

# Anti-DID Options

Hitoshi Yamamoto

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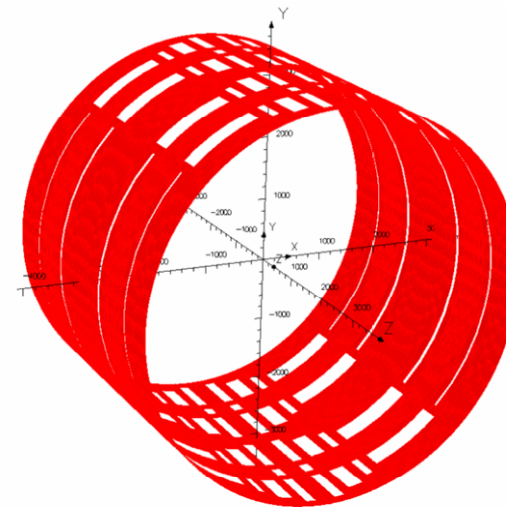
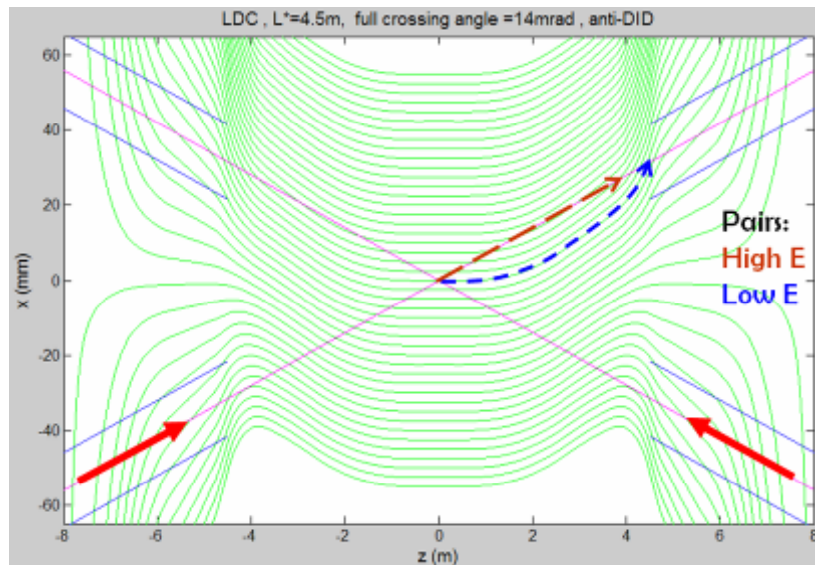
# Anti-DID

## ◆ Purpose:

- To make B parallel to outgoing beams

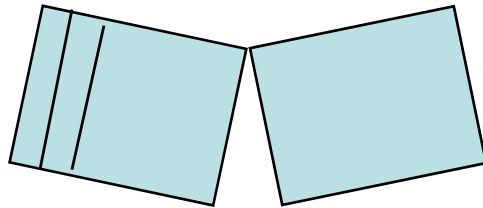
## ◆ Mean:

- Detector-Integrated-Dipole (DID)
- Uniformity of field near DID coil ? (TPC)

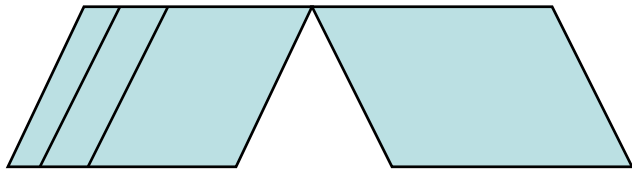


# Try modifying the Solenoid itself

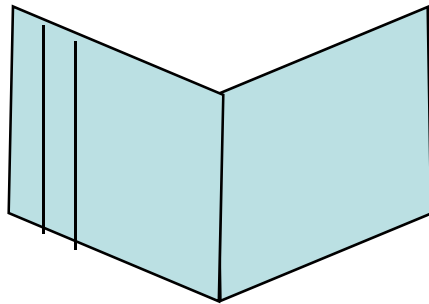
## ◆ Broken solenoid



## ◆ Bookshelf (A. Yamamoto)



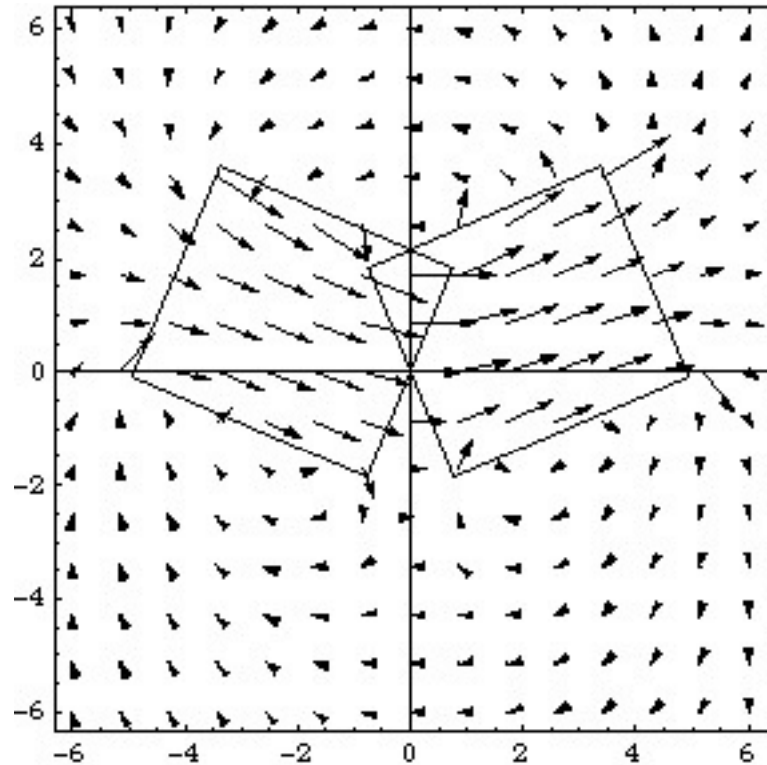
## ◆ Arrow



Use Mathematica.  
Superposition of loop  
fields (10 of them).

Pole tips not included.

# Broken Solenoid



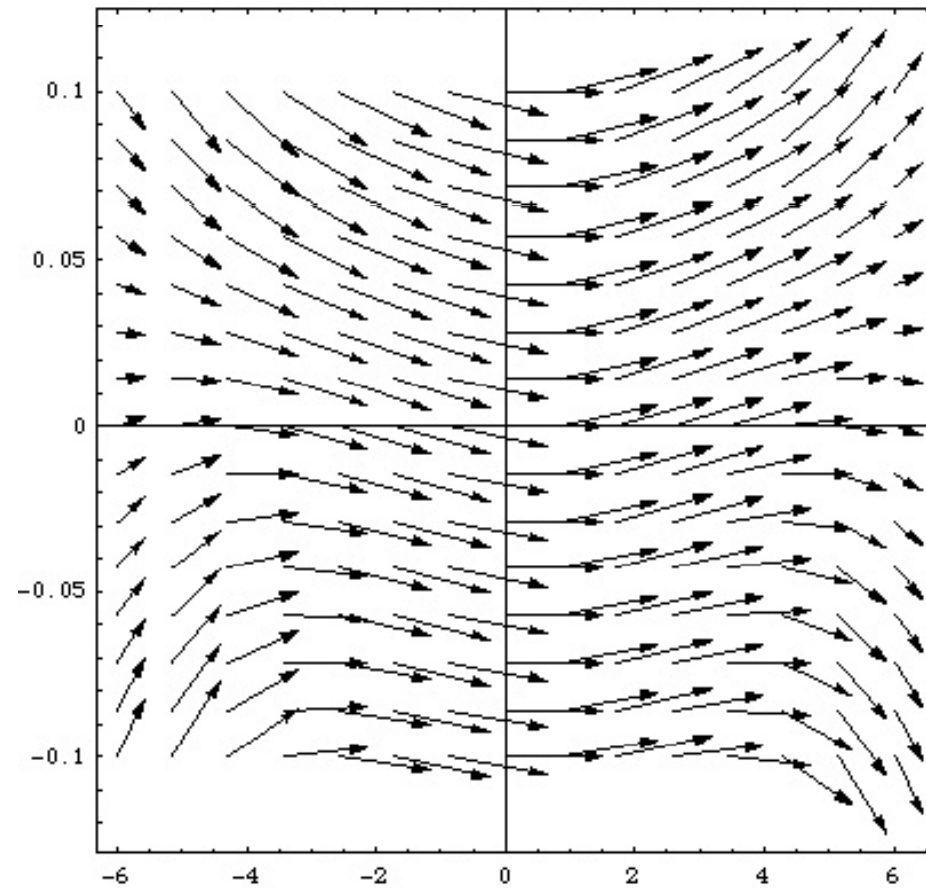
Coil  $r = 2\text{m}$   
 $L/2 = 4.5\text{m}$

Unit = m

The angle is exaggerated.

# Broken Solenoid

## Near beamline



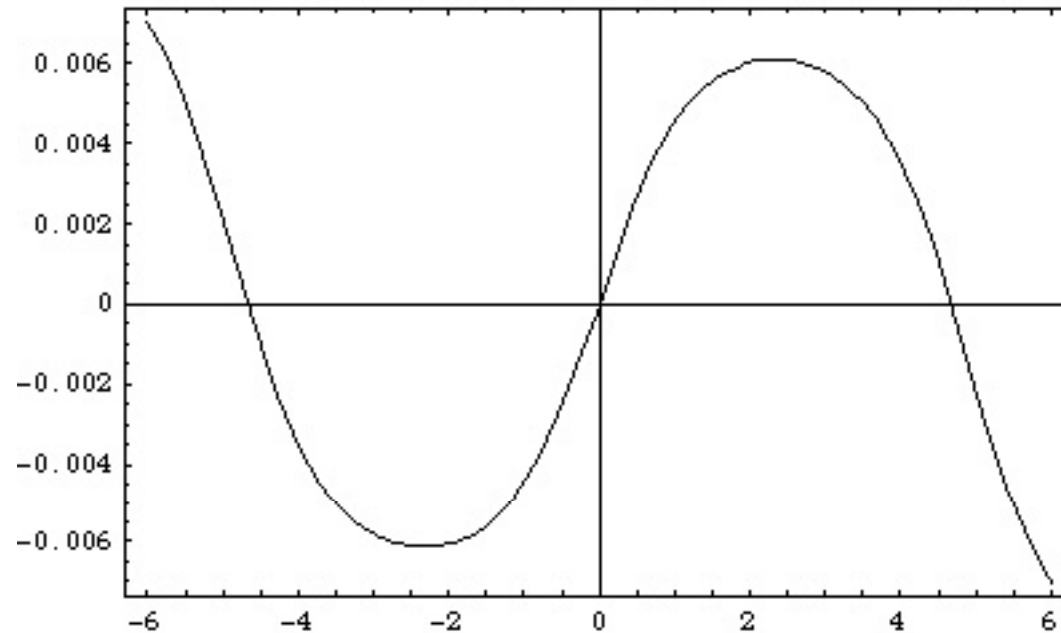
Coil  $r = 2\text{m}$   
 $L/2 = 4.5\text{m}$

Unit = m

Tilt angle = 0.007 rad.

# Broken Solenoid

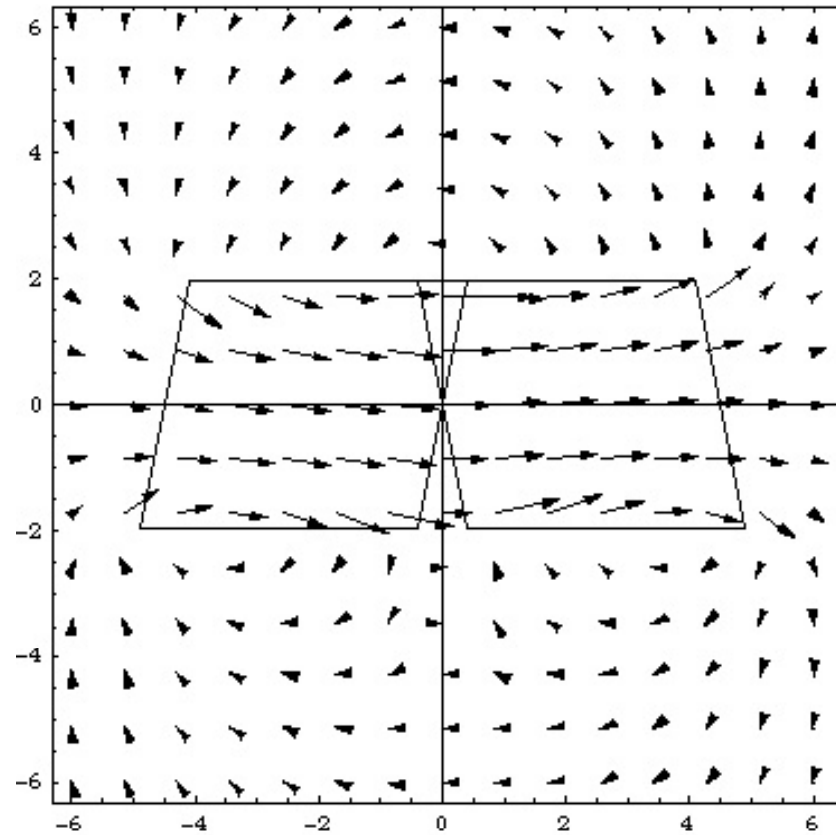
## Angle of B field on beam axis



$L/2 = 4.5\text{m}$

Tilt angle = 0.007 rad.  
Max angle ~ 86% of tilt angle.

# Bookshelf



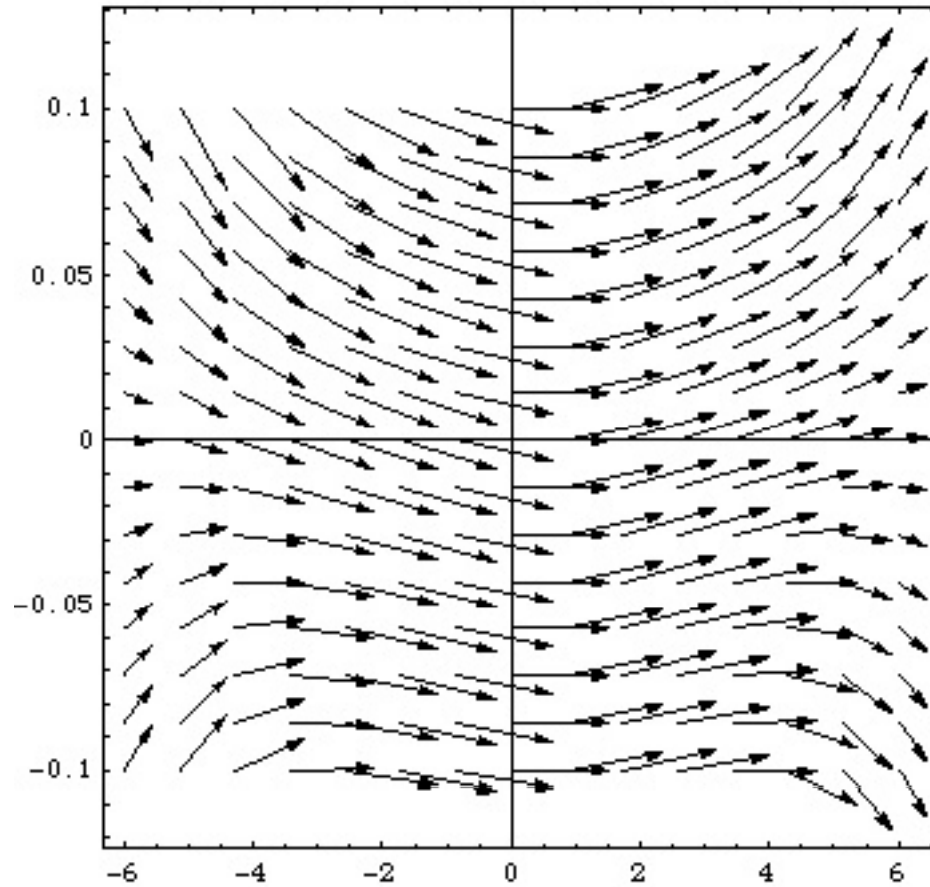
Coil  $r = 2\text{m}$   
 $L/2 = 4.5\text{m}$

Unit = m

The angle is exaggerated.

# Bookshelf

## Near beamline



Coil  $r = 2\text{m}$   
 $L/2 = 4.5\text{m}$

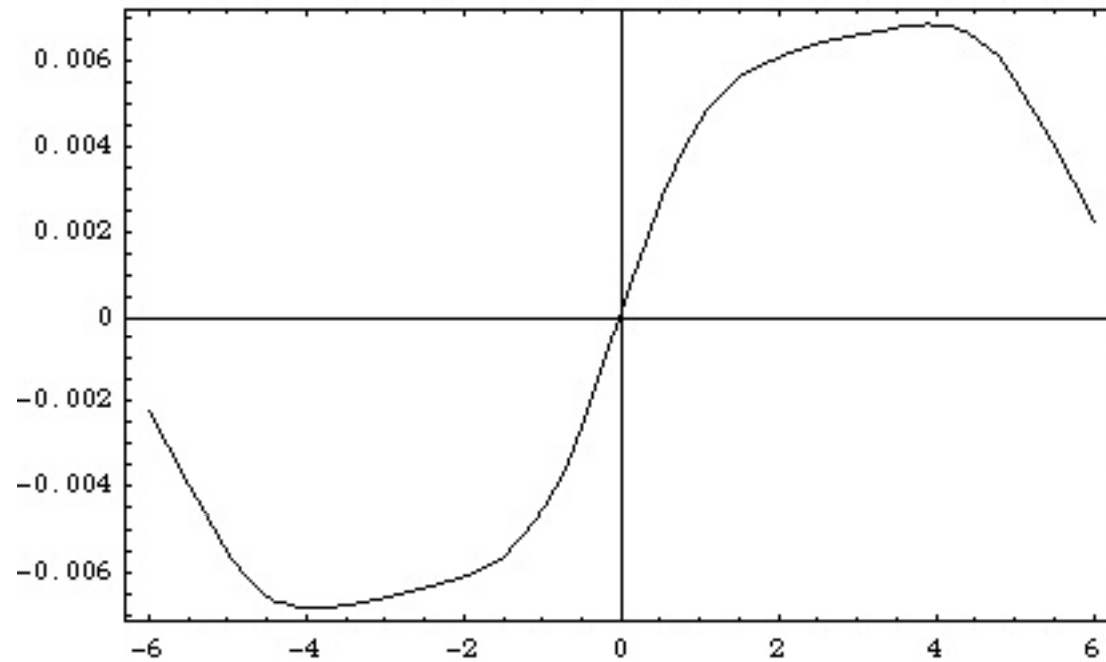
Unit = m

Tilt angle = 0.010 rad.



# Bookshelf

Angle of B field on beam axis

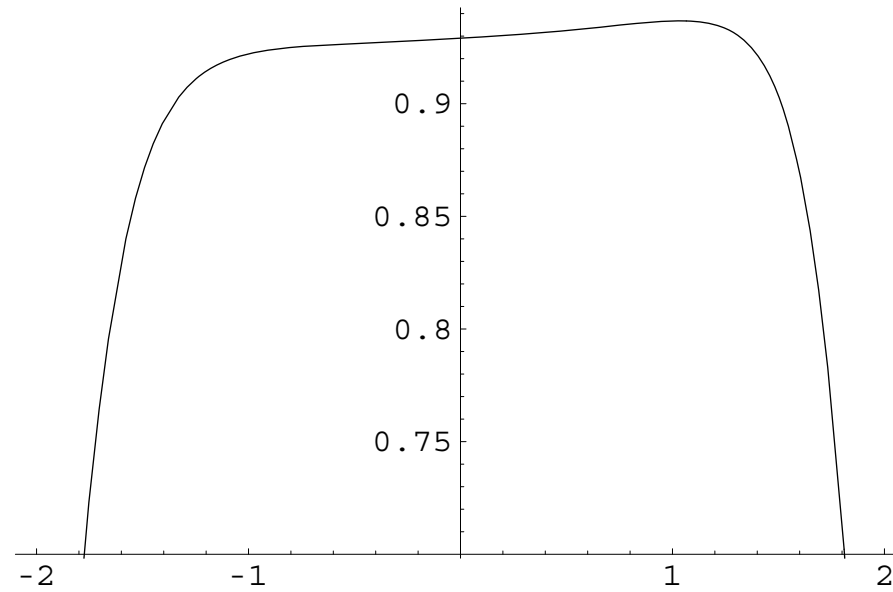


$L/2 = 4.5\text{m}$

Tilt angle = 0.010 rad.  
Max angle ~ 70% of tilt angle.

# Bookshelf

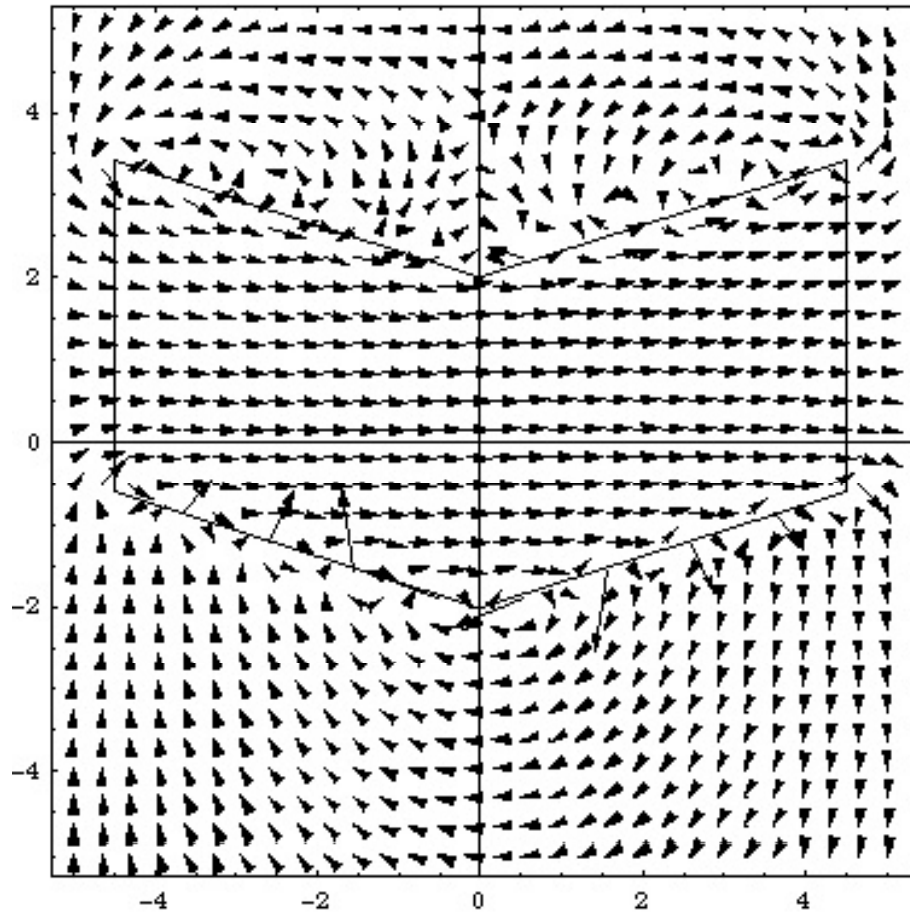
$B_z$  vs  $x$  at  $z=0$



$L/2 = 4.5\text{m}$

Tilt angle = 0.010 rad.  
~1% variation seen.

# Arrow



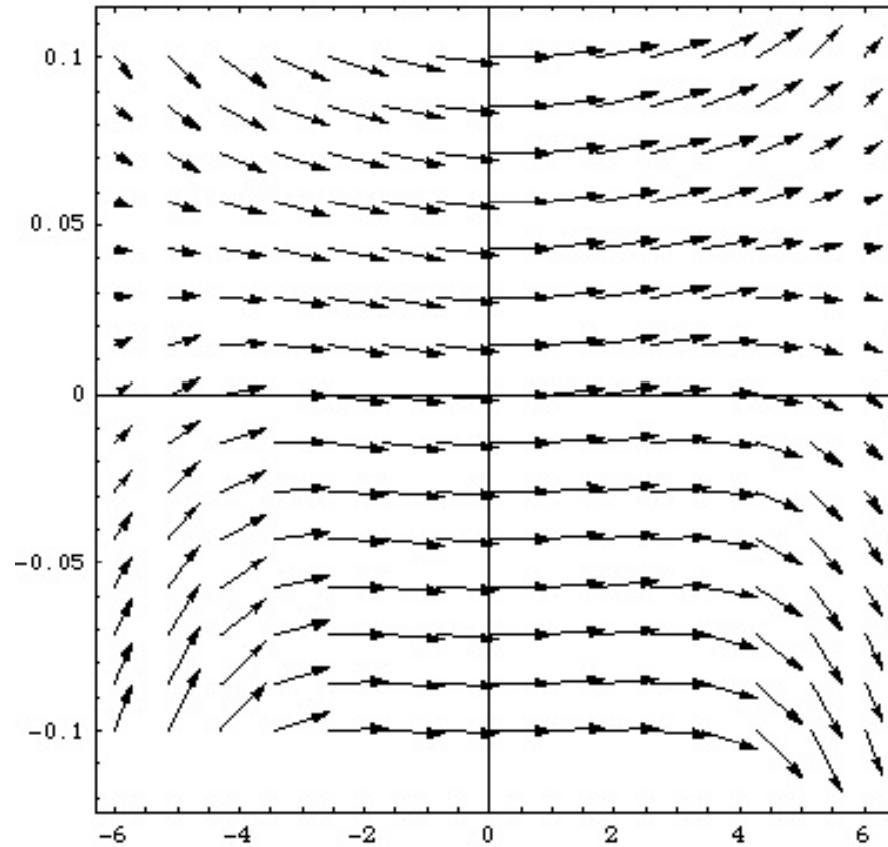
Coil  $r = 2\text{m}$   
 $L/2 = 4.5\text{m}$

Unit = m

The angle is exaggerated.

# Arrow

## Near beamline



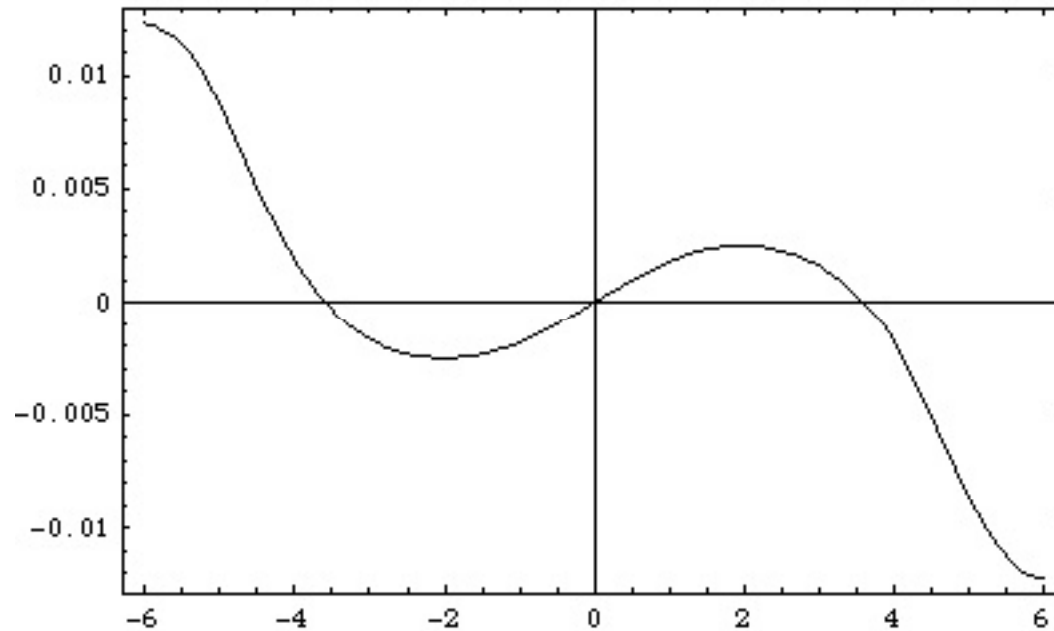
Coil  $r = 2\text{m}$   
 $L/2 = 4.5\text{m}$

Unit = m

Tilt angle = 0.010 rad.

# Arrow

Angle of B field on beam axis



$L/2 = 4.5\text{m}$

Tilt angle = 0.010 rad.  
Max angle ~ 25% of tilt angle.

# Summary

## ◆ Broken solenoid

- Most efficient in tilting the field.
- Maybe possible to adjust the angle later.

## ◆ Bookshelf

- Can use a straight cylinder.
  - Cannot change the angle later.
- Field is tilted by ~70% of the coil tilt.
- Cannot change the angle later.

## ◆ Arrow

- Not an efficient way to tilt the field.
- Cylinder is not straight.

# Questions

- ◆ Forces on the coil?
- ◆ Space for margins?
- ◆ Poletips?
- ◆ How important to have a flat field near the center?
- ◆ Field uniformity (TPC)?