Beam background in the fDiRC: Refined

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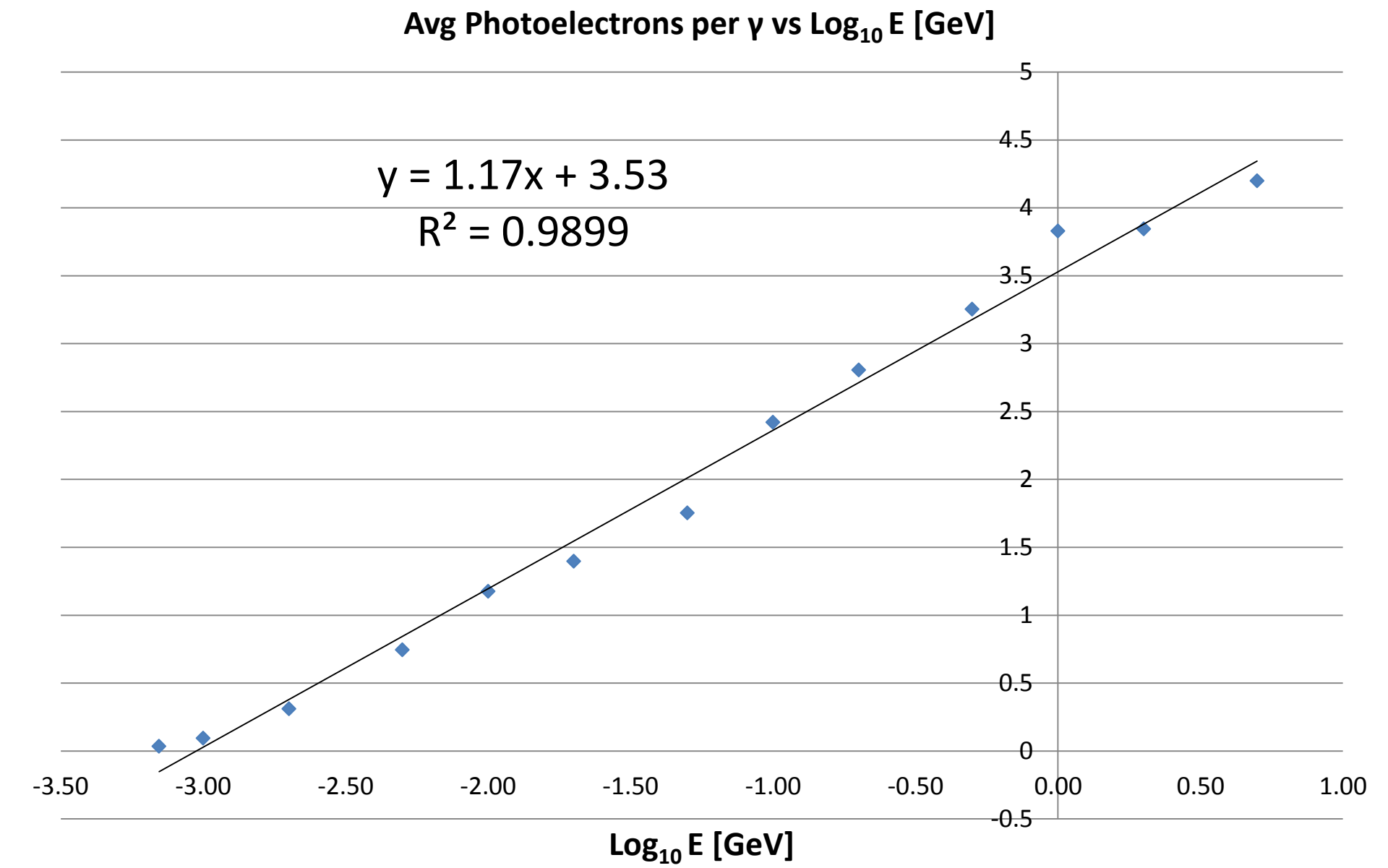
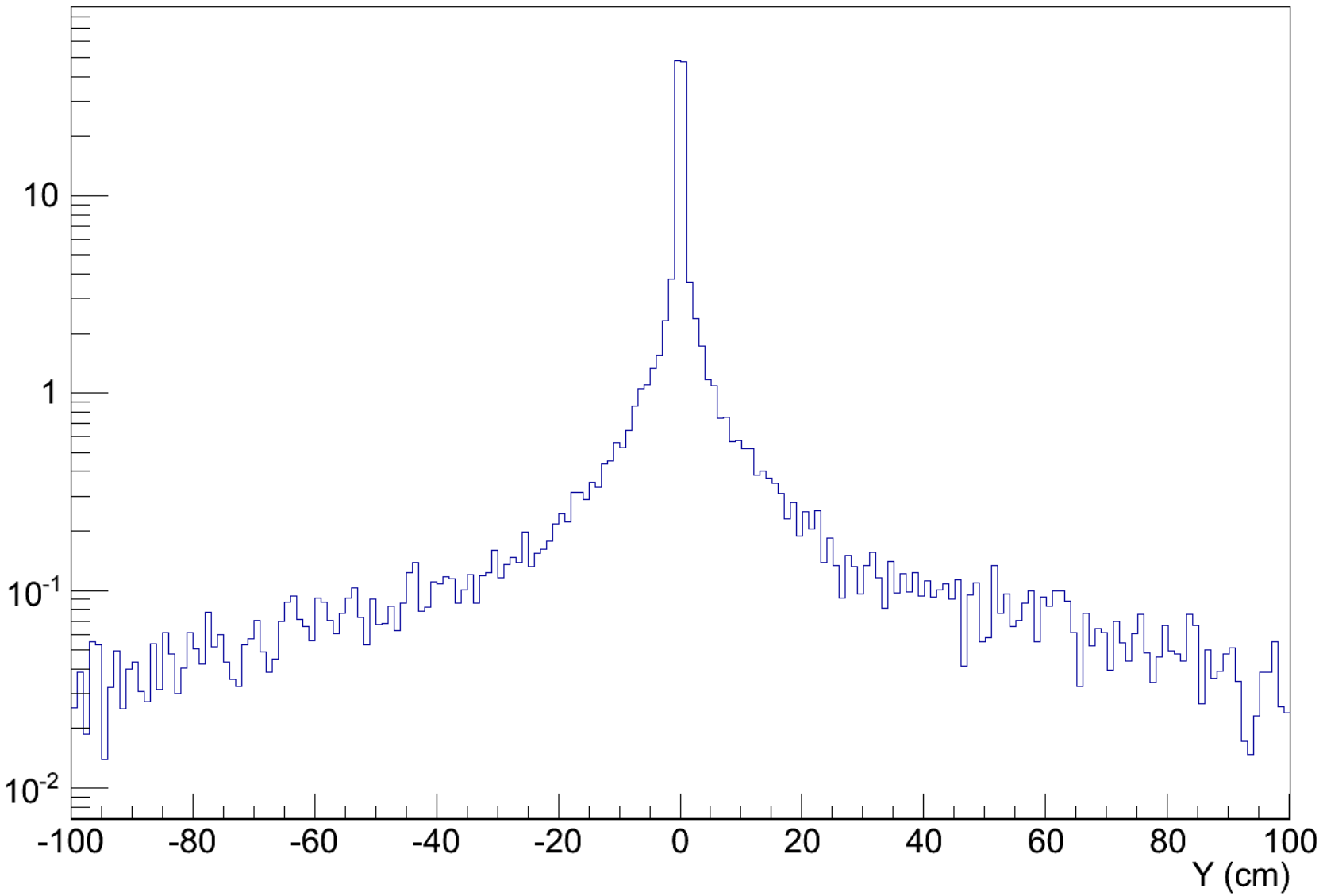
New Formula

- Placed bars at 600 in detector coordinates
- Based on Yi's data, gamma ray photoelectron yield was fitted logarithmically (next slide)
- Assumed electron photoelectron yield was proportional to the below with a max at 25
  - Still neglects angular effects

$$1 - \frac{1}{\beta^2 n^2} = 1 - \frac{\gamma^2}{n^2(\gamma^2 - 1)}$$


Avg Photoelectrons per γ vs Log10 E [GeV]
y = 1.17x + 3.53
R² = 0.9899
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
-0.5
-3.50
-3.00
-2.50
-2.00
-1.50
-1.00
-0.50
0.00
0.50
1.00
Log10 E [GeV]


DiRC Photoelectrons (using curves) in 100ns (1/cm)
10
1
10^-1
10^-2
-100
-80
-60
-40
-20
0
20
40
60
80
100
Y (cm)

Integration

- All, excluding, +- 15cm, results in 16.9 photoelectrons per 100ns
- The box closest to the beamline (15cm-58cm) averaged 5.9 per 100ns (2.9 per 50 ns)
  - Comparable to Yi's calculation of 2.5 per 50ns
  - Error could come from overestimating electron yield due to ignoring angular loses