Where I am:

-to be able to use the NaI as a means of calibrating the high energy sources, I need to show that calculated tables for efficiency (either Marion and Young or GEANT) in fact agree for a known source

The Previous Stumbling Point:

-solve the rate vs. distance problem of the NaI crystal
    -seems okay now

Complete:

1) Check GEANT efficiency vs. Marion and Young Tables

2) Check both GEANT and Marion and Young vs. a known Cesium-137 source of calibrated accuracy 3.7%

3) Observe the dependence of Aluminum casing in the detector

To Do Next:

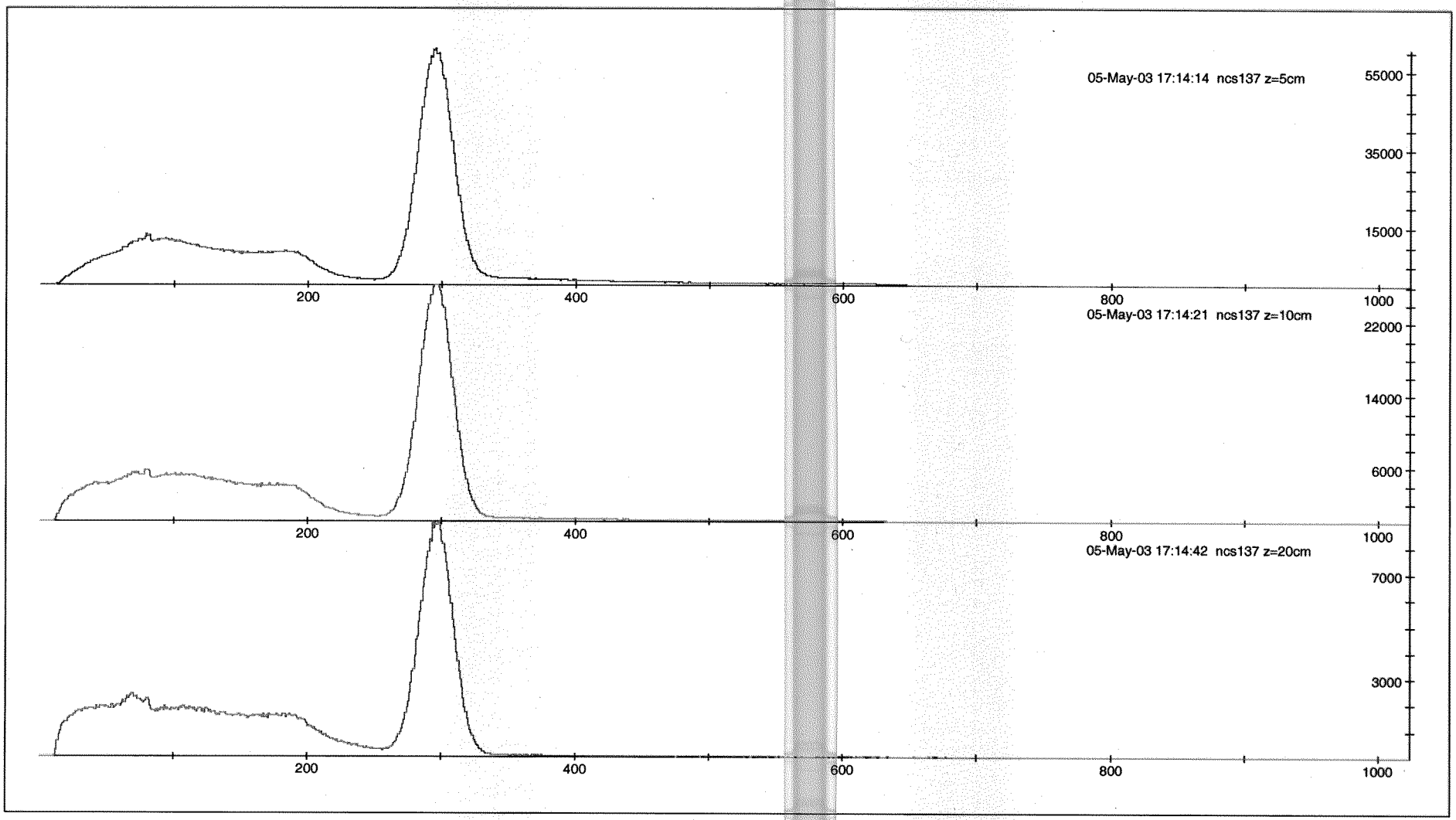
1) Study the "edge effects" of the crystal.
    -are they significant
    -does GEANT model them accurately

2) Approximate the size of the NaI crystals by observing a change in rate while moving a fan source over a crystal

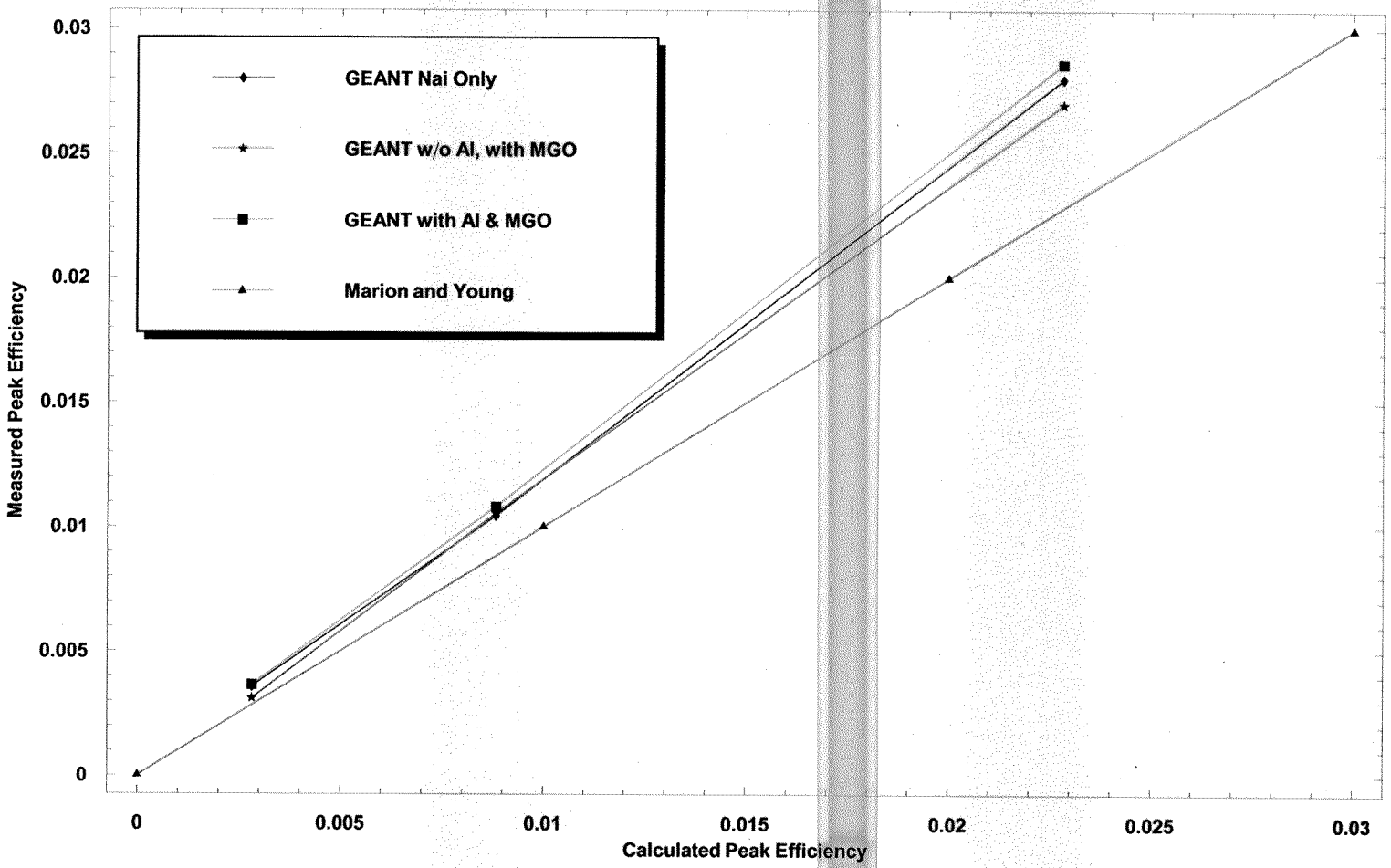
3) Add resolution effects to the simulation
    -is this a large factor
    -significant because measured points are a peak fit with a background subtraction

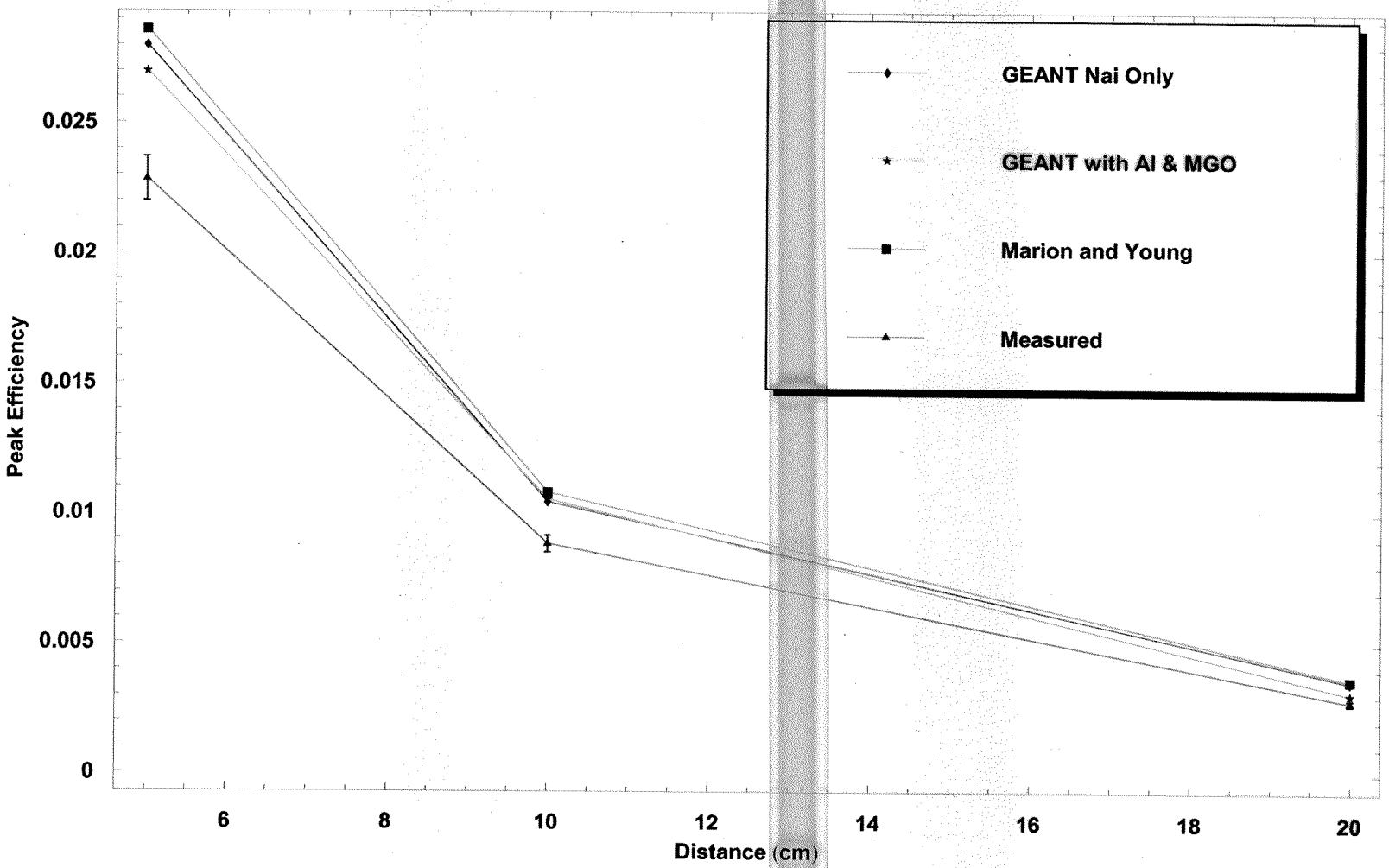
4) Go back and recheck the other NaI crystal to see if in fact it shows a difference compared to this one

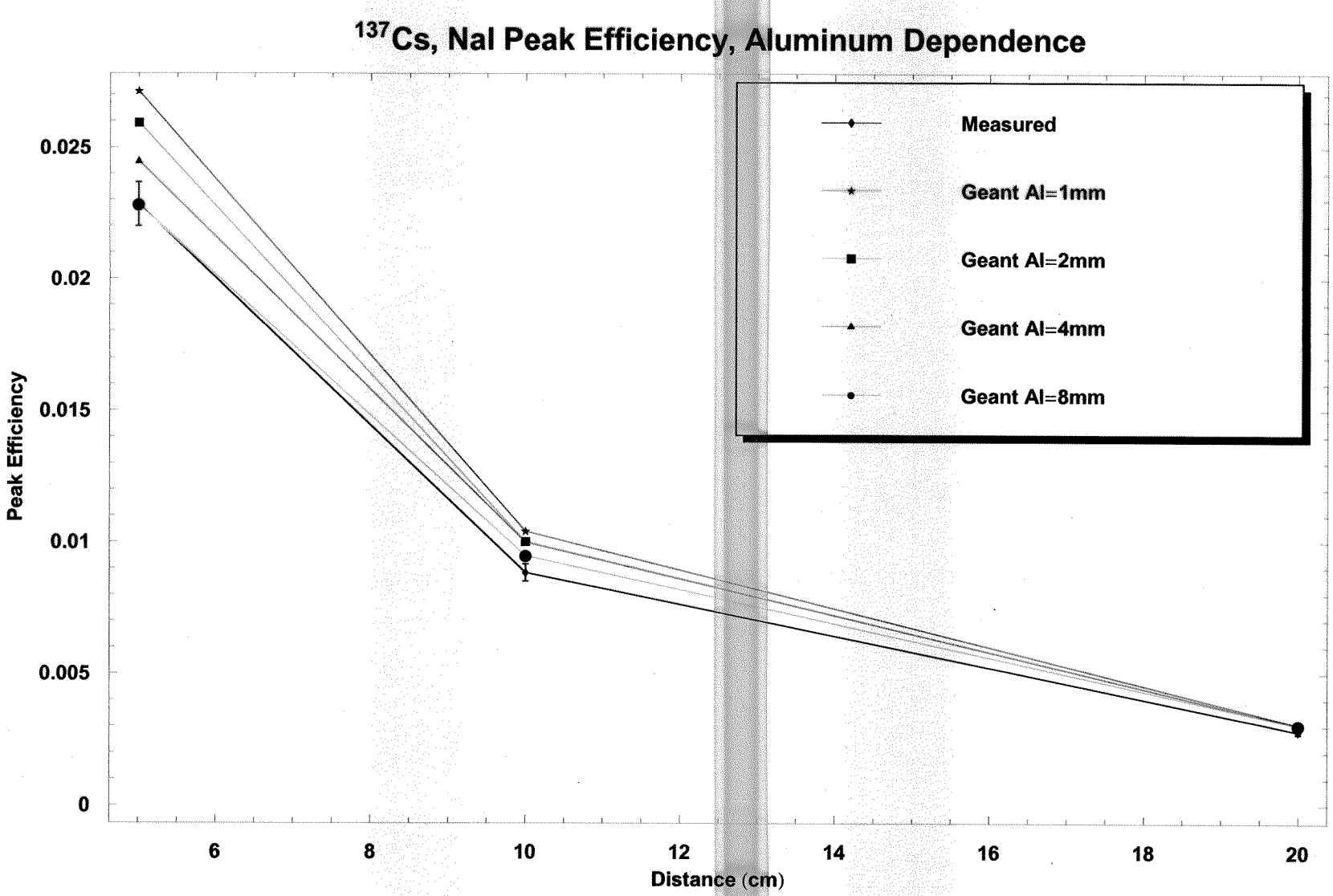
^{137}Cs source, NaI detector, $z = 5, 10, 20$



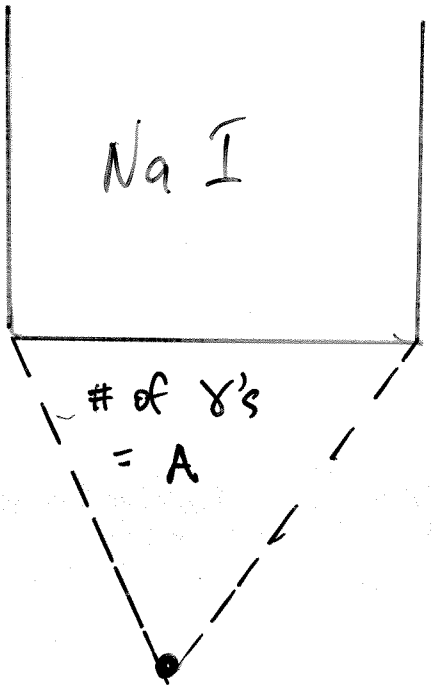
^{137}Cs, NaI Peak Efficiency, Deviation from Agreement

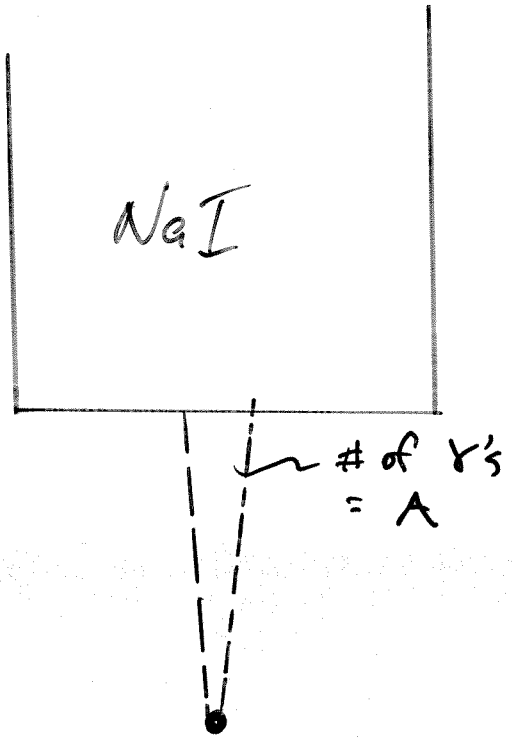



137Cs, NaI Peak Efficiency, Comparison of Calculated to Measured
GEANT Nai Only
GEANT with Al & MGO
Marion and Young
Measured
Peak Efficiency
0.025
0.02
0.015
0.01
0.005
0
6
8
10
12
14
16
18
20
Distance (cm)

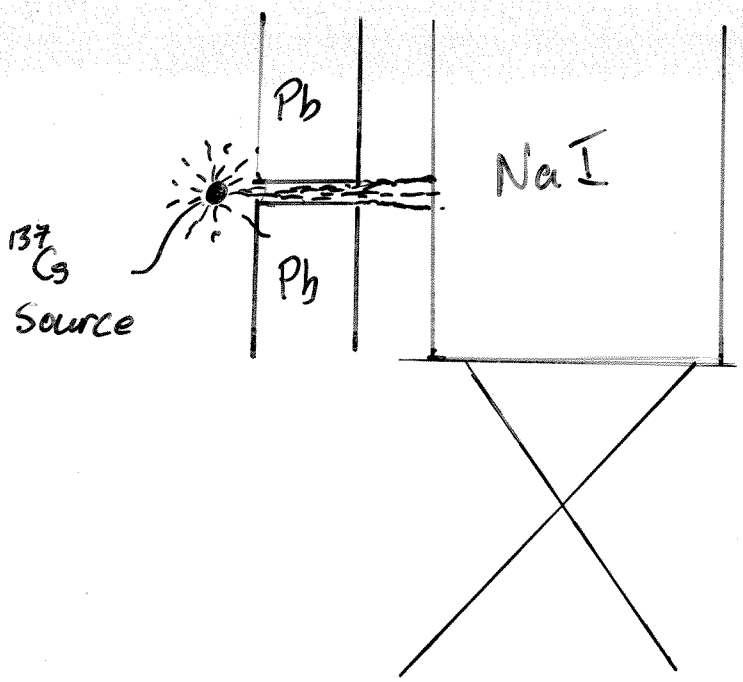

^{137}Cs, NaI Peak Efficiency, Aluminum Dependence
Peak Efficiency
0.025
0.02
0.015
0.01
0.005
0
6
8
10
12
14
16
18
20
Distance (cm)
Measured
Geant Al=1mm
Geant Al=2mm
Geant Al=4mm
Geant Al=8mm

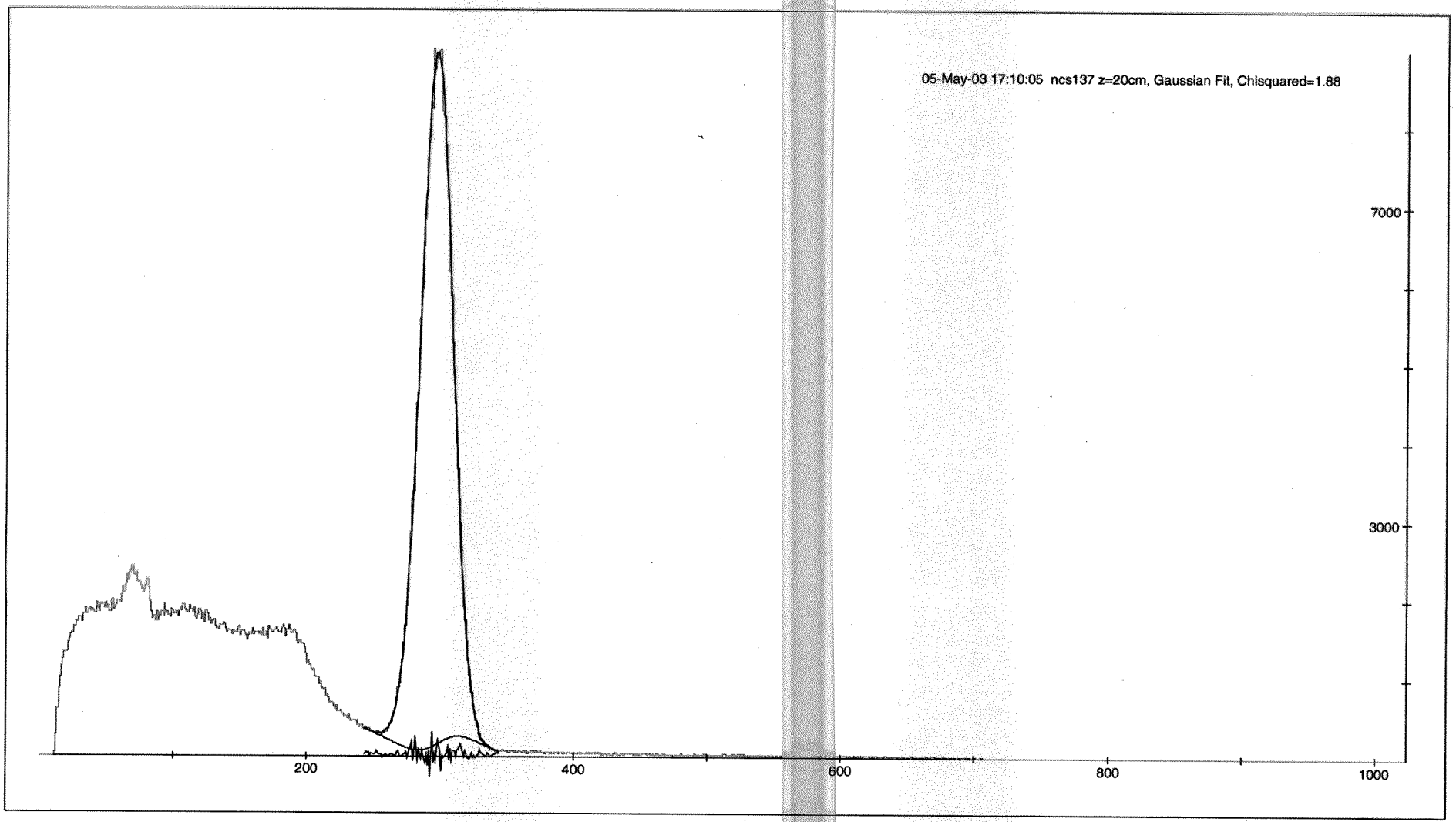
Edge Effects

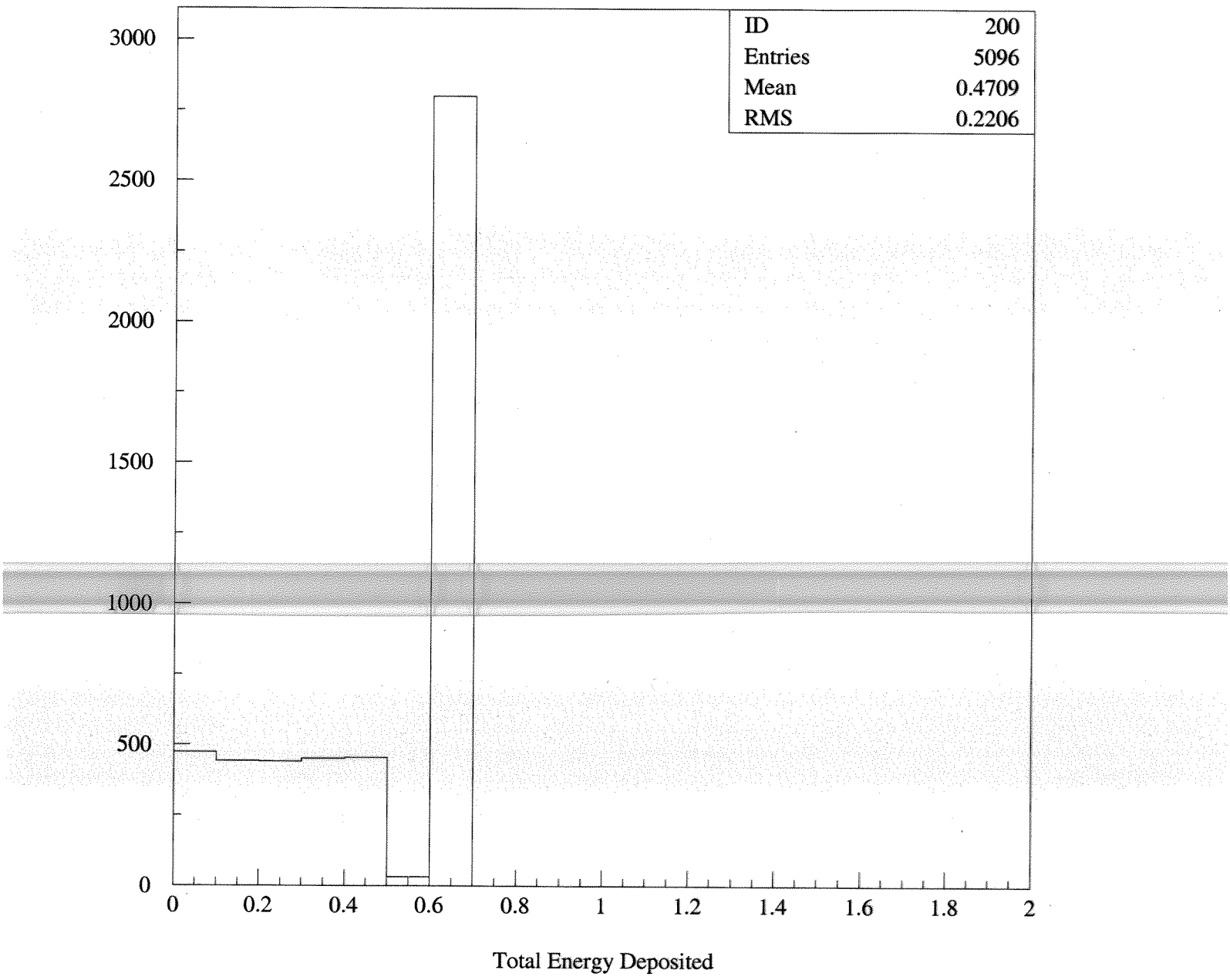




Measure Size of Crystal




05-May-03 17:10:05 ncs137 z=20cm, Gaussian Fit, Chisquared=1.88
7000
3000
200
400
600
800
1000


ID 200
Entries 5096
Mean 0.4709
RMS 0.2206
3000
2500
2000
1500
1000
500
0
0 0.2 0.4 0.6 0.8 1 1.2 1.4 1.6 1.8 2
Total Energy Deposited