**Fringe Fields in a Phototube Region
of the Rosie Magnet**

Bob Wands

<u>Introduction and Summary</u>

Phototubes will be mounted approximately 4 meters from the centerline of the Rosie magnet, near the face of the 72 inch diameter pipe. The purpose of this analysis is to determine the fringe fields at this location.

Fig. 1 shows the Rosie magnet and pipe. Fig. 2 shows the location of the region of interest relative to the magnet centerline.

Fringe fields are given in the plots of Figs. 3-11 for x-slices of 0.1 meters (The positive x-direction is into the paper). Units are gauss.

The plots show that the 72 inch pipe greatly influences the field (the plotted region extends in Z exactly to the front face of this pipe, as shown in Fig. 2), with fields in this region reaching up to 70 gauss. Away from the pipe, fields drop as low as about 20 gauss.

These fields are low enough to further reduce with mu-metal shielding. When the precise phototube locations and volume available for shielding are determined, further analysis can be done.
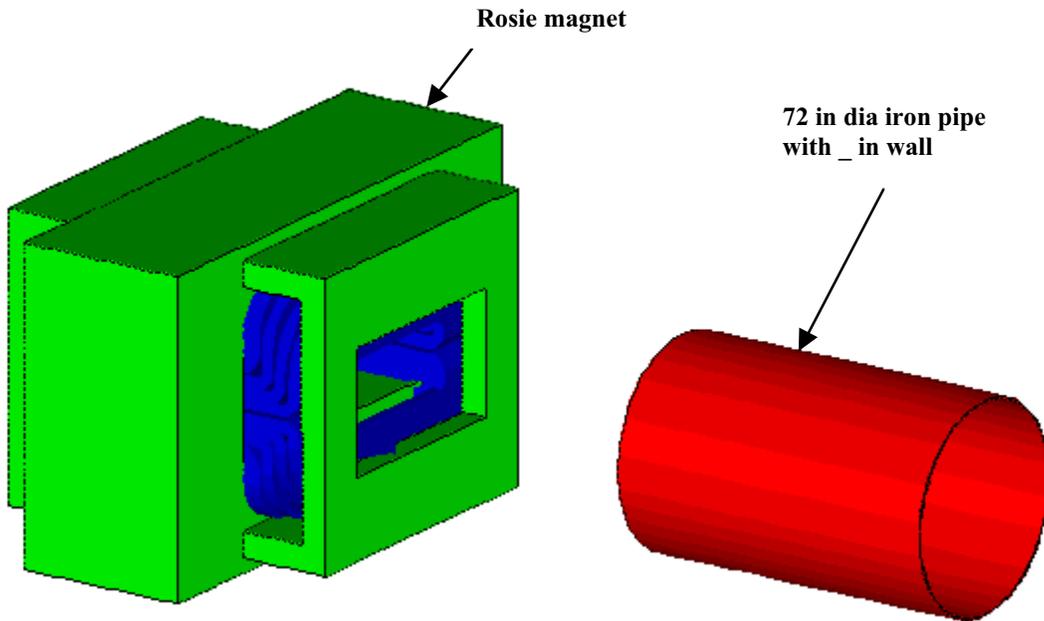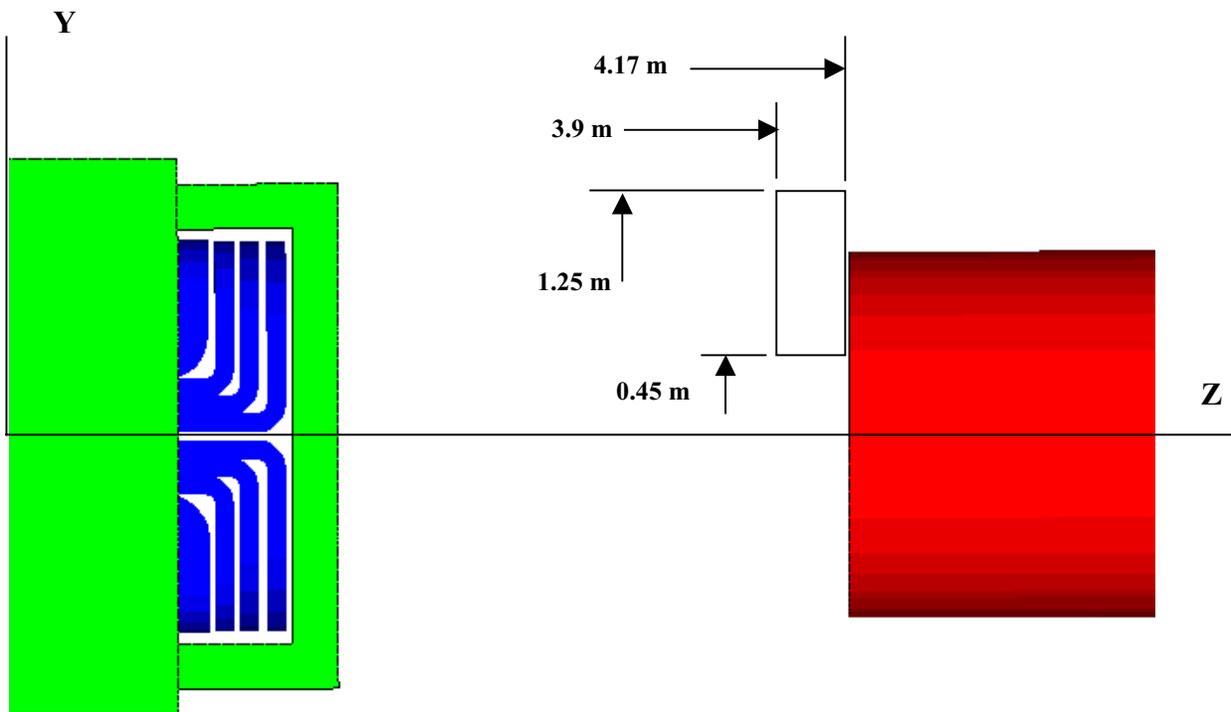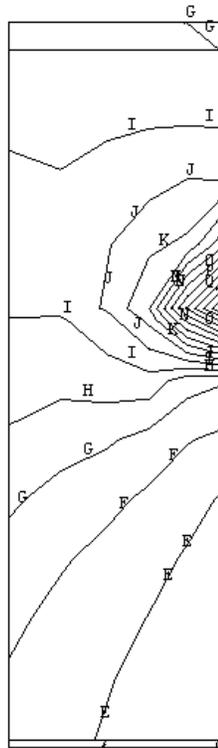
Rosie magnet

72 in dia iron pipe
with _ in wall

Figure 1. Rosie Magnet and Pipe

Y

4.17 m

3.9 m

1.25 m

0.45 m

Z

Figure 2. Location of Phototube Region

x = .1

Figure 3. Fringe Fields in Plane X = .1 m
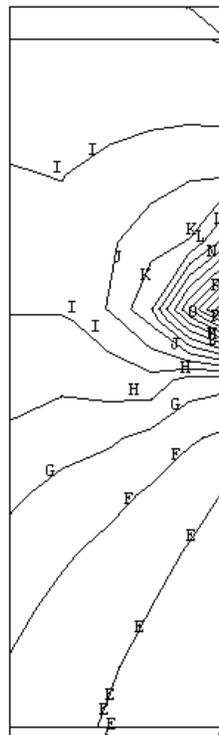
x = .2

Figure 4. Fringe Fields in Plane X = .2 m
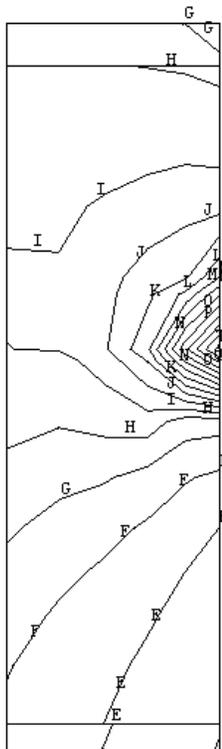
3

x = 0.3

Figure 5. Fringe Fields in Plane X = .3 m

x = 0.4

Figure 6. Fringe Fields in Plane X = .4 m

4

x = 0.5

Figure 7. Fringe Fields in Plane X = .5 m
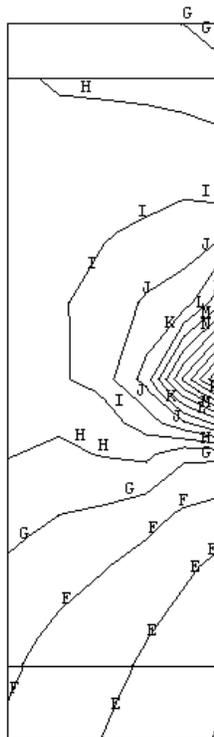
x = 0.6

Figure 8. Fringe Fields in Plane X = .6 m

ANSYS 5.7
JAN 18 2002
09:25:39
NODAL SOLUTION
STEP=2
SUB =1
TIME=2
BSUM   (AVG)
SMN =9.094
SMX =73.869
A   =0
B   =3.684
C   =7.368
D   =11.053
E   =14.737
F   =18.421
G   =22.105
H   =25.789
I   =29.474
J   =33.158
K   =36.842
L   =40.526
M   =44.211
N   =47.895
O   =51.579
P   =55.263
Q   =58.947
R   =62.632
S   =66.316
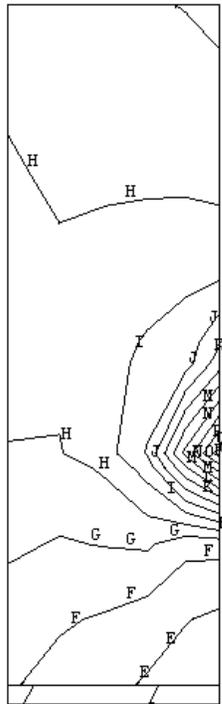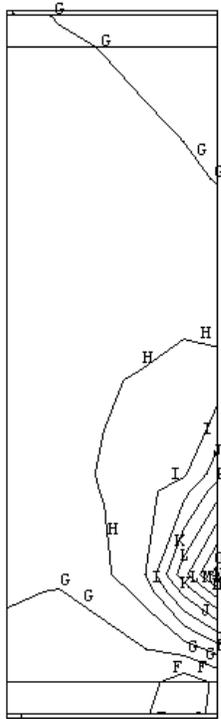T   =70

x = 0.7

Figure 9. Fringe Fields in Plane X = .7 m

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JAN 18 2002
09:26:20
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SUB =1
TIME=2
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SMX =73.869
A   =0
B   =3.684
C   =7.368
D   =11.053
E   =14.737
F   =18.421
G   =22.105
H   =25.789
I   =29.474
J   =33.158
K   =36.842
L   =40.526
M   =44.211
N   =47.895
O   =51.579
P   =55.263
Q   =58.947
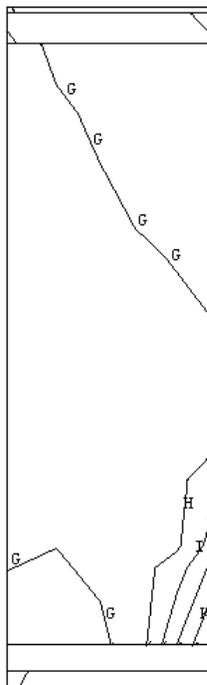R   =62.632
S   =66.316
T   =70

x = 0.8

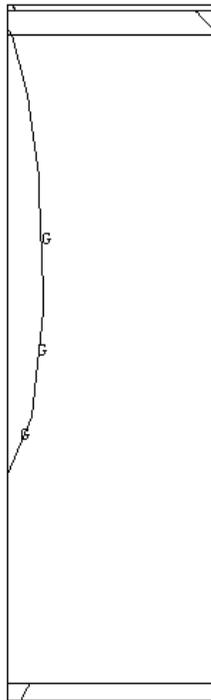**Figure 10. Fringe Fields in Plane X = .8 m**

6

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ANSYS 5.7
JAN 18 2002
09:26:38
NODAL SOLUTION
STEP=2
SUB =1
TIME=2
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SMX =73.869
A    =0
B    =3.684
C    =7.368
D    =11.053
E    =14.737
F    =18.421
G    =22.105
H    =25.789
I    =29.474
J    =33.158
K    =36.842
L    =40.526
M    =44.211
N    =47.895
O    =51.579
P    =55.263
Q    =58.947
R    =62.632
S    =66.316
T    =70
```

x = 0.9

Figure 11.

7