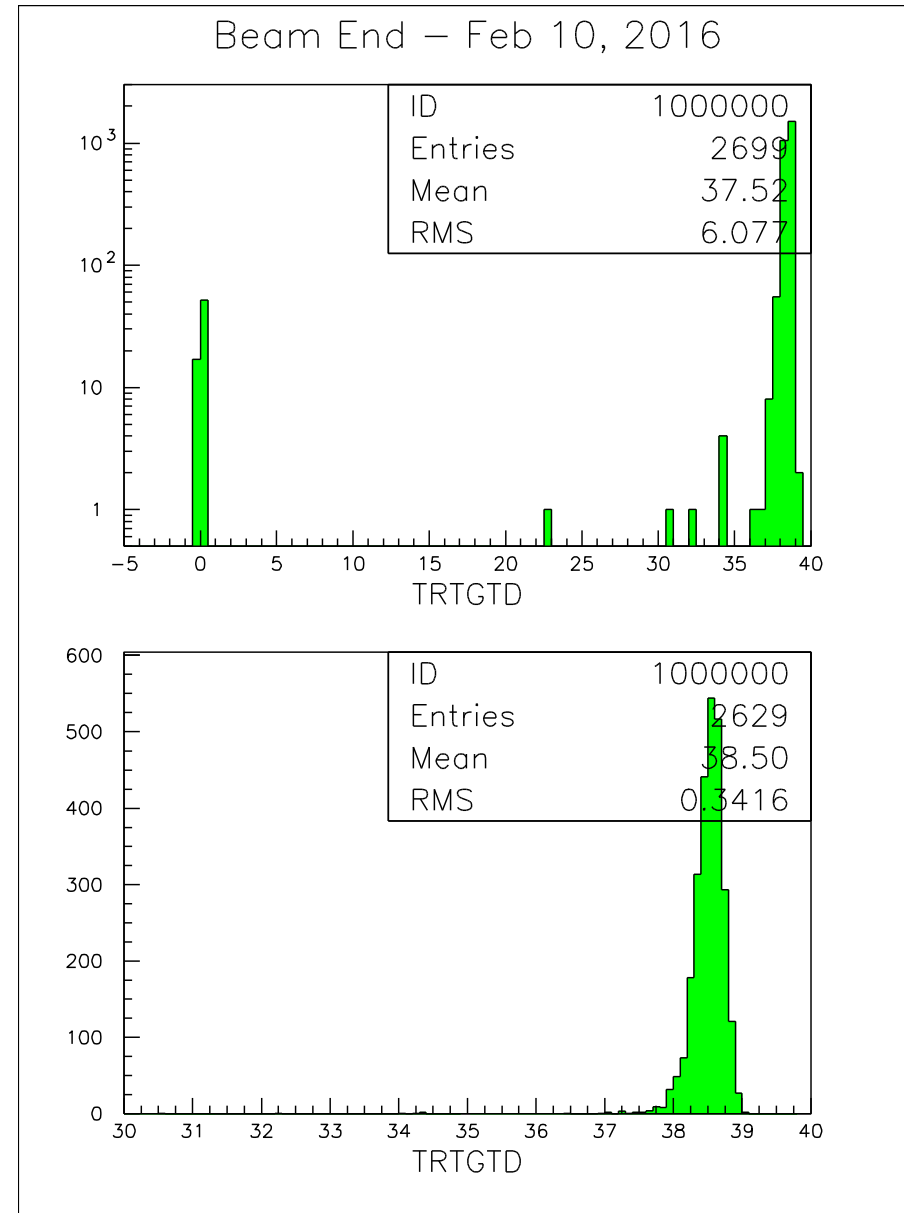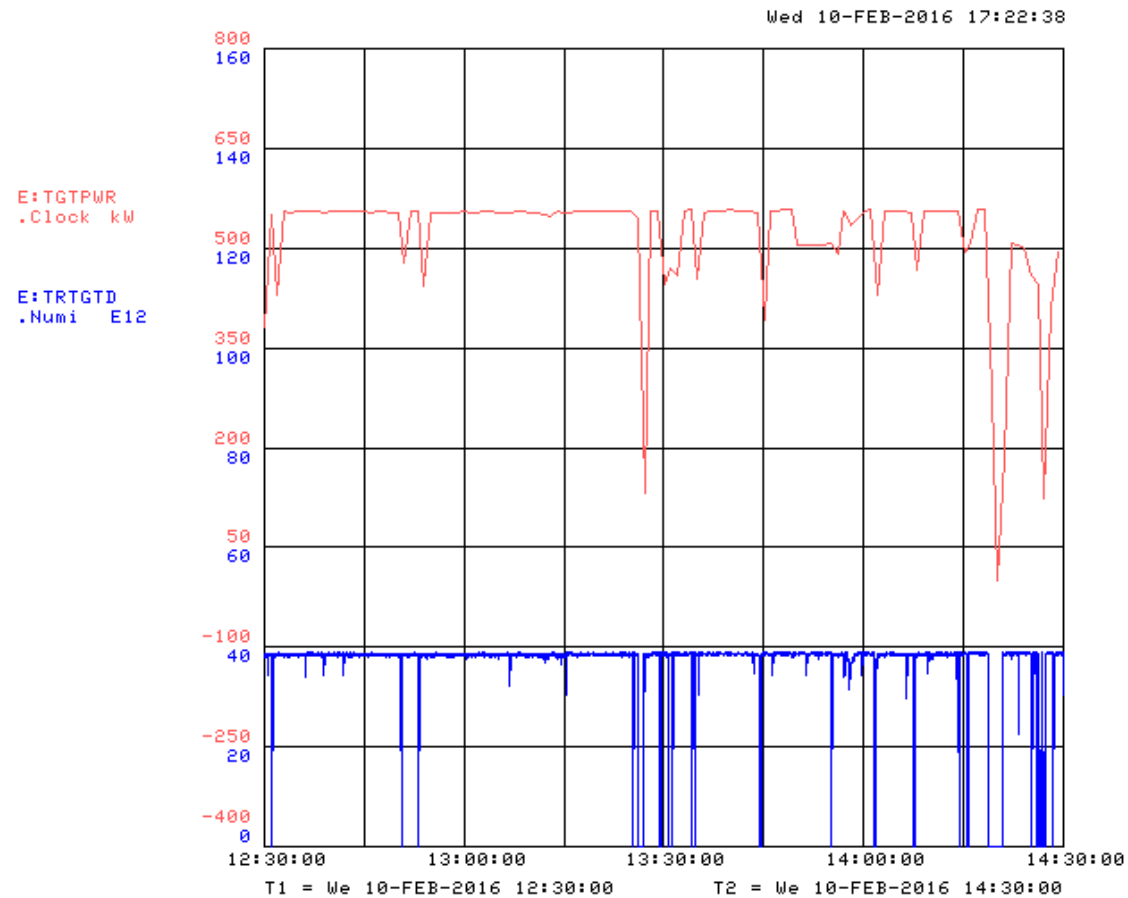# Beam Size at 0.5 MW
and a few other thoughts

D. A. Jensen

Feb 16, 2016

Power Feb 10, 2016 early PM
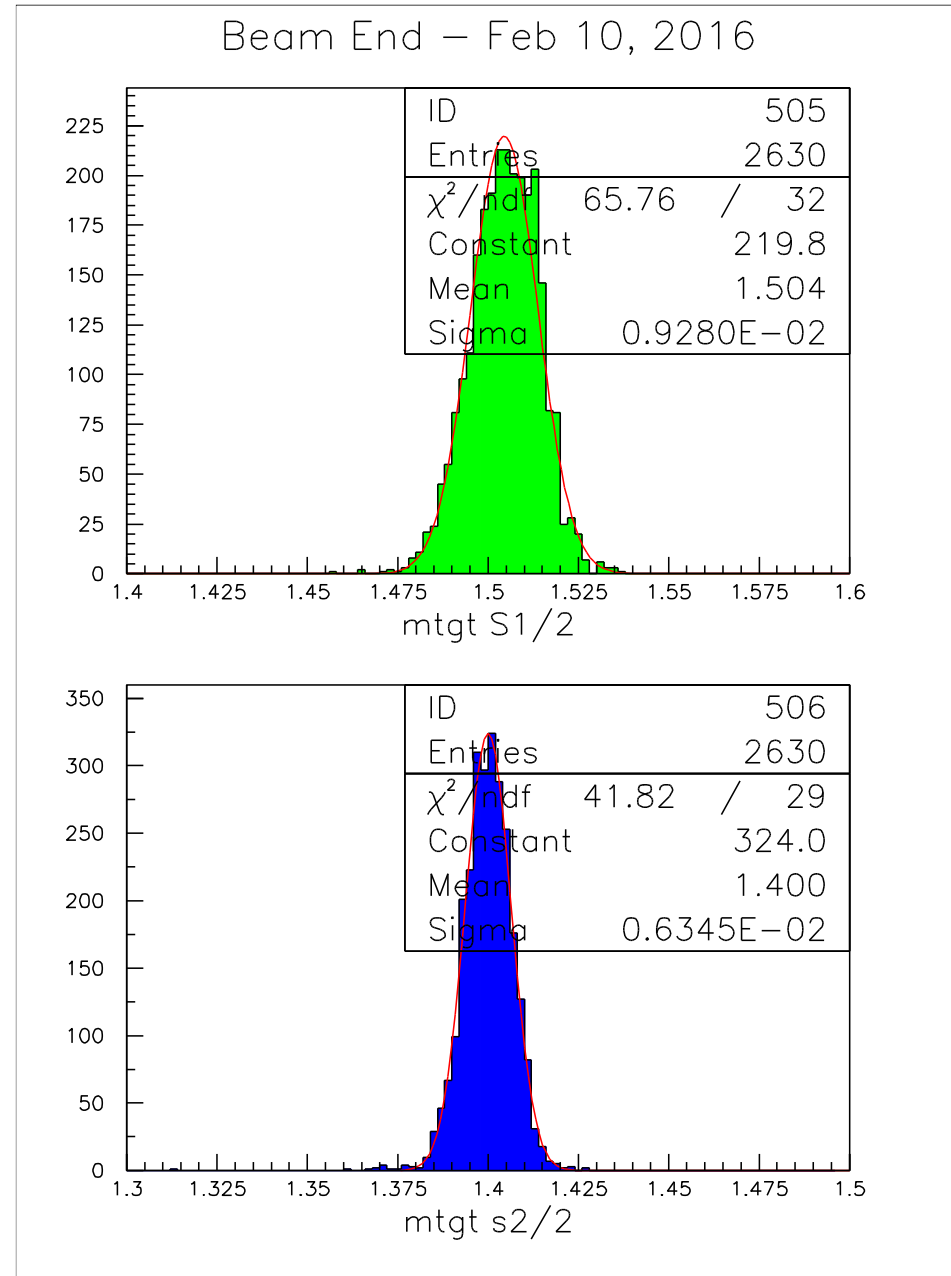
Beam Size

Trtgtd = 38.5

1.5 mm σ in X
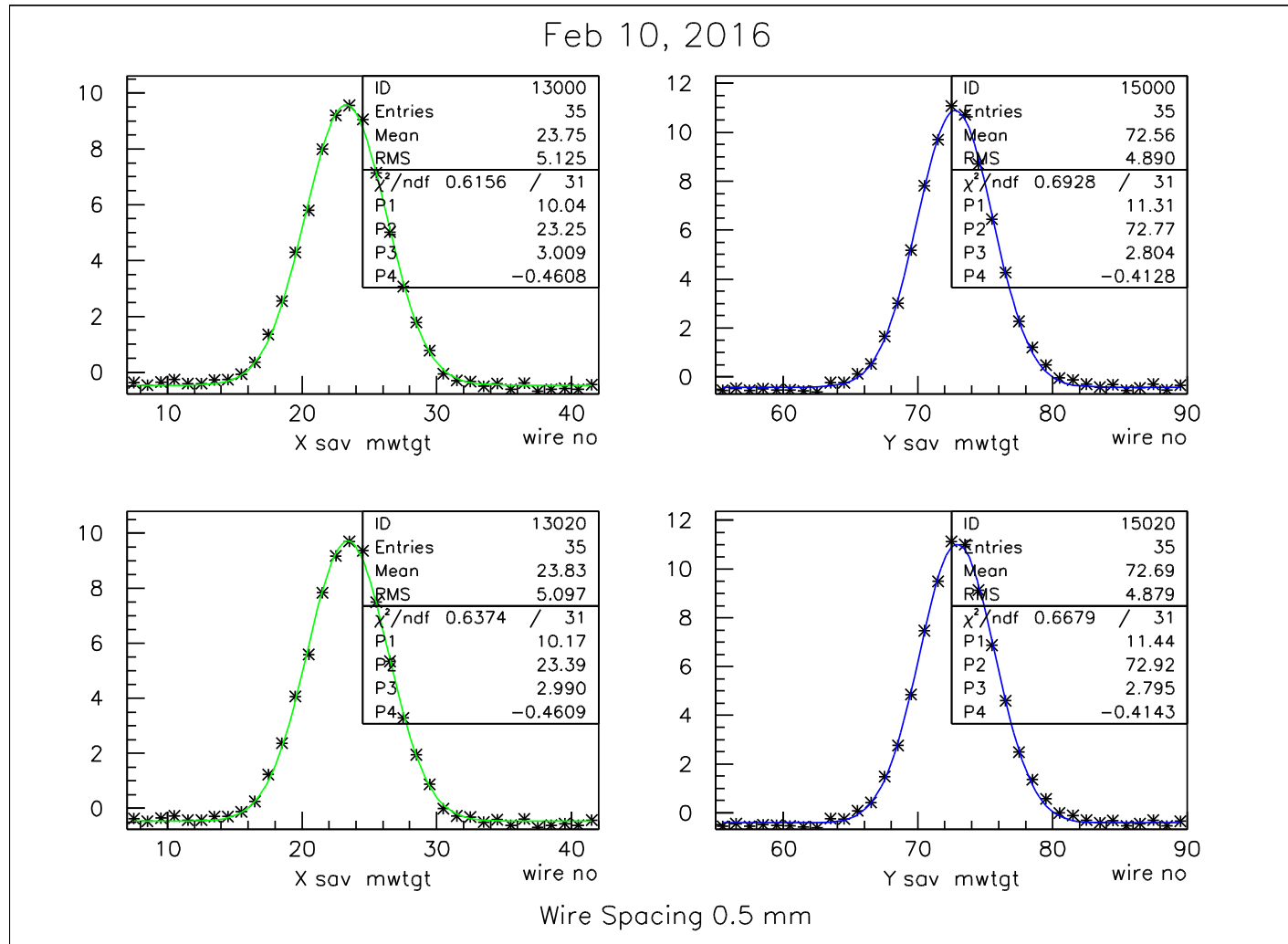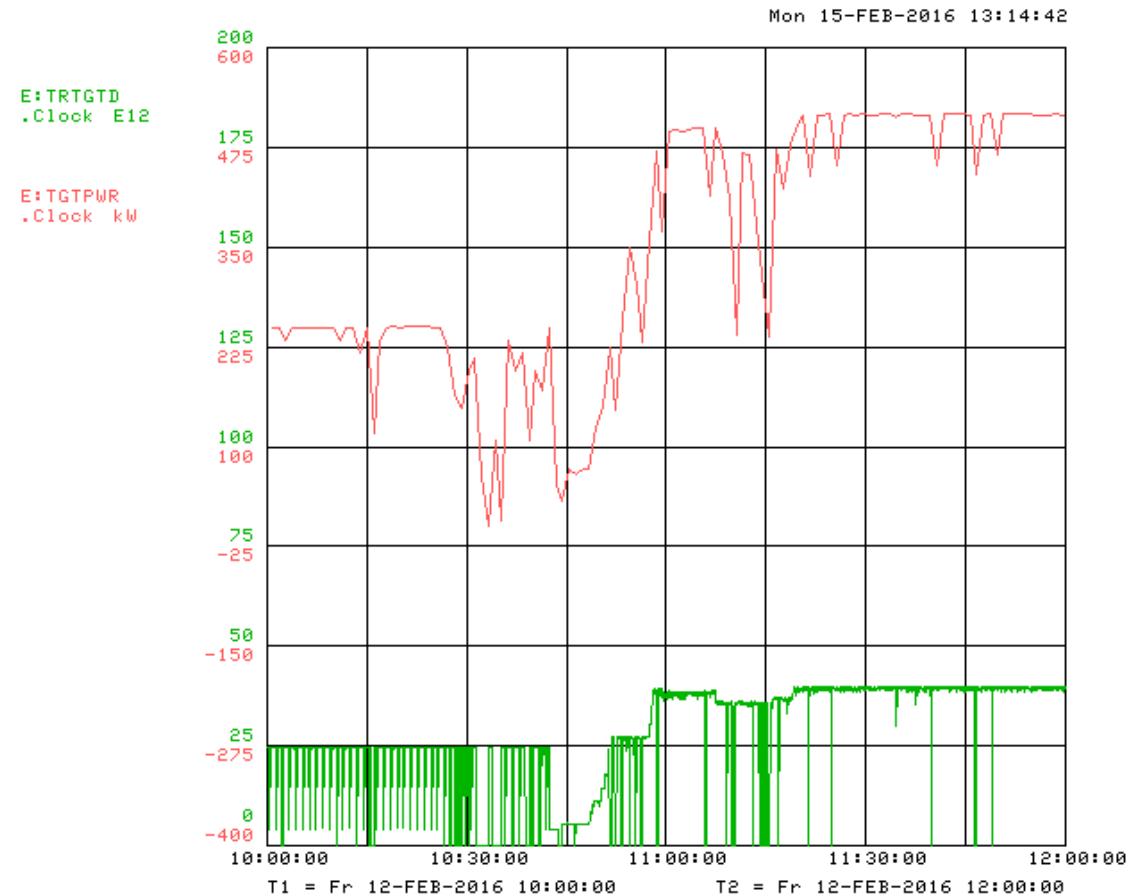
1.4 mm σ in Y

Sample Target SEM fits for Feb 10 data

Feb 10, 2016

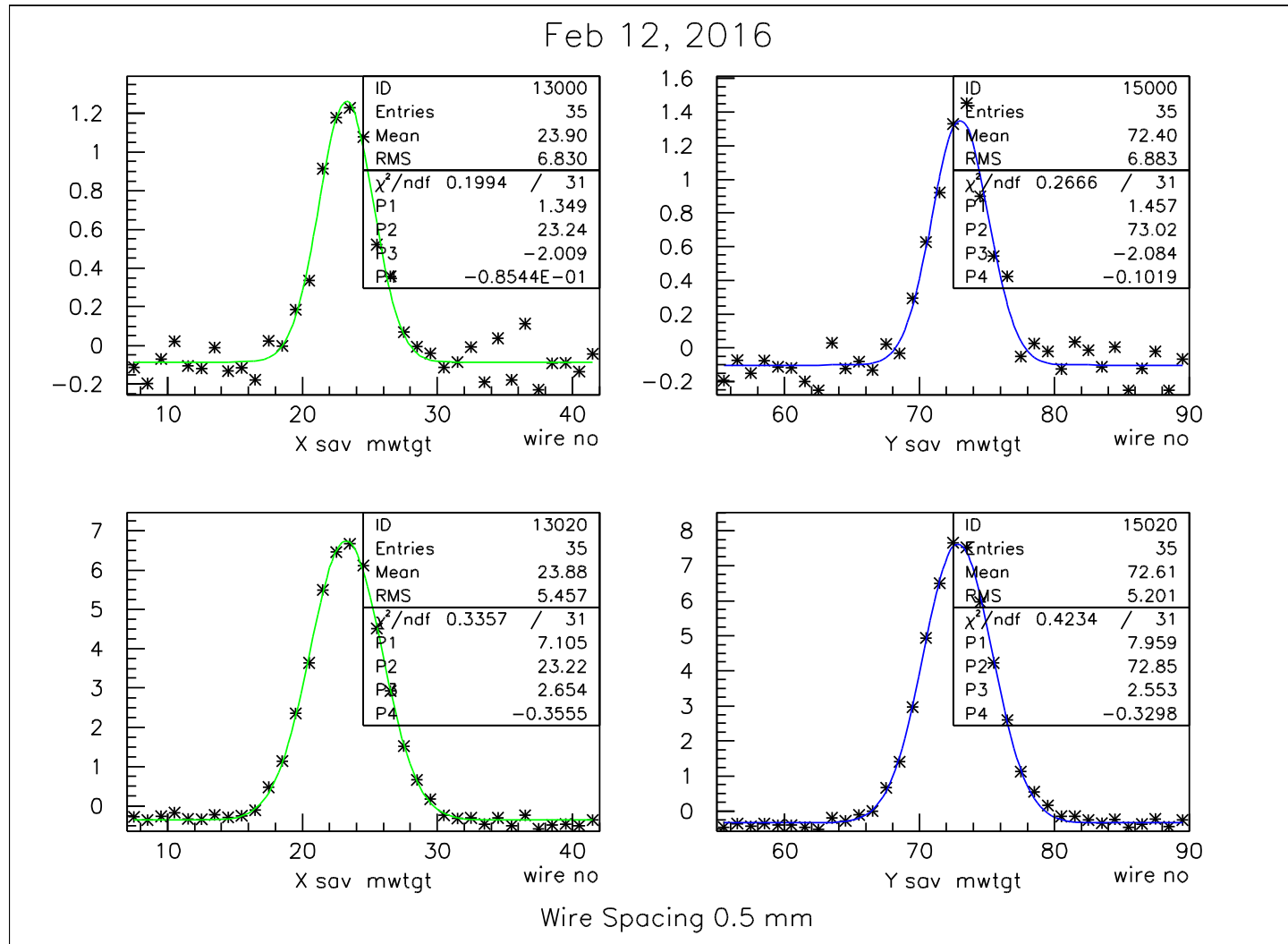Wire Spacing 0.5 mm

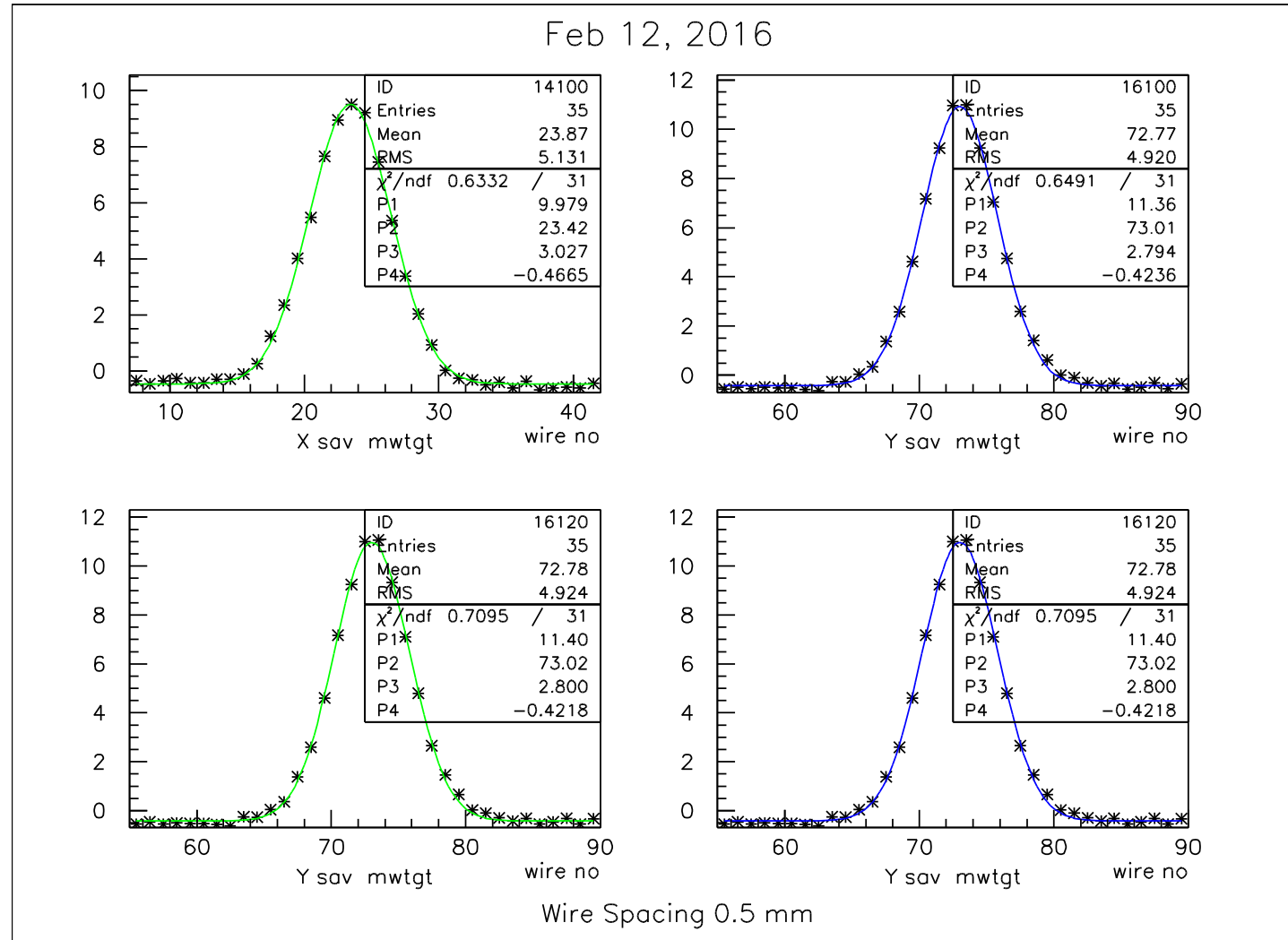# Another sample of High Intensity – Feb 12, 2016

I=24.6, σ_x = 1.32, σ_y = 1.27,   I= 38.5, σ_x = 1.52, σ_y = 1.42
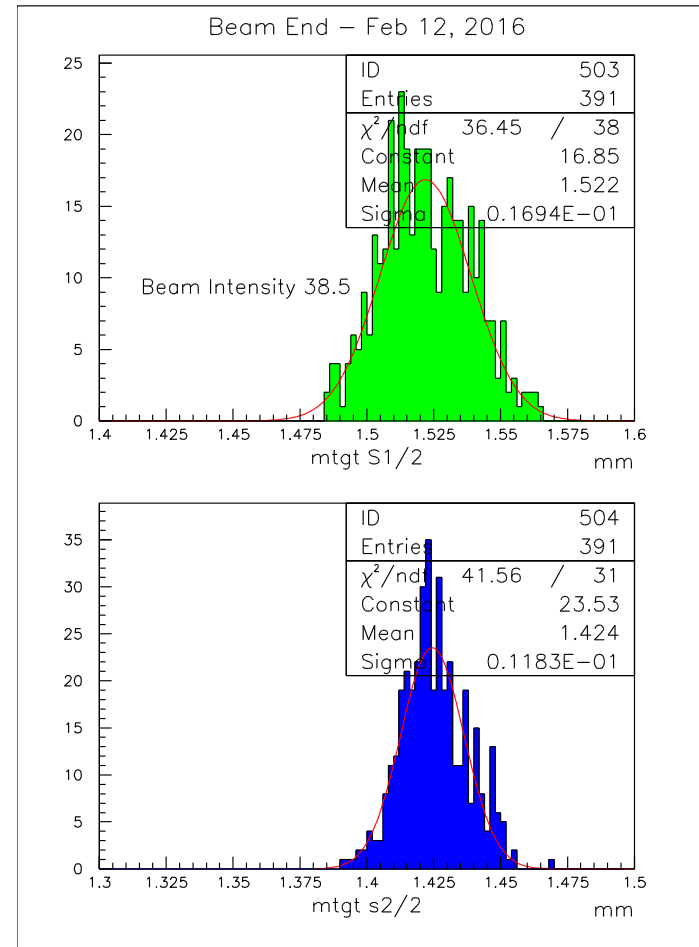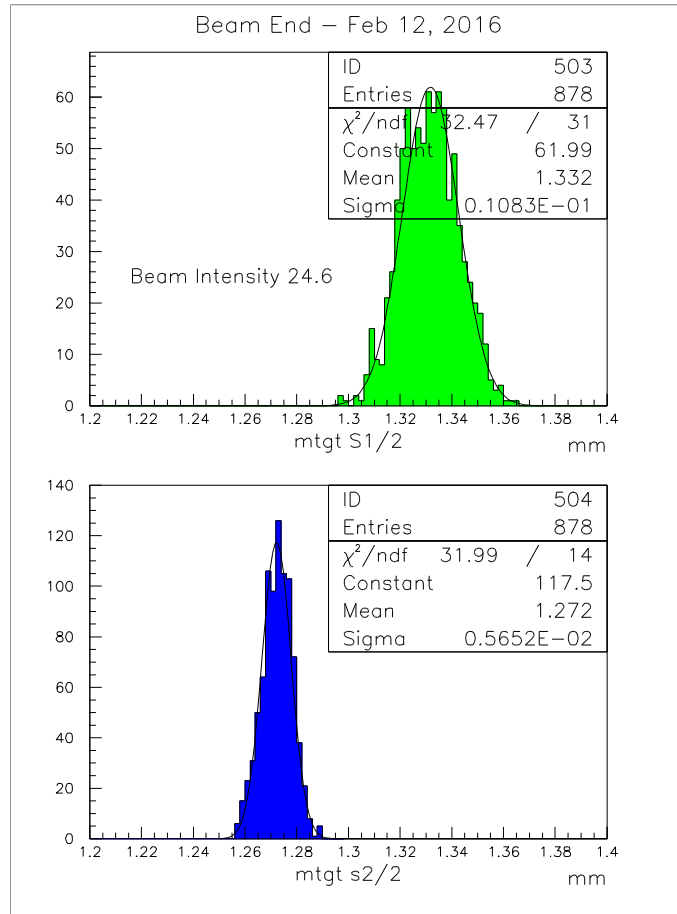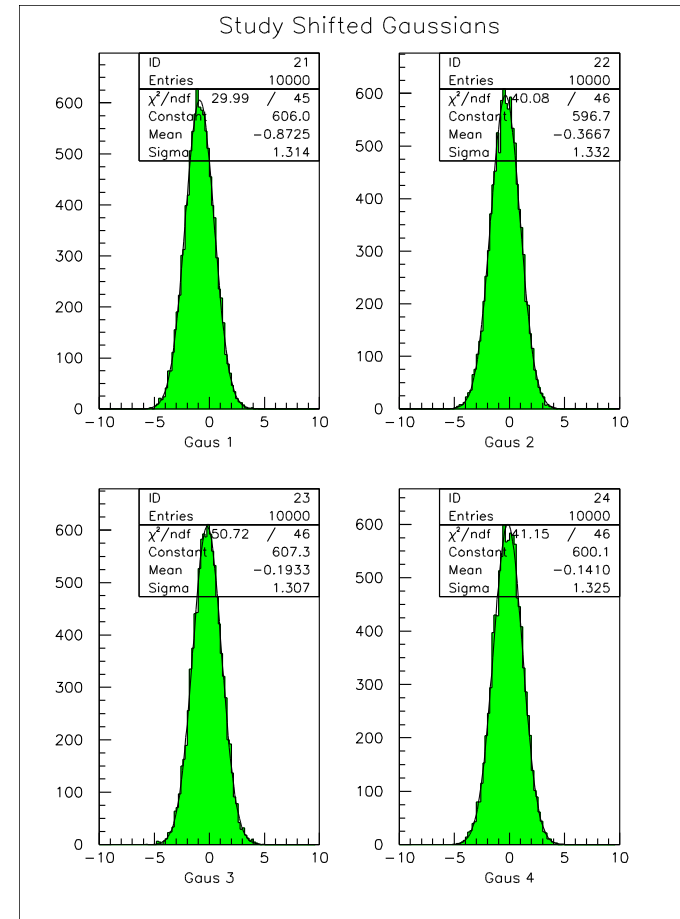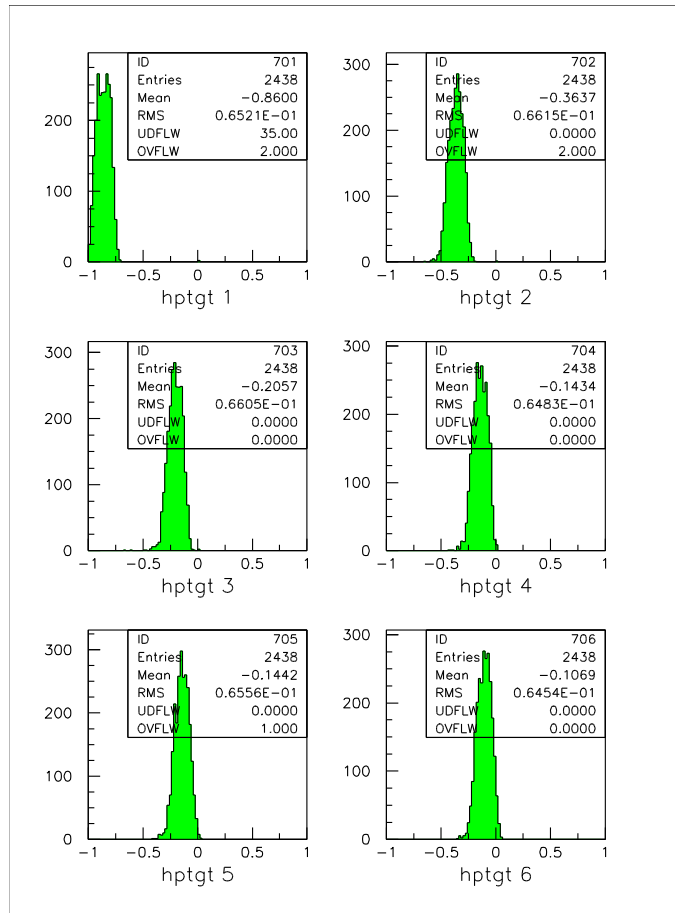
Sample Target SEM fits for Low Intensity Feb 12 Data

Sample Target SEM fits for Feb 12 High Intensity Data

Feb 12, 2016

ID	14100
Entries	35
Mean	23.87
RMS	5.131
χ^2/ndf 0.6332 / 31	
P1	9.979
P2	23.42
P3	3.027
P4	−0.4665

X sav mwtgt — wire no

ID	16100
Entries	35
Mean	72.77
RMS	4.920
χ^2/ndf 0.6491 / 31	
P1	11.36
P2	73.01
P3	2.794
P4	−0.4236

Y sav mwtgt — wire no

ID	16120
Entries	35
Mean	72.78
RMS	4.924
χ^2/ndf 0.7095 / 31	
P1	11.40
P2	73.02
P3	2.800
P4	−0.4218

Y sav mwtgt — wire no

ID	16120
Entries	35
Mean	72.78
RMS	4.924
χ^2/ndf 0.7095 / 31	
P1	11.40
P2	73.02
P3	2.800
P4	−0.4218

Y sav mwtgt — wire no

Wire Spacing 0.5 mm

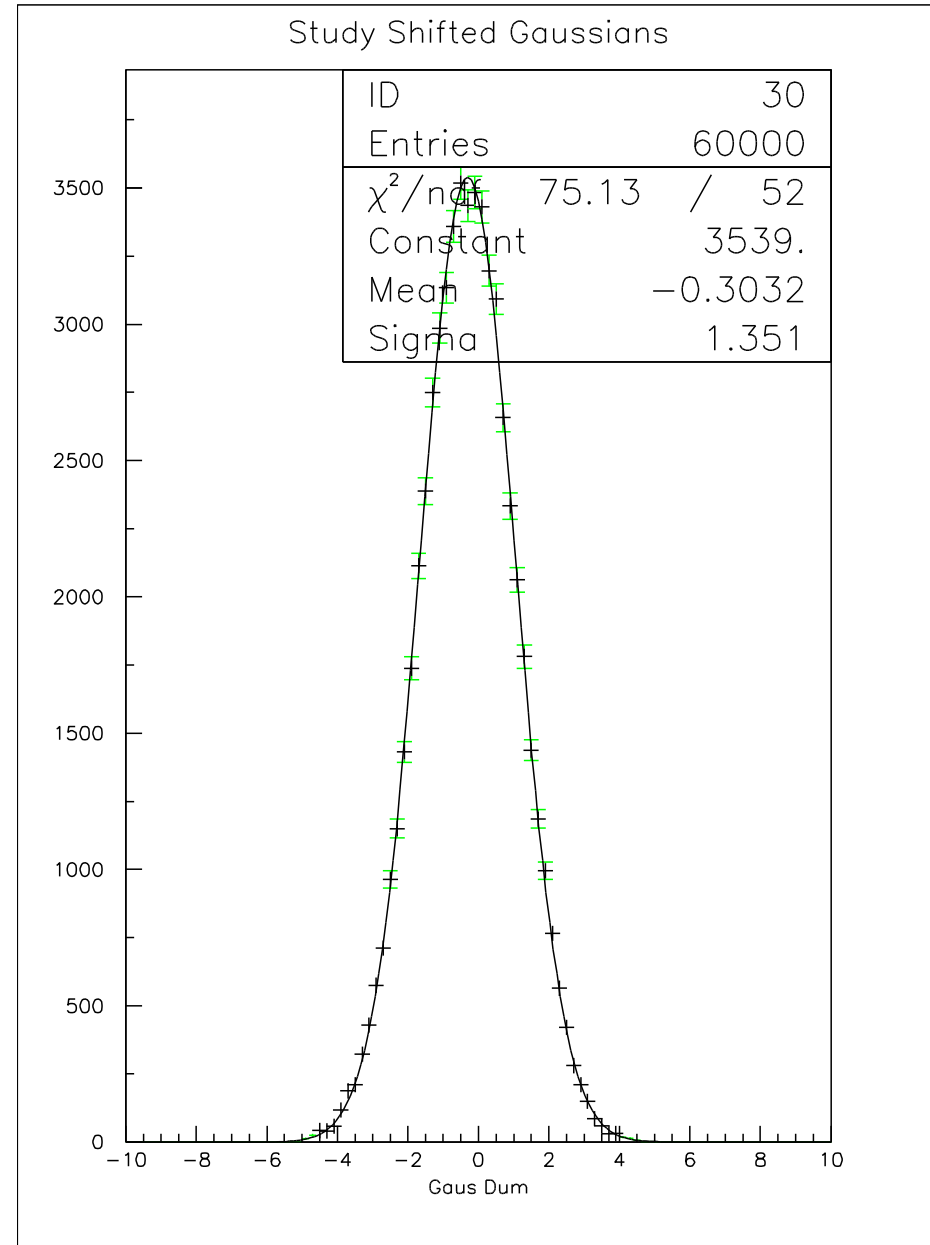# The question was asked – what happens to the fits to the SEM fits when the different batches move?

Measure offsets, simulate with MC: σ as SEM, X_m as BPM   units are mm
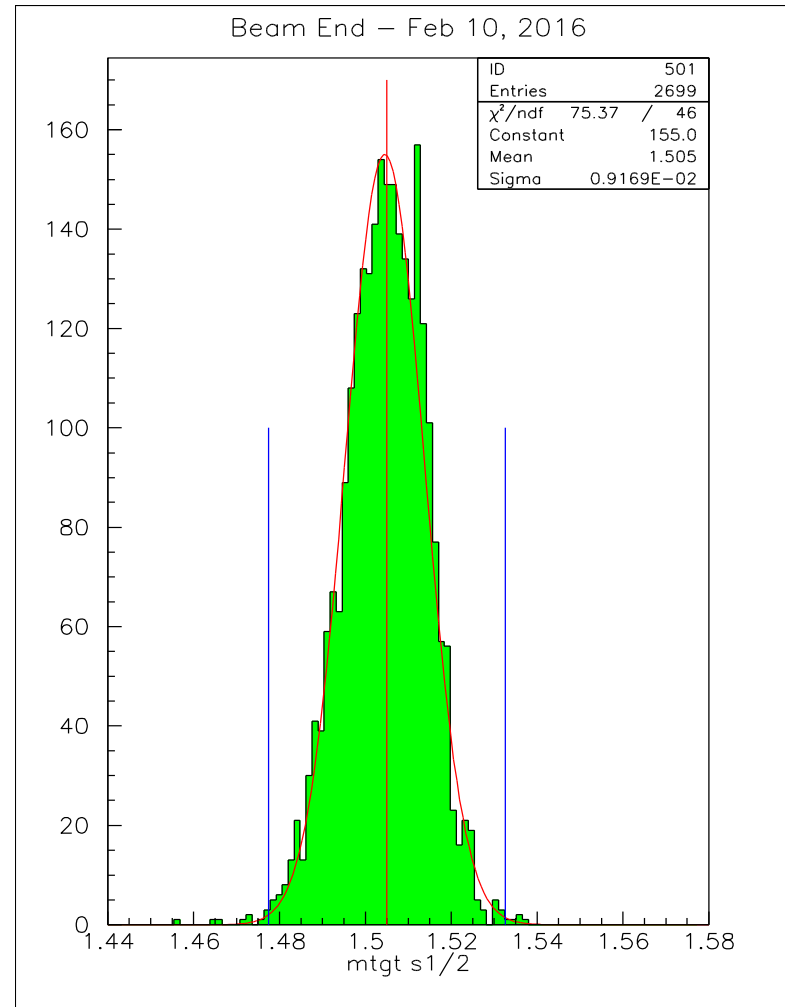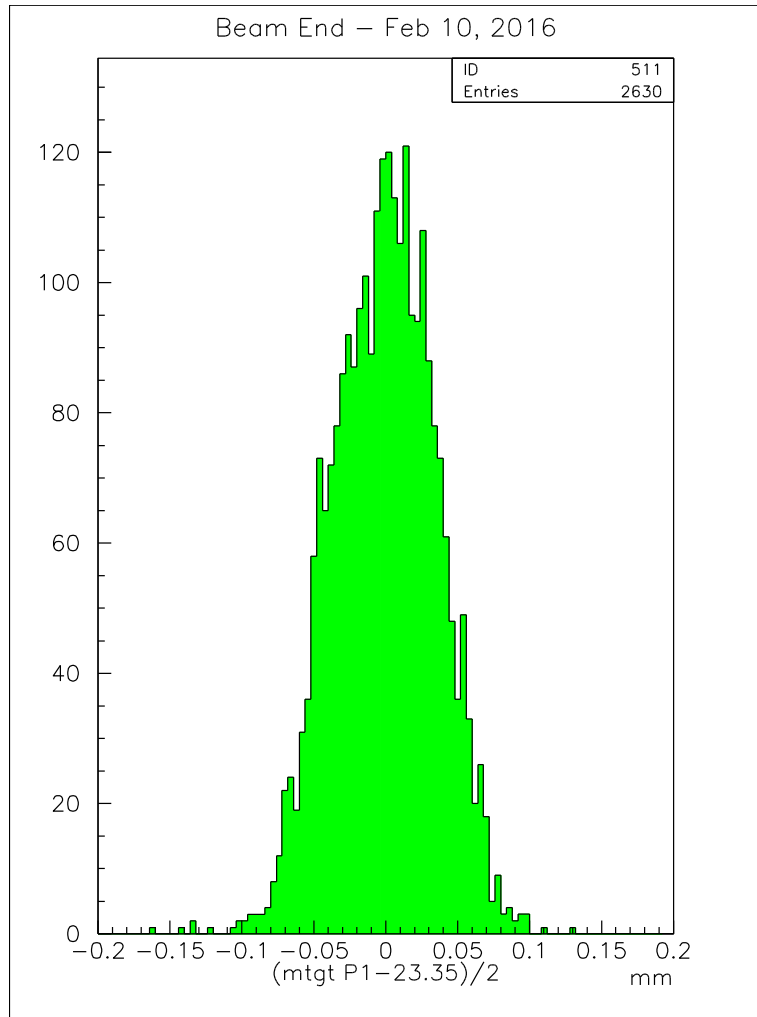
Add all the signals:
Result:

broadening ~ 2%
offset   ~ .15mm
χ^2 46 -> 75

But fit looks good

Study Shifted Gaussians

ID	30
Entries	60000
χ^2/ndf	75.13 / 52
Constant	3539.
Mean	−0.3032
Sigma	1.351

Gaus Dum

May ask: How much beam hits how much of the target how much of the time... Beam center stable(left), Beam wide(right)

σ = 0.092
3σ = .28 mm

½ width +3 σ =
1.50+.28 ~ 1.8 mm
 from beam center
to the edge of the
target ????

And the beam moves almost a mm from batch to batch!

Colors of the batches are 1 is black, 2 red, 3 green, 4 blue, 5 yellow, 6 pink.

Horizontal units are mm