

# Reaction Plane Detector: IR test of PMT's in BField

# Overview

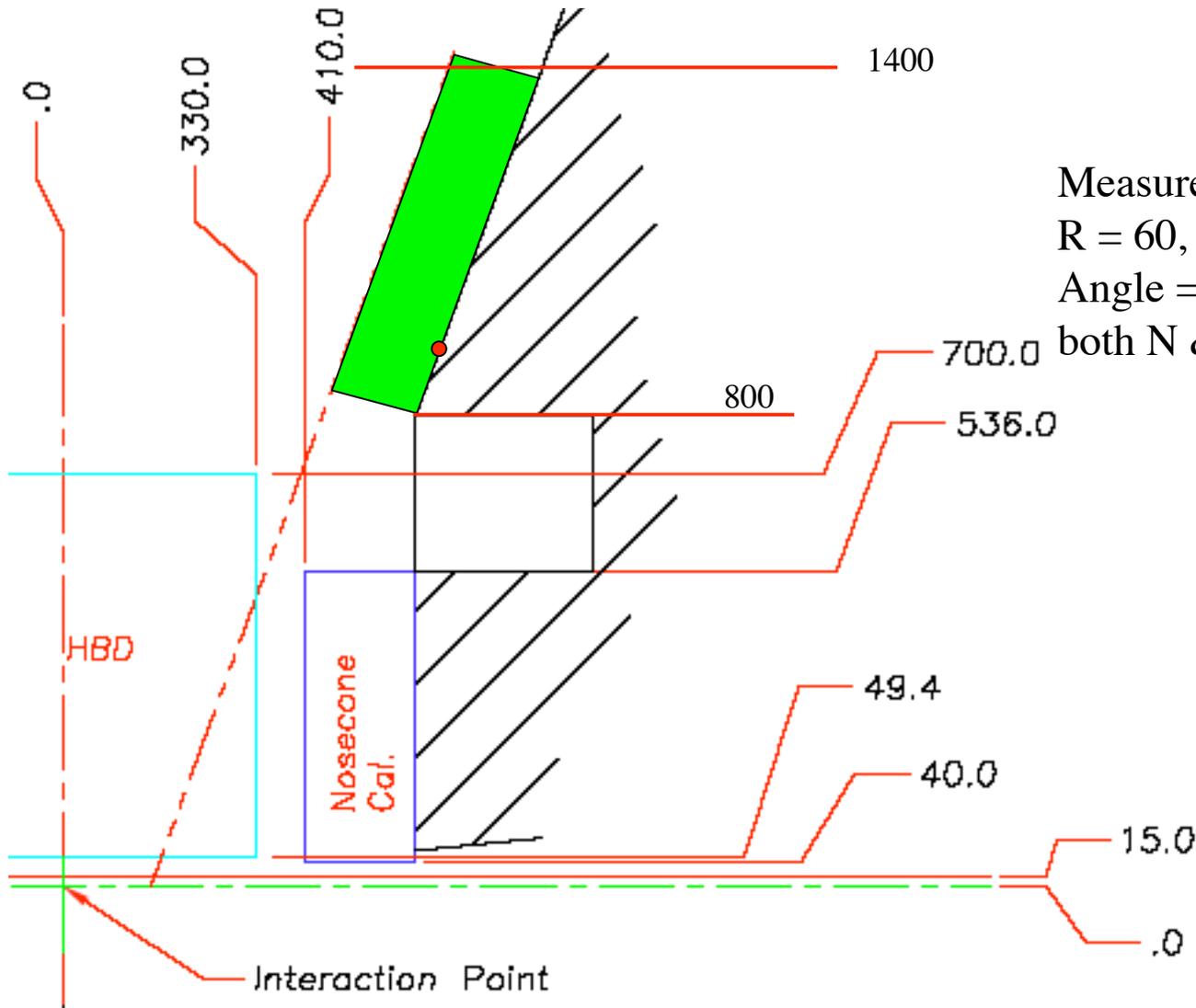
- Pmt response sensitive to orientation wrt magnetic field
- Magnetic field lines near face of nosecone not well mapped
- Need to find optimal position for placement in IR
  - Magnets must be at full field
  - IR must be accessible to move pmts
  - Number of accesses reduced by using multiple pmt's simultaneously, but test stand becomes more complicated
  - Each time the tubes are moved the field will have to be ramped down & up (~15min total)
  - Want to minimize magnet ramping

# Schedule

- Feb 3-7: Shield wall moved in
- Feb 7: Blue ring @ 4K (beam likely)
- Need to be on restricted access to debug system - will depend on MCR's schedule
- Most likely time to fit this in is the weeks of Jan 30 & Feb 6
- It has been explicitly emphasized that we need to minimize the amount of time we are requesting to do this test
  - Must optimize number of positions to be measured
  - Run multiple pmt's simultaneously (14)
  - Will not be able to debug electronics chain - best to use discriminator and scope inside IR

# Test Overview (I)

Green box shows allowed region for pmt's according to +/- field map  
(pmt's need to be a radius greater than the inner coil)

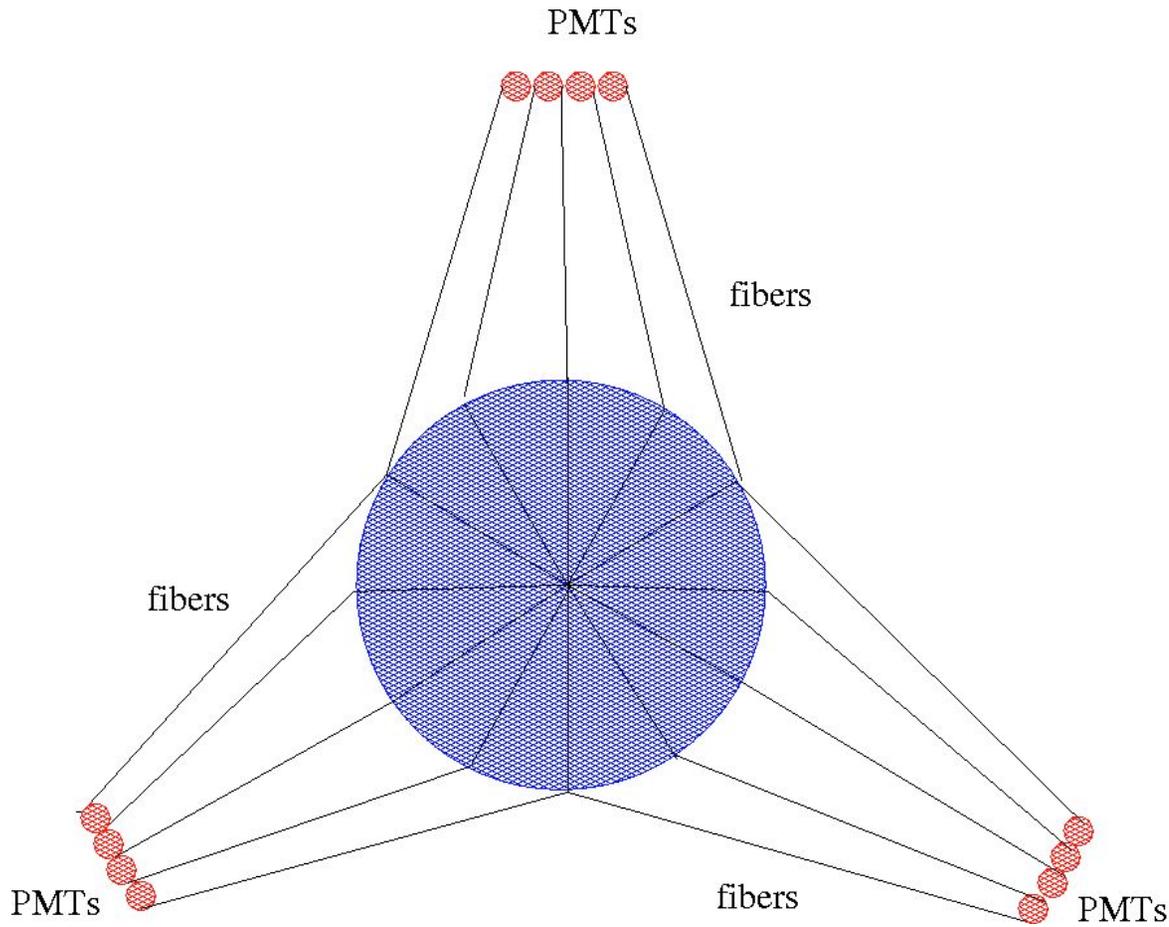


Measure tube performance at  
R = 60, 70, 80, 90, 100, 110, 140 cm  
Angle = || beam, 30deg beam  
both N & S at 3 phi positions



Not a suitable for the final position of PMTs.

Unknown distortion of the field from the coming detectors.



Since fiber is flexible, we can divide 12 PMTs spatially into 3 different groups with 120 degree from each others.

This avoid the distortion region and reduce the number of field tests.

Fibers need to have the same length to have same attenuation of signal.

The second possibility is to group 6 PMTs at each phi position, but fiber will be longer

# One possible scenario

We have 14 PMTs available.

1) Field test will be done in

- PMT parallel and 30 degree from beam pipe.
- 2 arms being tested separately
- ++ and +- field configurations.

2) Each test we test 4 radial locations: 80, 90, 110, 130cm and 3 phi locations

3) PMT can be slide along beam direction from the pole-face to  $|Z|=41$ cm.

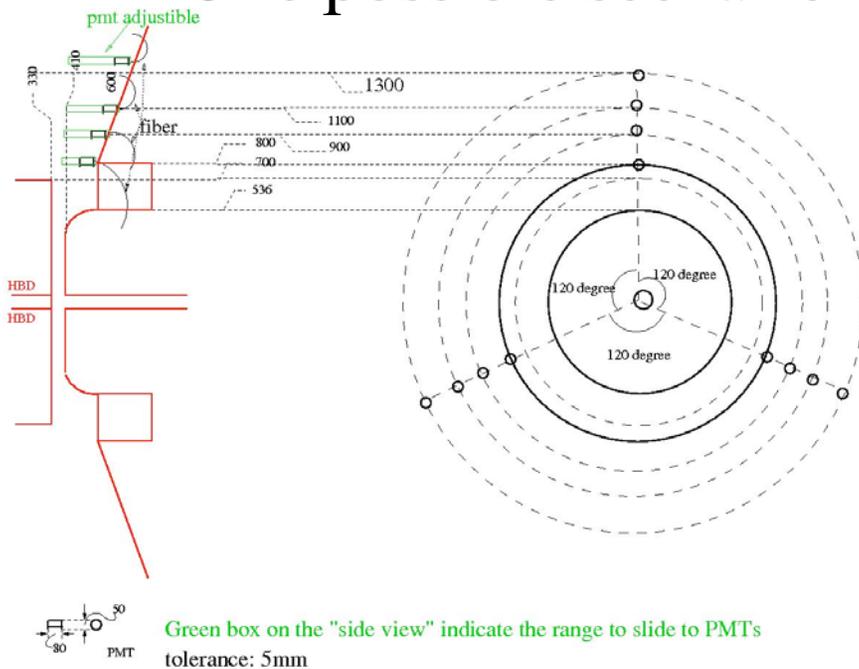
Requires total 8 times of magnet ramps.

Need to decide where to put 12 LEDs

- Need to build a box holding all the 12 LEDs.
- Need to decide where to put the box in the IR.

Need to discuss with Don about details such as mounting structures.

Time scale Jan 30 – Feb 6



Same as above but with PMT rotate 30 degree relative to the beam line

