November 11, 2001
DØNote 3499 2nd extension

Yet Another Update to the DØGStar Geometry Description of the Central Muon Upgrade Detector

H. T. Diehl

Fermi National Accelerator Laboratory

Batavia, IL 60510

1 Introduction, Content, and Summary

This note supplement contains documentation for the recent change correcting errors in the DØ Central Muon Geometry for Run II. Namely, 4 PDT's orientations were incorrectly described[1].

On looking at the data we found that the CFB Bottom PDT's were incorrectly oriented. For instance, the event display of Fig.1 shows a cosmic ray[2]. It entered the detector at the top of the picture leaving a track. It penetrated the side of the calorimeter leaving a nearly continuous trail of hits. Then it hit the bottom A-layer and exited through the bottom B- and C-layers. The B-layer hit would line up better if the chamber was flipped over or rotated.

We checked the physical orientation of PDT 135, the CF Bottom B-layer PDT that is south-west-most. Cell 0 is up, on the north edge of the chamber. The stagger is set so the layer with cell 0 (upper) has its wires in the middle, the middle layer has its wires south-most, and the lower layer has its wires north-most. FEB 1 is on the N cells. PDT 115 has the same orientation. For PDT's 116 and 136, cell 0 is uppermost layer on the south edge. The stagger is set so the layer with cell 0 (upper) has it's wires in the middle, the middle layer has its wires north-most, and the lower layer has its wires south-most. FEB 1 is on the S cells.

We checked that the chambers were constructed consistant with the local chamber geometry [3].

We changed the .tz file so that the CF Bottom B PDT geometry was correct. Also, we readjusted the geometry so CF Bottom B scintillator remained on the undersides. See Fig. 2.

We pulsed all of the PDT's wires and masked off all cells except for cell 0. Only [4] the 4 CFB bottom PDT's had orientation inconsistent with the geometry.

References

[1] H. T. Diehl, "Another Update to the DØGStar Geometry Description of the Central Muon Upgrade Detector", DØNote 3499 extension, July, 1999. B. S. Acharya and H. T. Diehl, "Update to the DØGStar Geometry Description of the Central Muon Upgrade Detector", DØNote 3499, April 1998.

[2] One can see the trail of energy deposition left by the muon as it proceeds through the side of the calorimeter, offset from the center. A muon going out through the center of the detector hits typically 4 hadronic layers.

[3] H. Johari et al., "Muon Chamber Alignment", DØNote 2279, Sept. 1994. The local coordinates for Run I were as follows. Orient yourself so the you are standing in front of the end of the chamber with the electronics up in front of you. The coordinate system has $\hat{x}$ up, $\hat{y}$ to the right, and $\hat{z}$ away, along the wires. The origin is at the bottom left (wire?) of the PDT. Cell 0 is topmost layer on the left.

[4] Note that until November, 2001 PDT 011 had FEB 1 plugged into FEB 4 slot in the Control Board and vice-versa. This mixed up the hits from those channels.

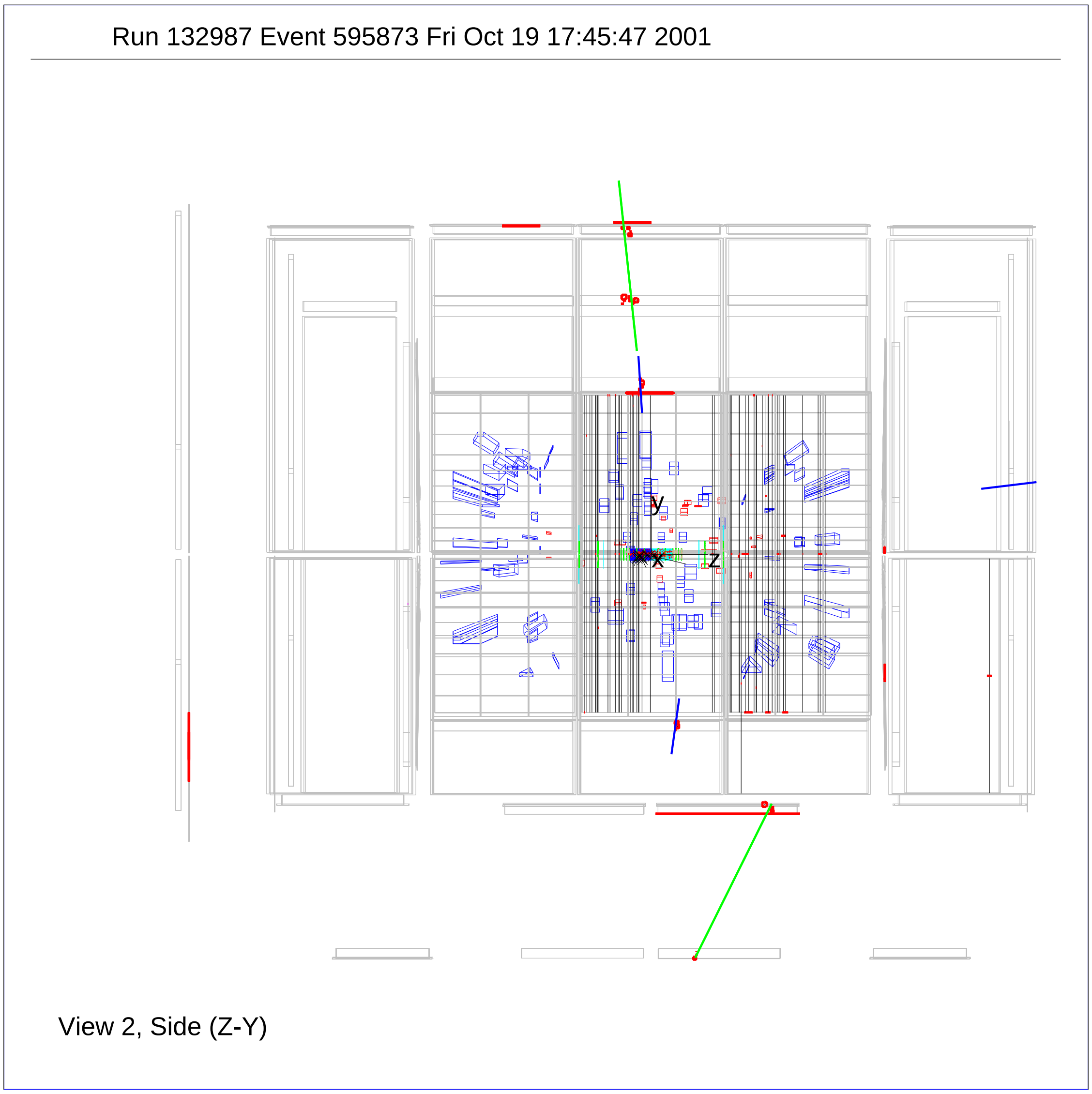

Figure 1: Side view of the DØ detector showing a cosmic ray muon. It entered the detector at the top of the picture leaving a track. It penetrated the side of the calorimeter leaving a nearly continuous trail of hits. Then it hit the bottom A-layer and exited through the bottom B- and C-layers. The B-layer hit would line up better if the chamber was flipped over or rotated. It turned out that the PDT was upside down relative to the geometry.

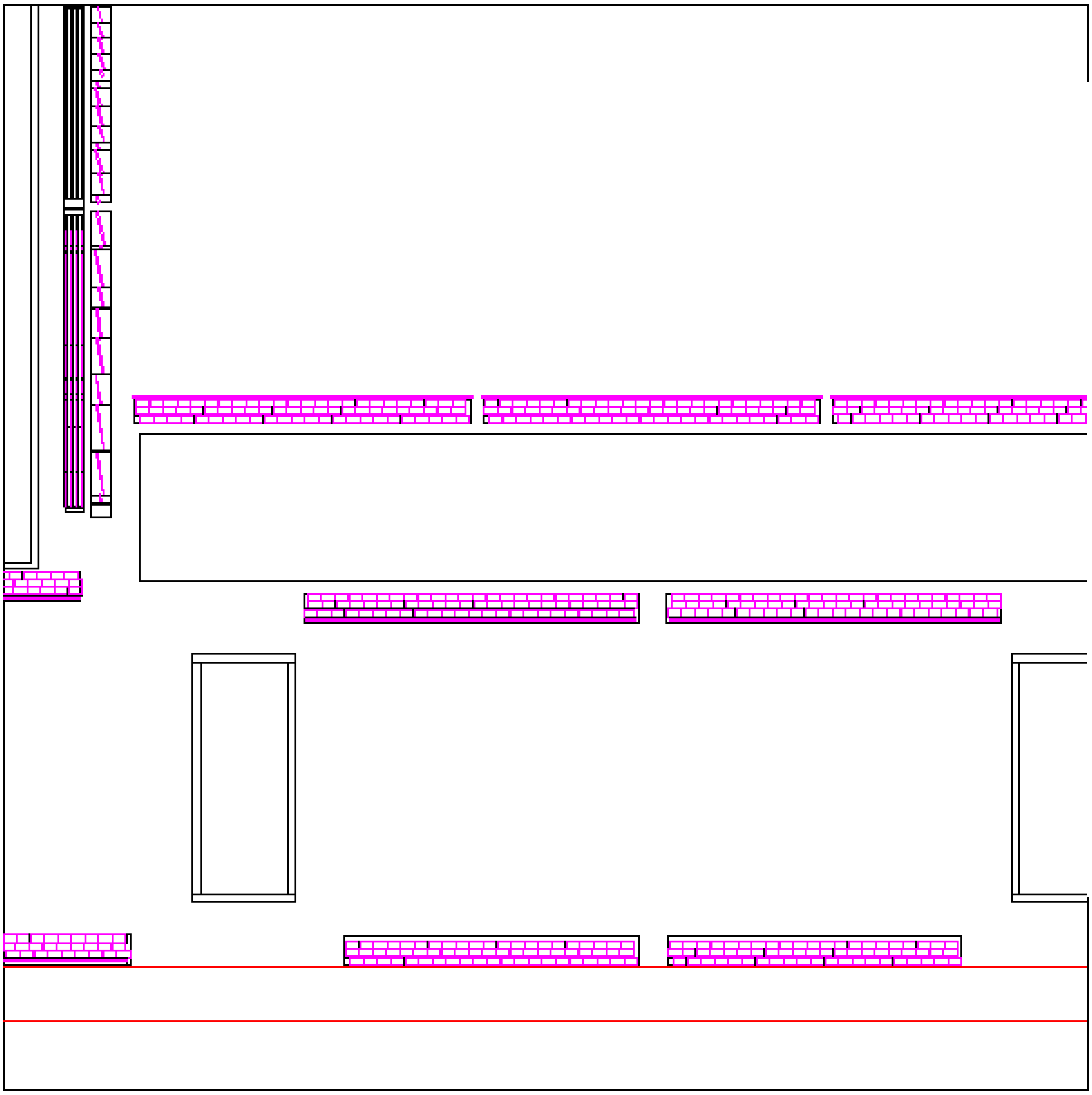

Figure 2: Side view of the DØ detector showing detail of CFB Bottom PDT's 115 (left) and 135 (right) looking east from the west side of the detector. Note the scintillators are underneath. This is after the geometry correction.