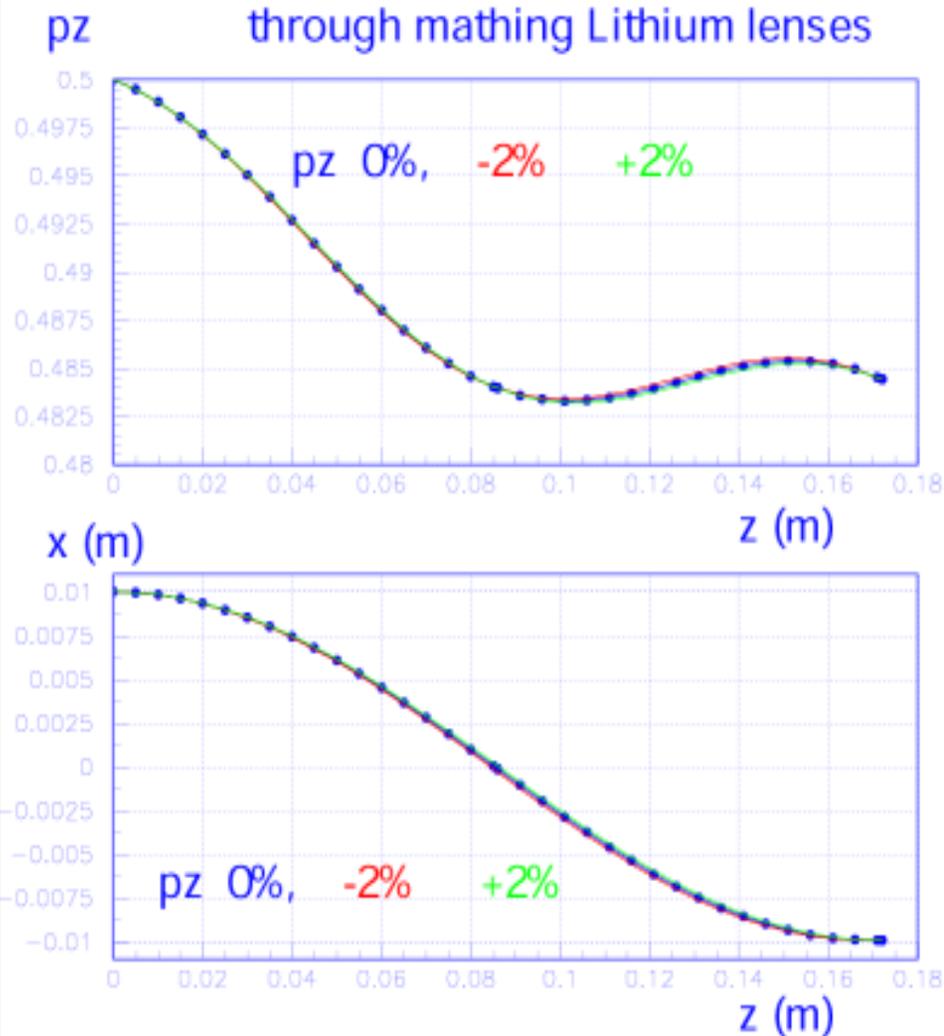


- (29 m in Bending cells)

a race track ring



Matching Lithium lens



- Muon tracks through matching Lithium lenses

Summary

- Try to track-simulate a SYNCH model of a race track cooling ring with a Lithium lens with β min at 1 cm.
- What questions to ask?
- Track-simulated 6D cooling in a 8 cell cooling ring with Li lenses with β min at 30 cm.
- working on 16 cell ring(45 deg. bend. and straight cells) with short Lithium lenses with β min at 1 cm.