

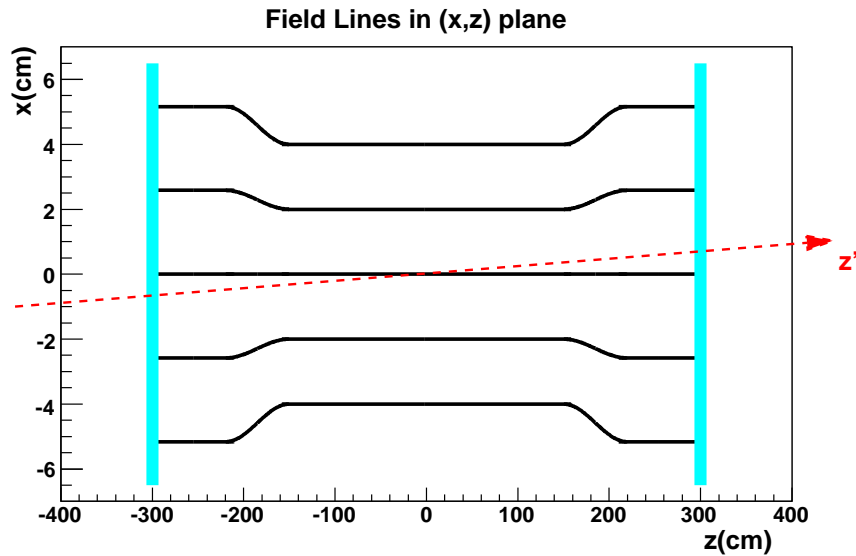
Simple study of UCNA MWPC position with different field configurations

Motivation: Brad observed a linear correlation between the x MWPC right – left and the x position of the Sn source, about 15%. Effects of misaligned field???

Monte Carlo procedure:

- UCNG4 Monte Carlo Code from Junhua
- Compiled against GEANT4.7.0
- Uniformly throwing 364 keV electrons (^{113}Sn source) at $z=0$, but with various x location
- Track electron in the magnetic field
- Record hit location on the left/right MWPC

Field map in the UCN spectrometer



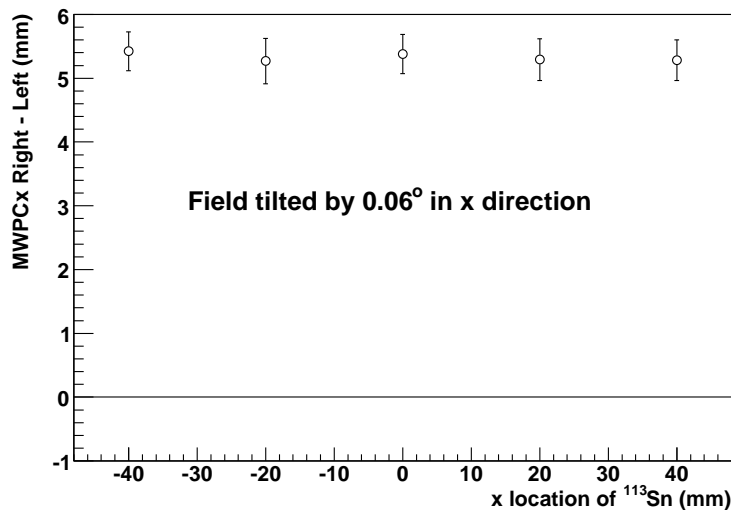
Tilted field is equivalent of a titled axis:

$$x_R = \frac{x_0}{\sqrt{0.6}} + \Delta Z \sin \theta_{tilt}$$

$$x_L = \frac{x_0}{\sqrt{0.6}} - \Delta Z \sin \theta_{tilt}$$

$$\text{So } x_R - x_L = 2 \Delta Z \sin \theta_{tilt}$$

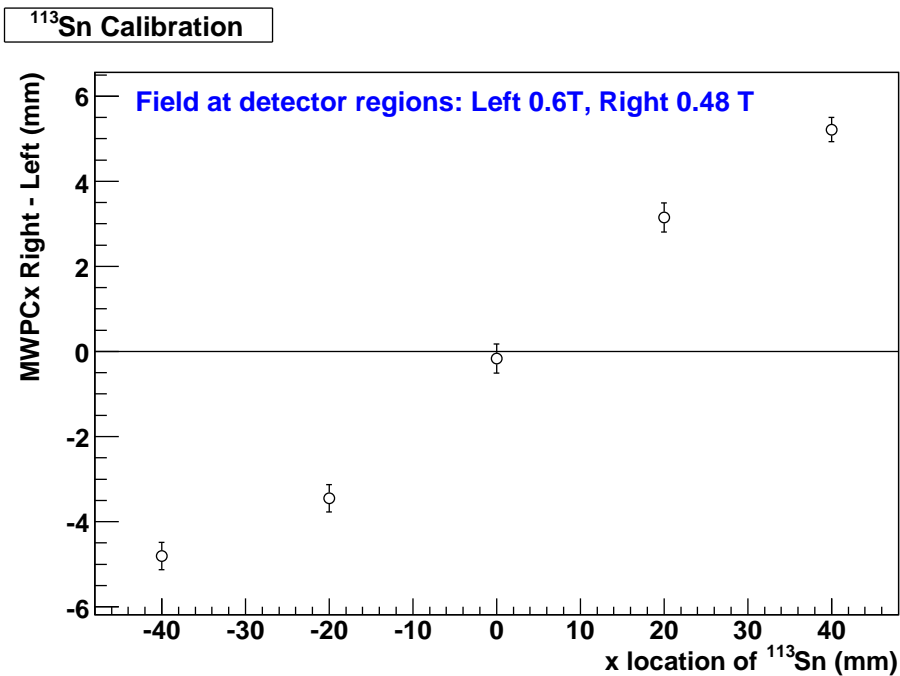
¹¹³Sn Calibration



Just a constant offset,
Independent of x of the
source, **despite the field
expansion region!**

Wild thought, what if the field expansion is asymmetric?

Example: $B = 0.48$ T on the left detector, and 0.6 T on the right detector



MC reproduces the slope in the data.
However ...

- The field had to be VERY asymmetric
- The coils had to be “squashed” on x only, since no such behavior was seen in y