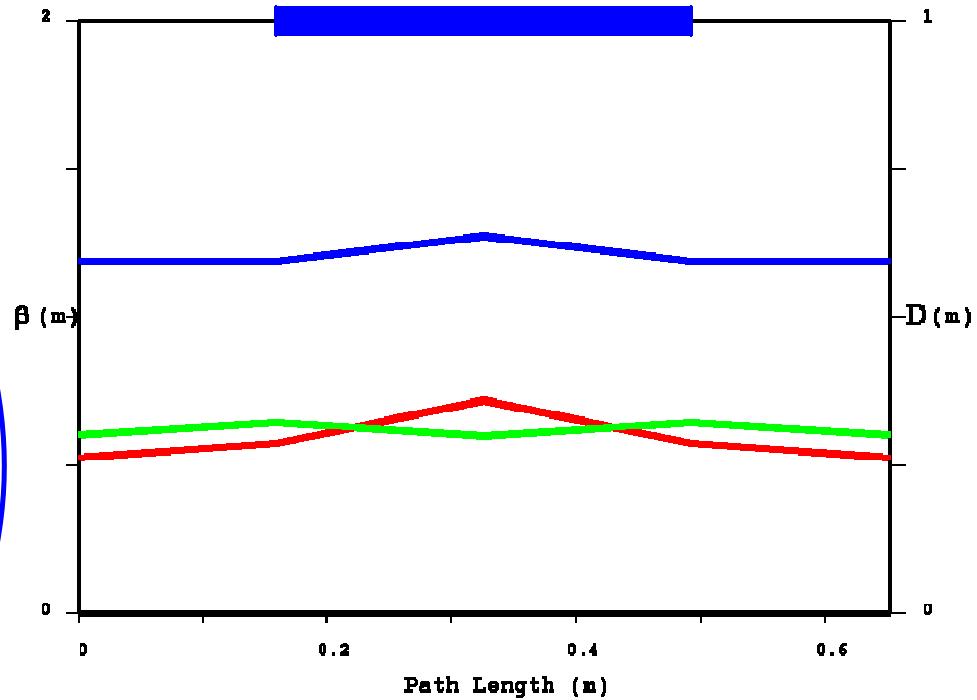
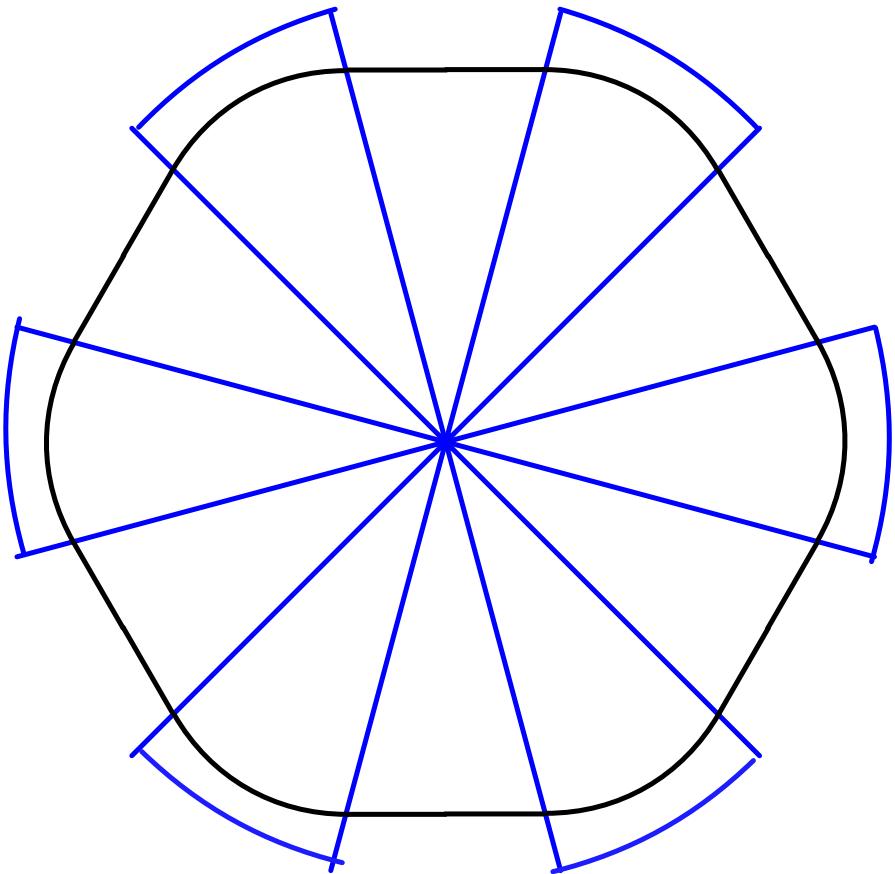


# Gas Filled Dipole Wedge Rings

6 DIPOLE RING



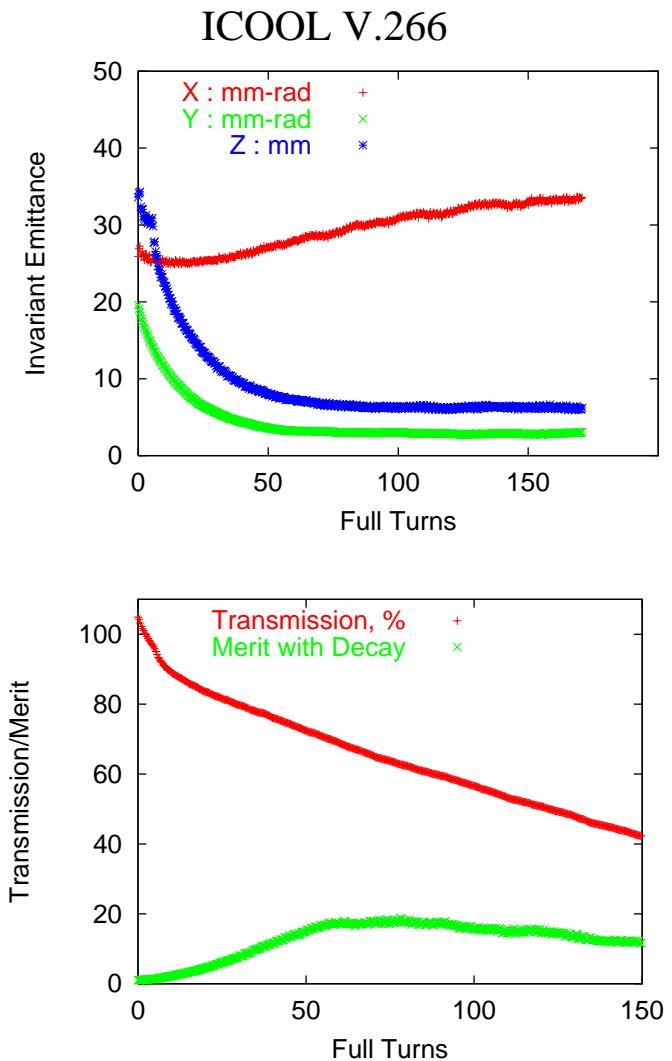
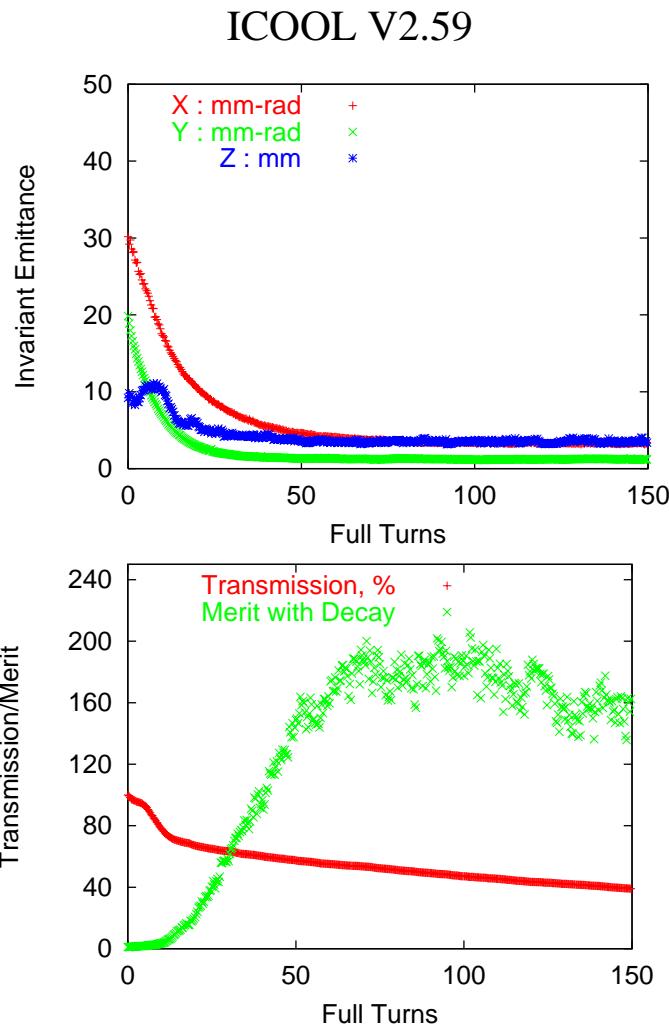
Key parameters at  $r = 60$  cm

$\beta_x = 53$  to  $72$  cm ;  $\beta_y = 60$  to  $64$  cm

Dispersion =  $60$  to  $64$  cm

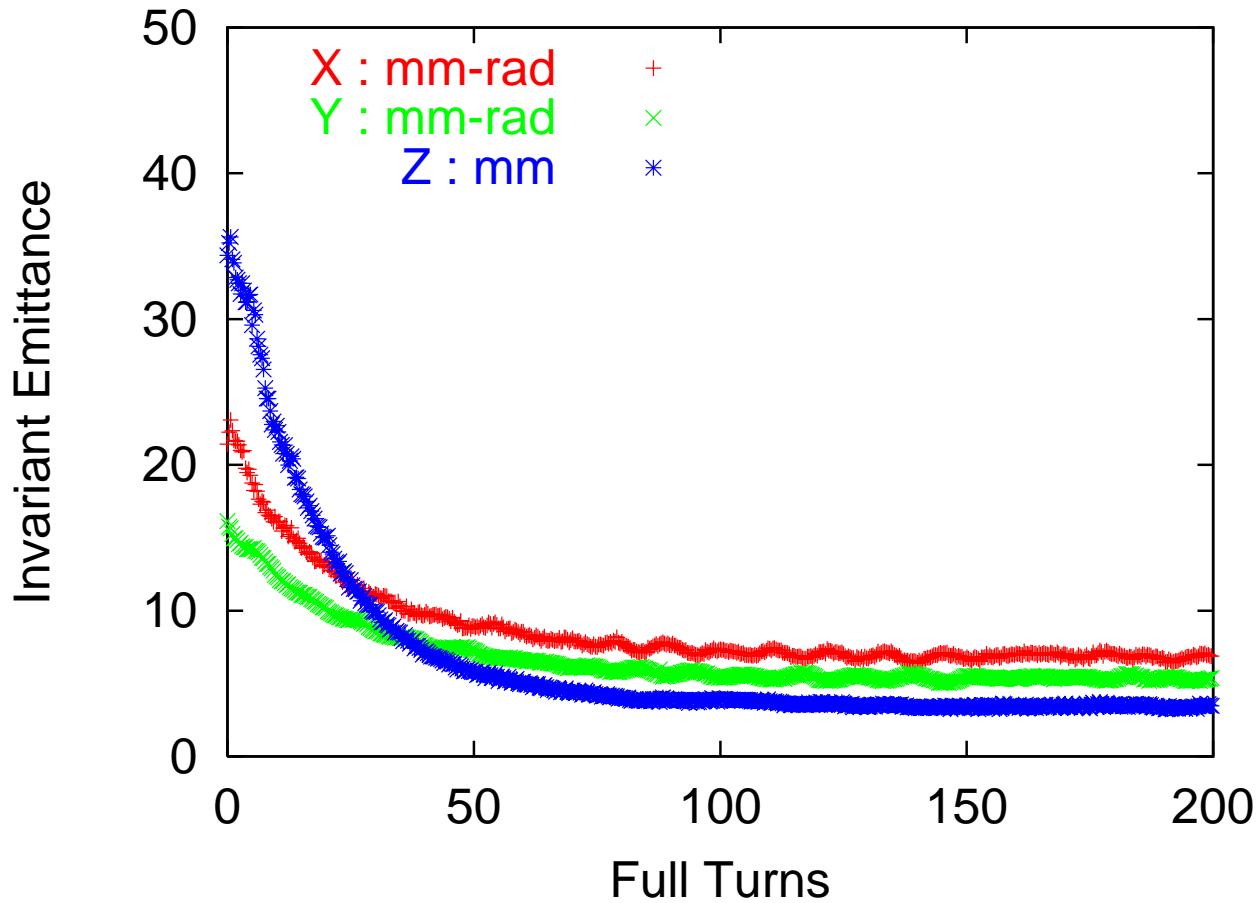
Circumference =  $3.91$  m

# Recalculation with ICOOL V2.66

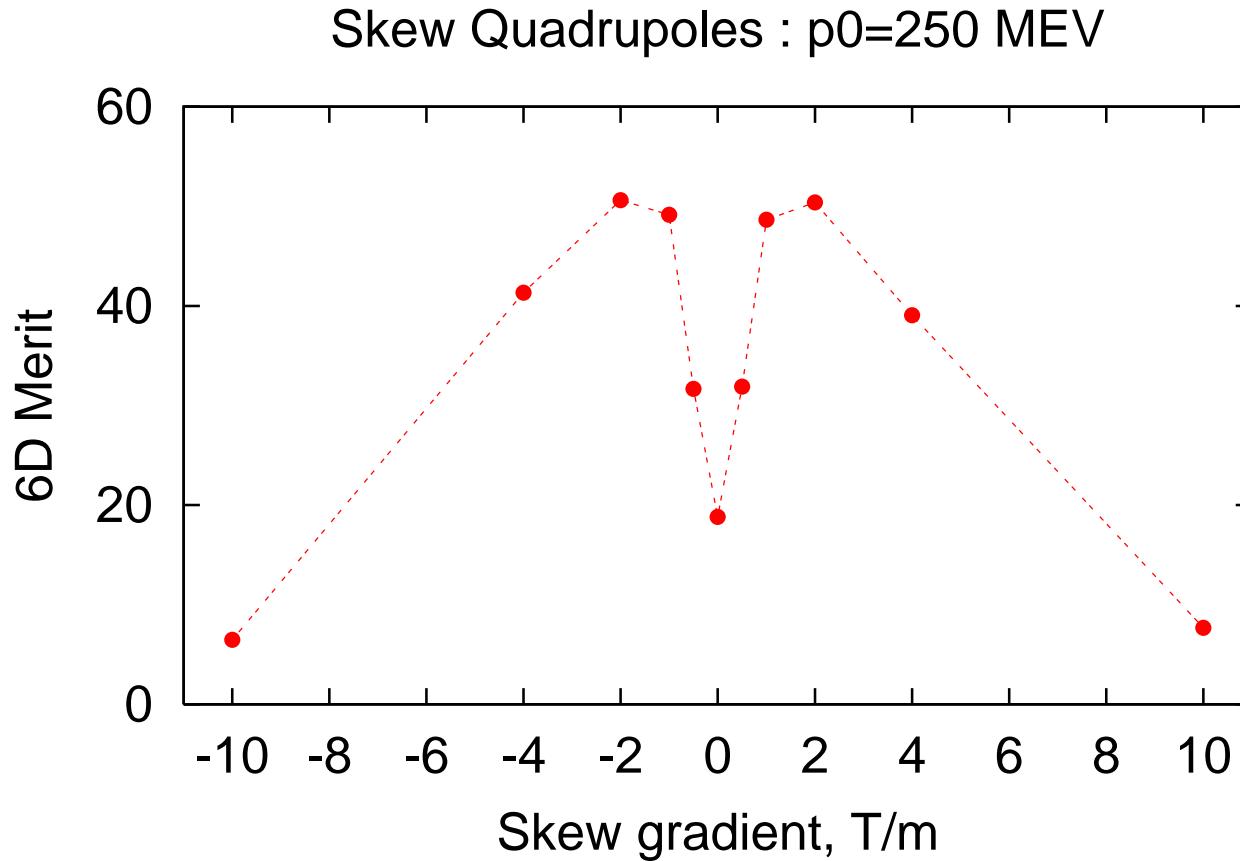


# Introduce Skew Quadrupoles

- Bracket dipoles with thin (3cm) skew quadrodes
- Skew quadrupoles real estate at 9% circumference
- Test various gradients.
- X/Y Coupling achieved



# Skew Quadrupoles Performance



Horizontal Focusing

# A Demonstration Scenario

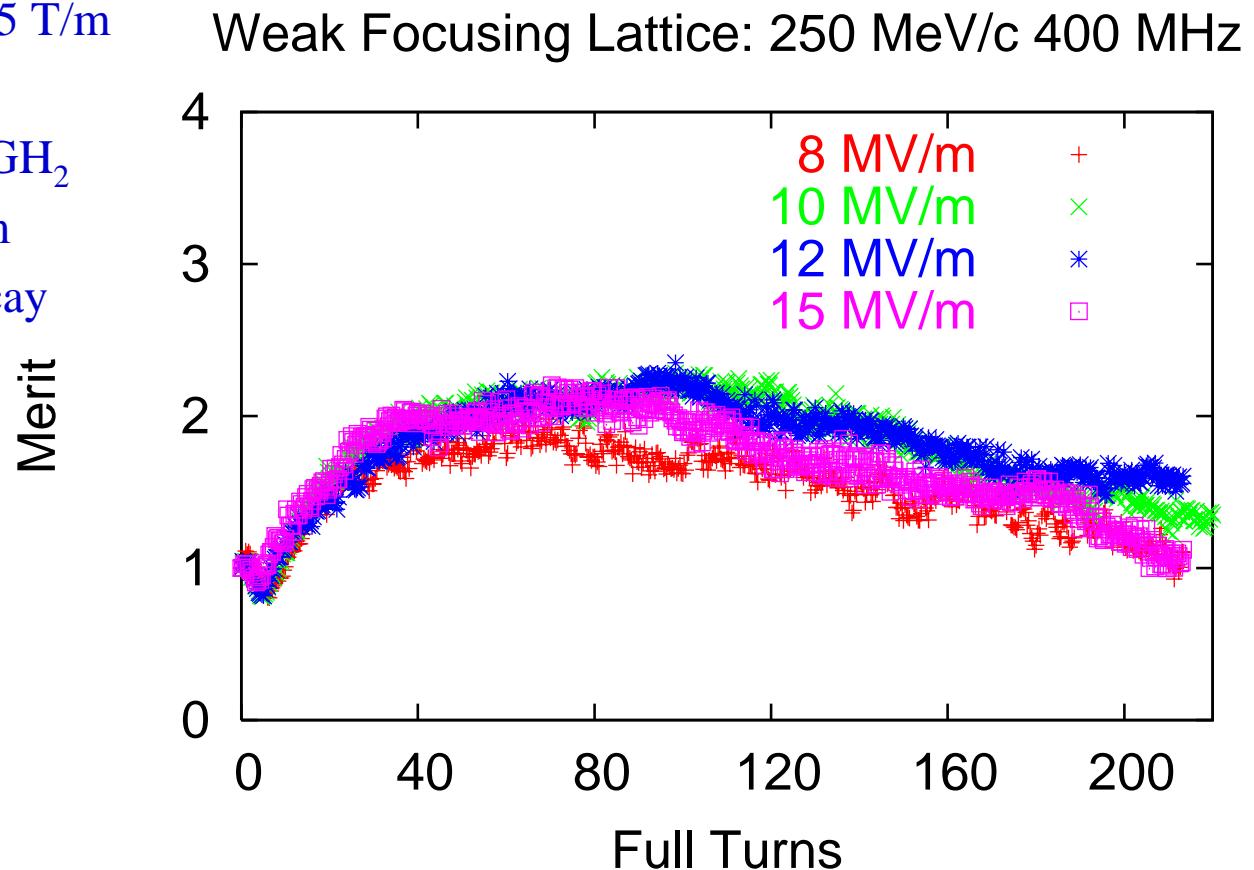
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- Merit factor of  $\sim 10$  is sufficient
- Muon decay ignored
- Rf frequency at 800 MHz
- Beam aperture at  $\pm 7$  cm
- Gas density at 10 atmos at 77° K
- DC dipole field at 1.5T
- Pulsed dipole field  $\sim 3$ T

# Weak Focusing Lattice

## Lattice Parameters

- Skew Quads at 1.5 T/m
- RF at 400 MHz
- 40 Atmospheres GH<sub>2</sub>
- Aperture  $\pm 10$  cm
- Merit without decay
- $B_0 = 2.62$  T

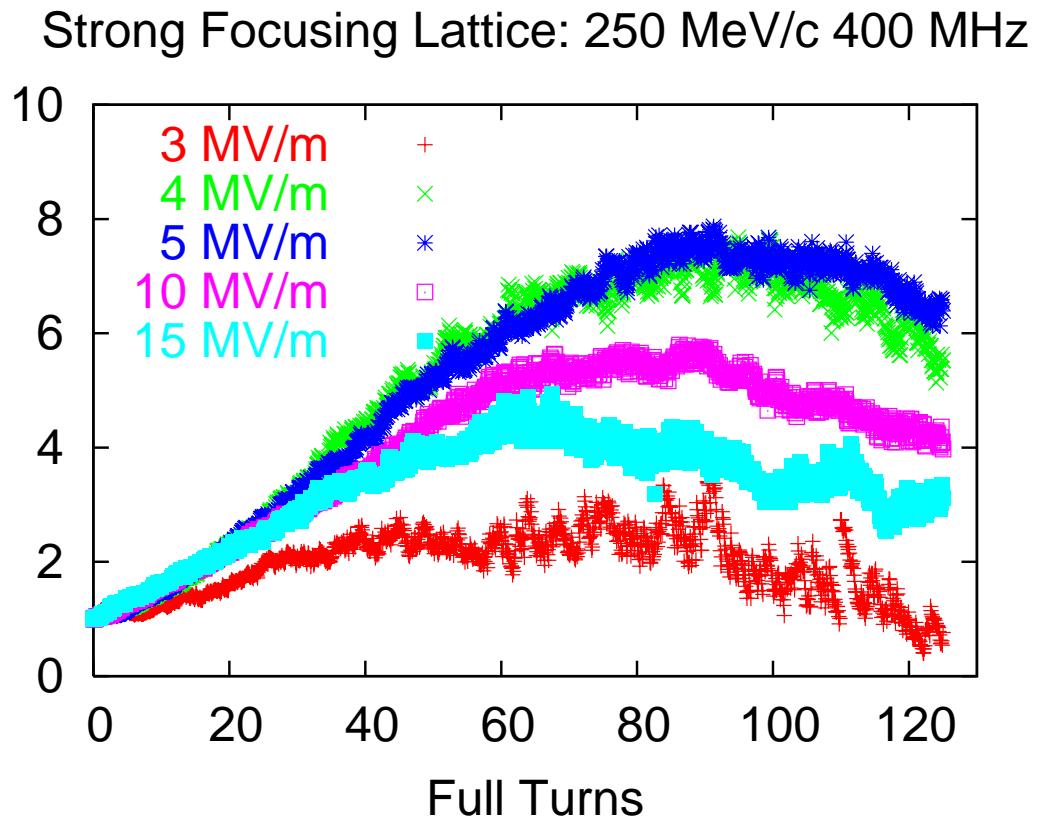


# Strong Focusing Lattice

## Lattice Parameters

- RF at 400 MHz
- 40 Atmospheres GH<sub>2</sub>
- Aperture  $\pm 10$  cm
- Merit without decay
- $B_0 = 2.62$  T

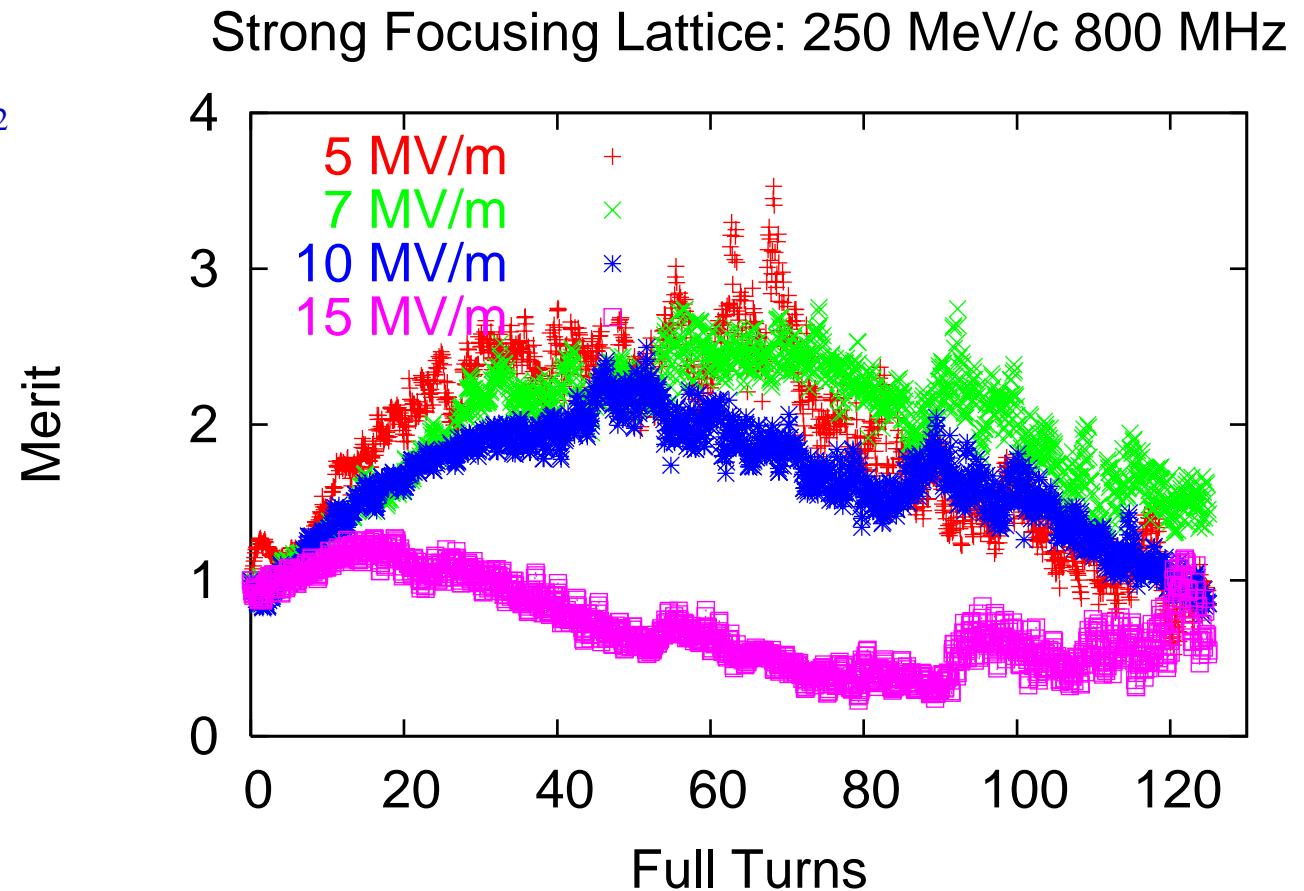
Merit



# Strong Focusing Lattice (cont)

## Lattice Parameters

- RF at 800 MHz
- 40 Atmospheres GH<sub>2</sub>
- Aperture  $\pm 7.5$  cm
- Merit without decay
- $B_0 = 2.62$  T



# Workshop Summary

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- 1) Weak Focusing 250 MeV/c ring with four/six dipoles.
- 2) Two/Four 201.25 MHz RF Cavities,  
Bore = +20cm, Thickness = 43 cm, Diameter = 120cm
- 3) 1.8 Tesla DC dipoles with copper coils and iron return yokes  
Vanadium permendur pole faces could buy another 0.3 Tesla if needed.  
Iron = 2.0 Tesla max. Vanadium permendur = 2.3 Tesla max.
  - 30 cm magnet gaps
  - 6m beam circumference (not final)
- 4) 10 atmosphere hydrogen at 77K
- 5) Magnets are tilted around the beam axis to provide skew quad field components.
- 6) One of the open slots is devoted to injection and possible extraction. Provide a low B-field path through the iron to get muons almost onto orbit and then use muon energy adjustment, DE/dx, and RF phase to get the muons on orbit. Needs simulation!!!
- 7) One or two of the open slots are devoted to beam diagnostics.  
X, Y, and stereo planes of 1.5mm scintillating fibers attached to multi anode PMTs at room temperature. Readout my multi-hit TDCs.  
Orbit one muon at a time. Muon angular spread = +-3 degrees.
- 8) Muon Beam Sources:
  - FNAL: Muon Test Area, 400 MeV protons
  - BNL: AGS D2 Beam Line
  - JLAB: Drell-Yan photoproduced muons.
- 9) Cost estimate for the ring system is ~\$5M

# Weak Focusing Lattice at 40 Atmos.

