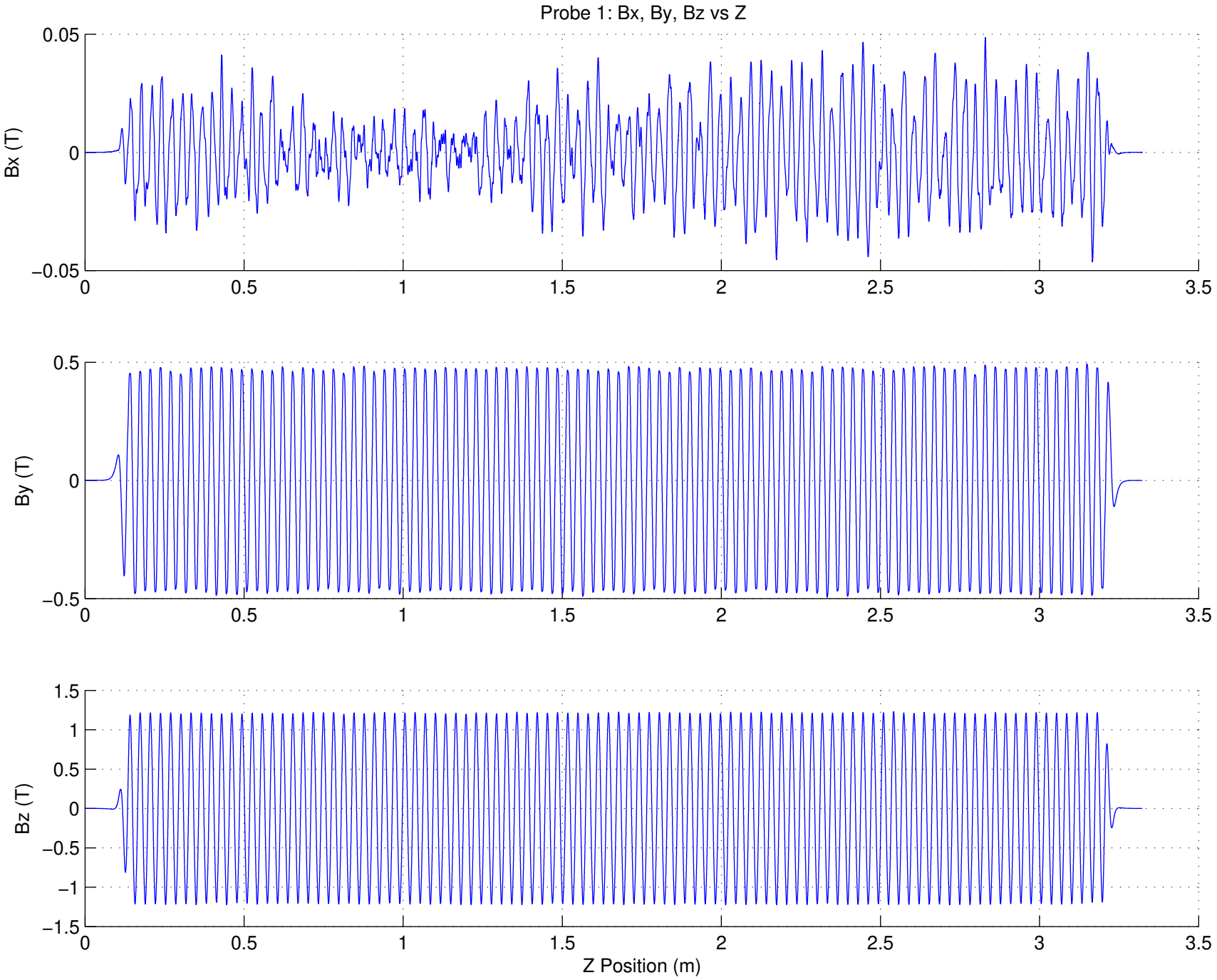
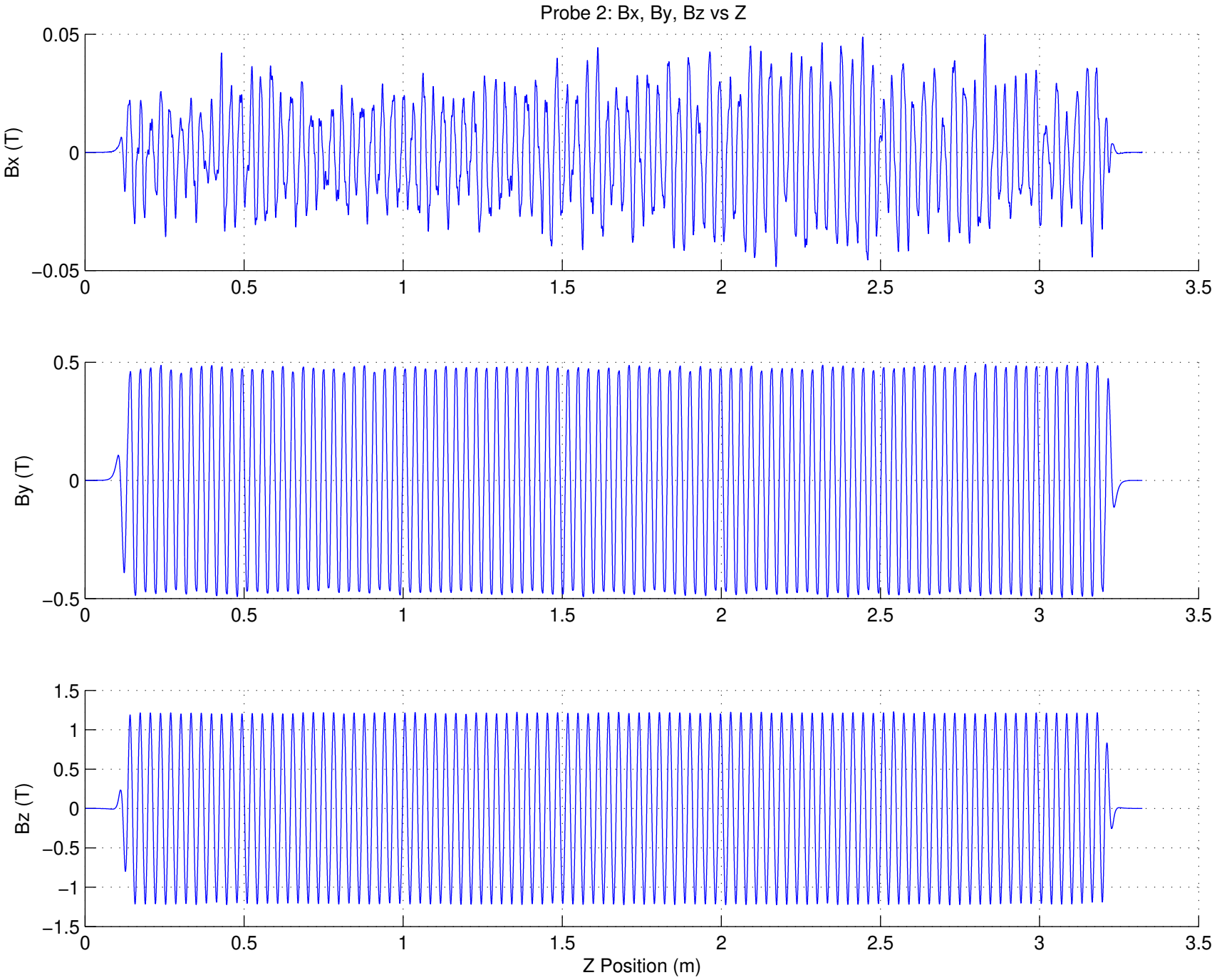
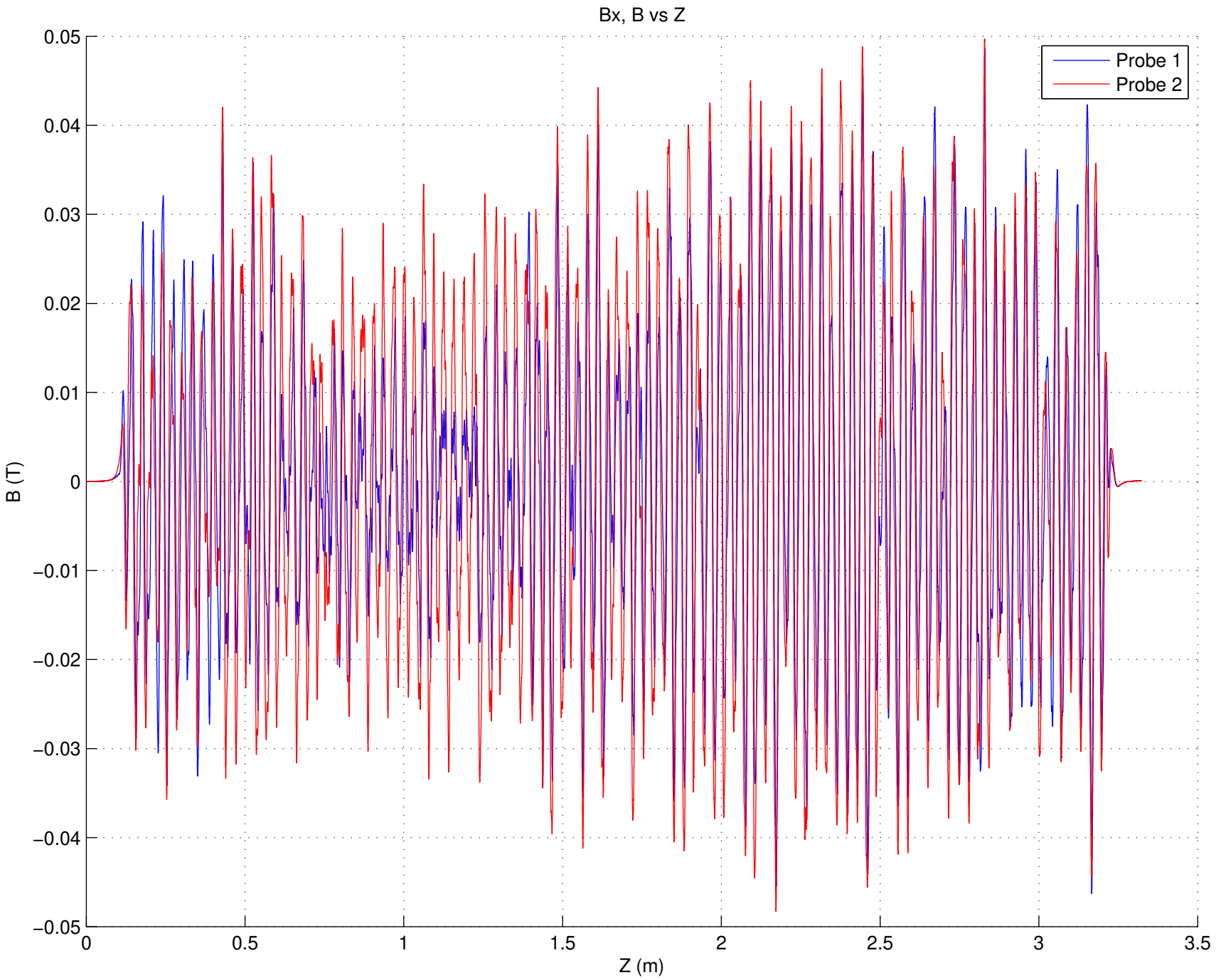
SLAC Magnetic Measurements

Hall Probe Array Analysis
****

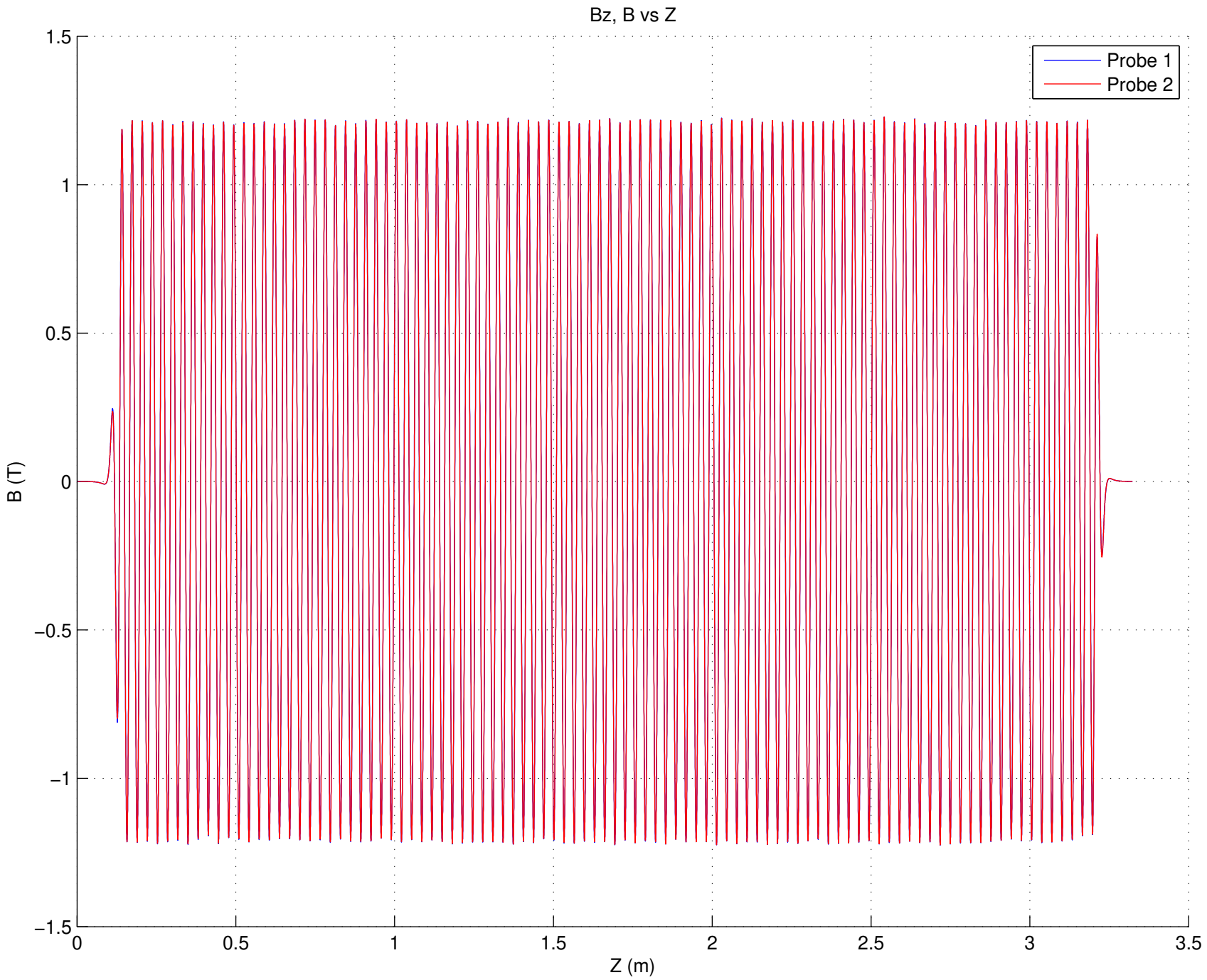
Parameters:
INPUT−FILE−DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Assembled Measurements\Final Measurements\LPVMF\KR0
INPUT−FILE−NAME =DUTestOutput.dat
INPUT−FILE−TYPE =ZVXYZVXYZH
UND−POL−MODE =LIN−POL−VERT−FIELD
PROBE1−BX−CALIB−FILE =v:\MET\MagServe\MagData\LCLS\Hall probe\SENIS−119−12\SENIS−119−12−X.ini
PROBE1−BY−CALIB−FILE =v:\MET\MagServe\MagData\LCLS\Hall probe\SENIS−119−12\SENIS−119−12−Y.ini
PROBE2−BX−CALIB−FILE =v:\MET\MagServe\MagData\LCLS\Hall probe\SENIS−120−12\SENIS−120−12−X.ini
PROBE2−BY−CALIB−FILE =v:\MET\MagServe\MagData\LCLS\Hall probe\SENIS−120−12\SENIS−120−12−Y.ini
NUM−ZERO−GAUSS−MEAS =200
PROBE2−OFFSET−DIR =Y

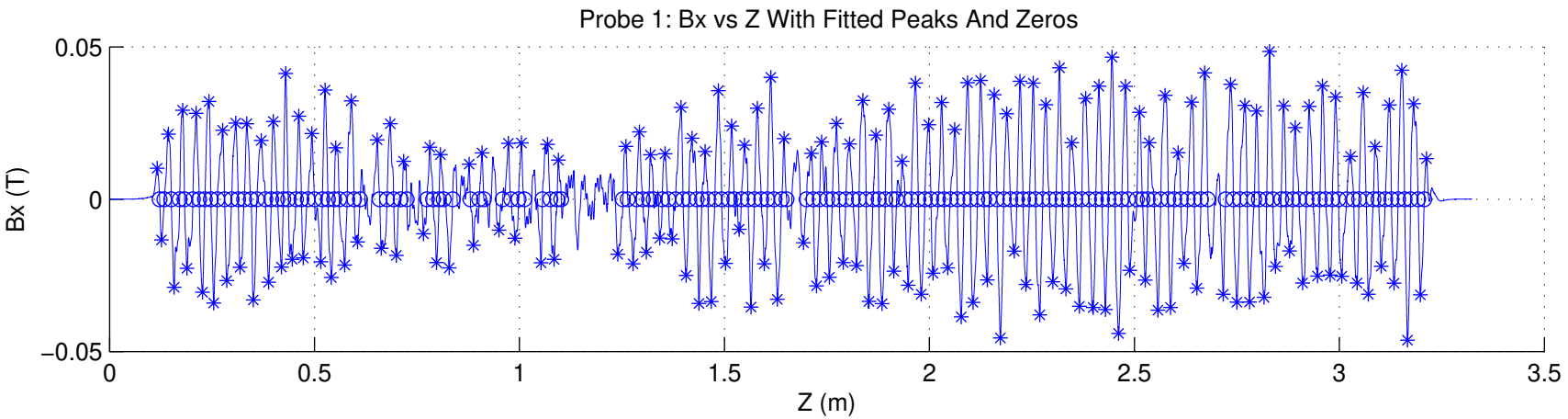

Probe 1: Bx, By, Bz vs Z
Bx (T)
0.05
0
−0.05
By (T)
0.5
0
−0.5
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z Position (m)

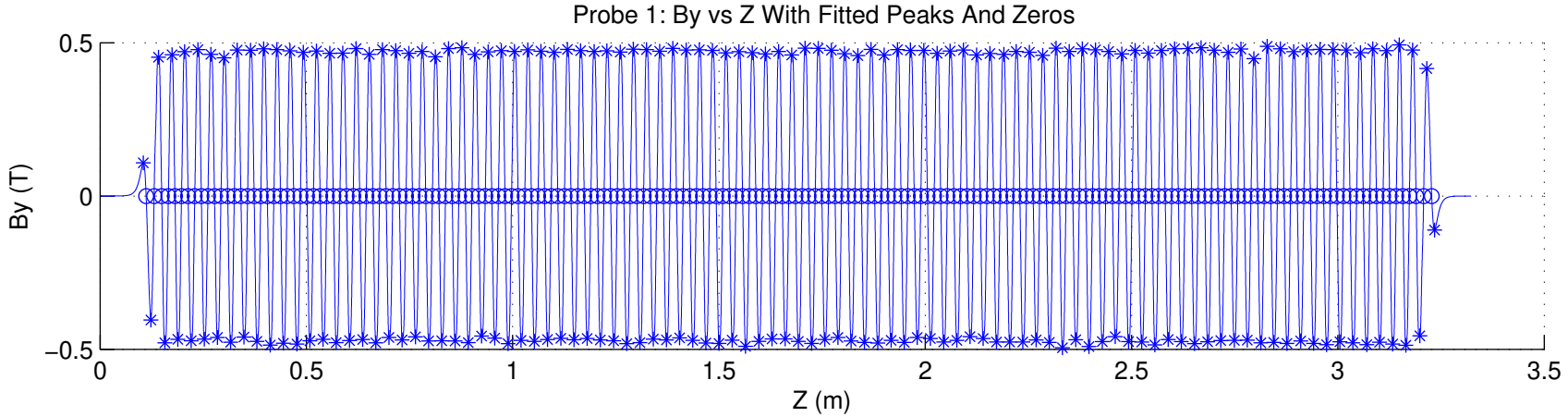

Probe 2: Bx, By, Bz vs Z
Bx (T)
0.05
0
−0.05
By (T)
0.5
0
−0.5
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z Position (m)

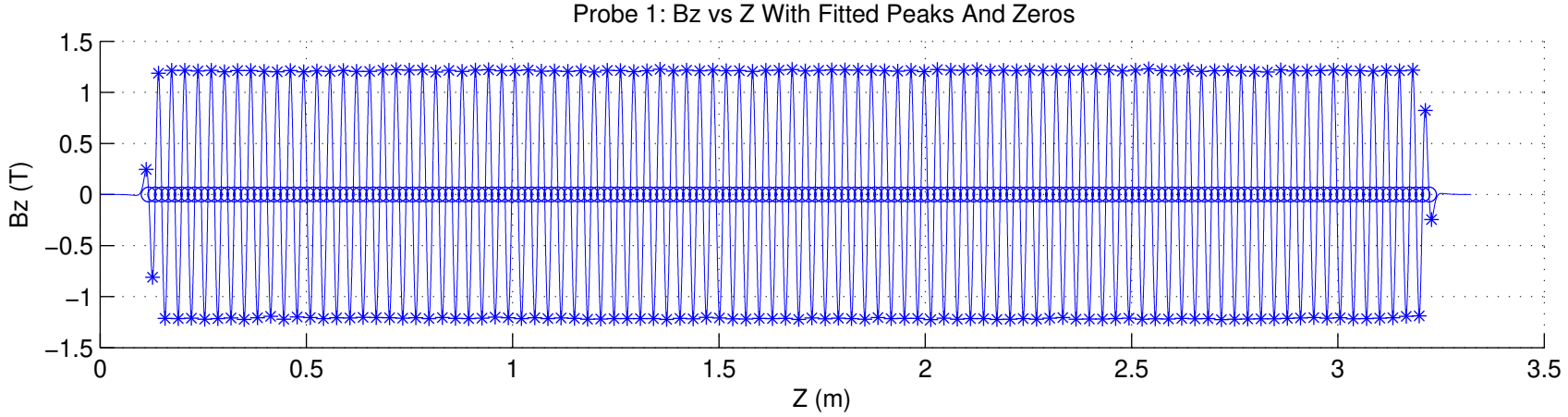

Bx, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
0.05
0.04
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
−0.04
−0.05
0
0.5
1
1.5
2
2.5
3
3.5

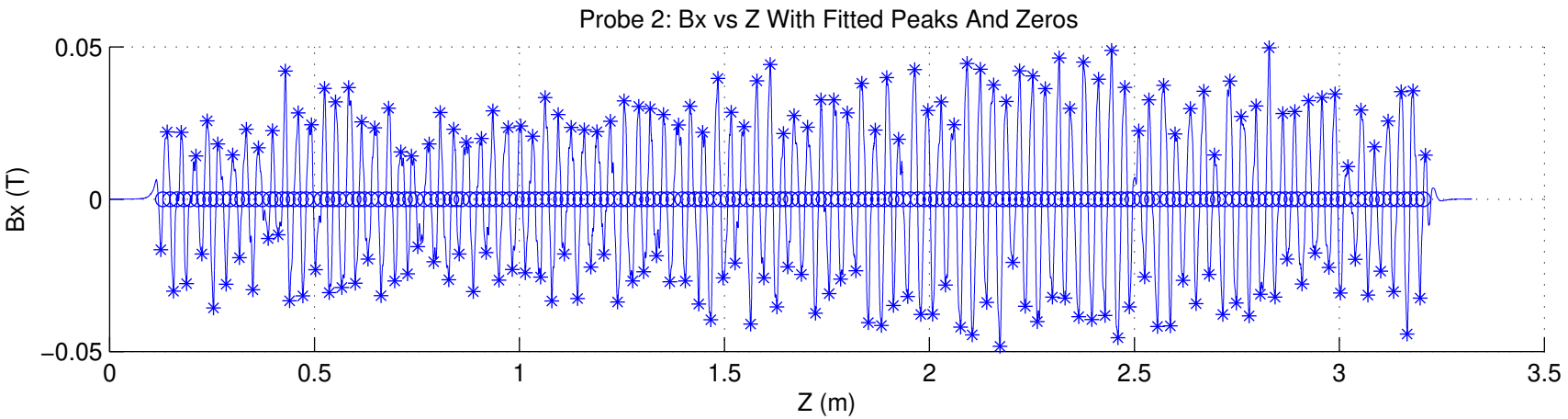
By, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
0.5
0.4
0.3
0.2
0.1
0
−0.1
−0.2
−0.3
−0.4
−0.5
0
0.5
1
1.5
2
2.5
3
3.5

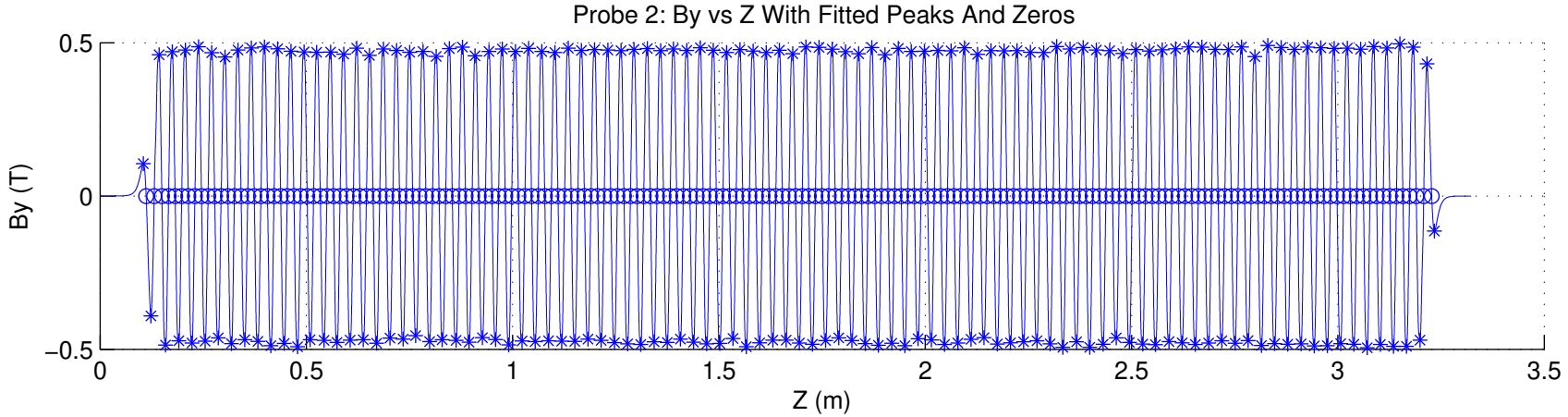

Bz, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

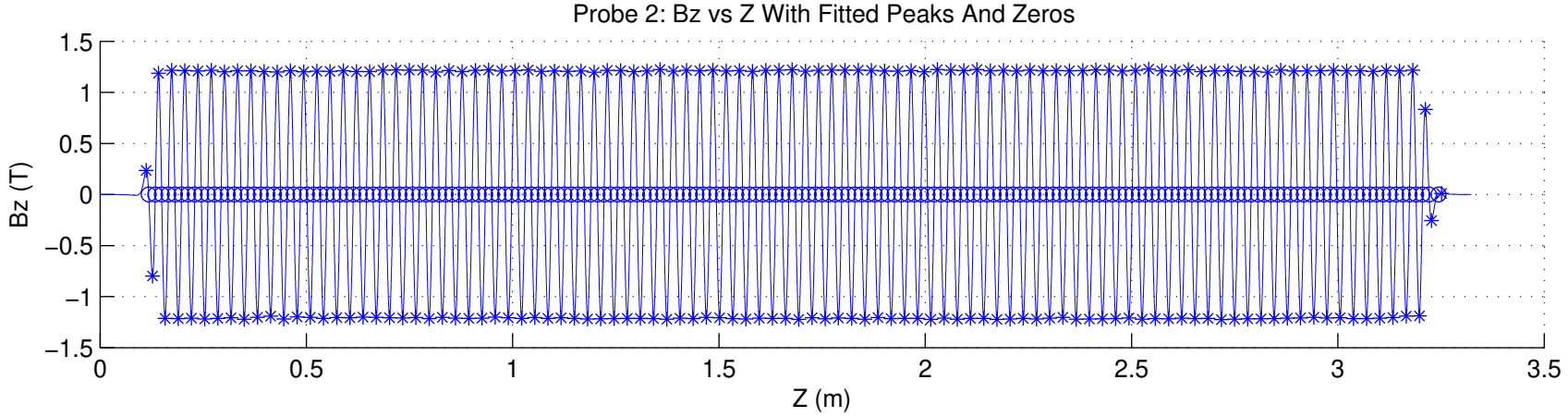

Probe 1: Bx vs Z With Fitted Peaks And Zeros
Bx (T)
Z (m)
0.05
0
−0.05
0
0.5
1
1.5
2
2.5
3
3.5

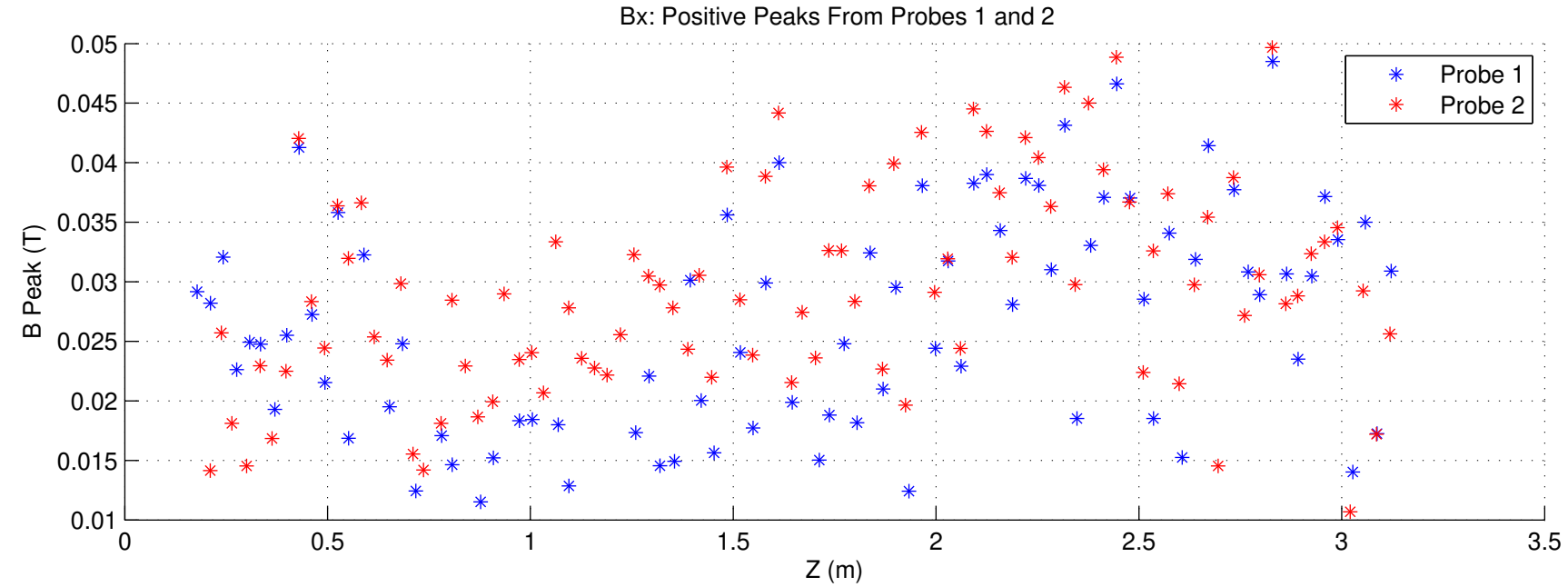

Probe 1: By vs Z With Fitted Peaks And Zeros
By (T)
Z (m)
0.5
0
−0.5
0
0.5
1
1.5
2
2.5
3
3.5

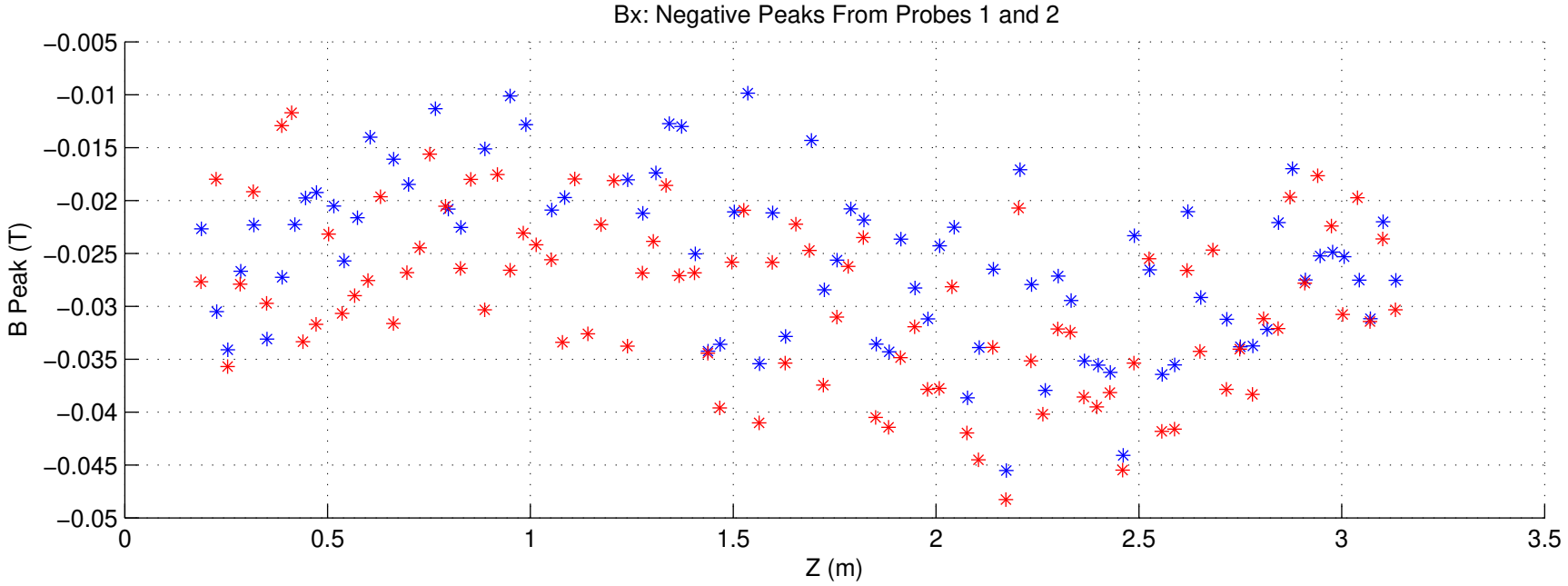

Probe 1: Bz vs Z With Fitted Peaks And Zeros
Bz (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

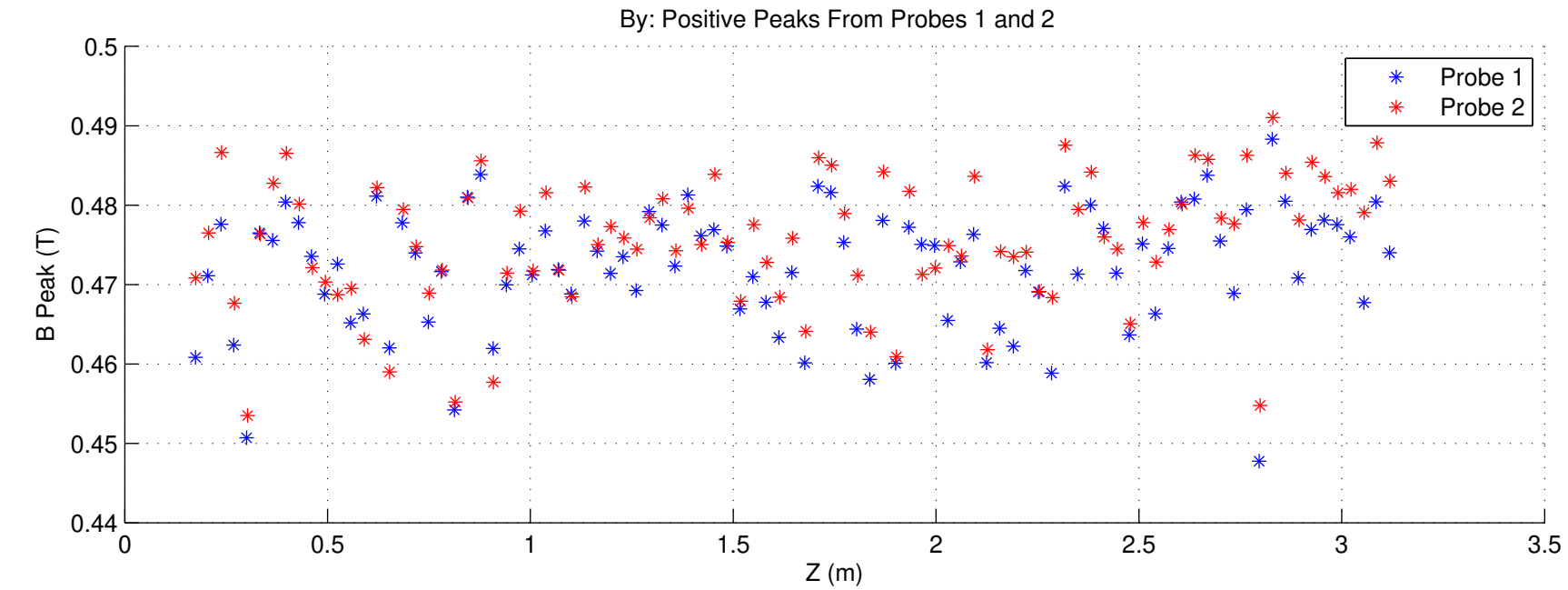

Probe 2: Bx vs Z With Fitted Peaks And Zeros
Bx (T)
0.05
0
−0.05
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

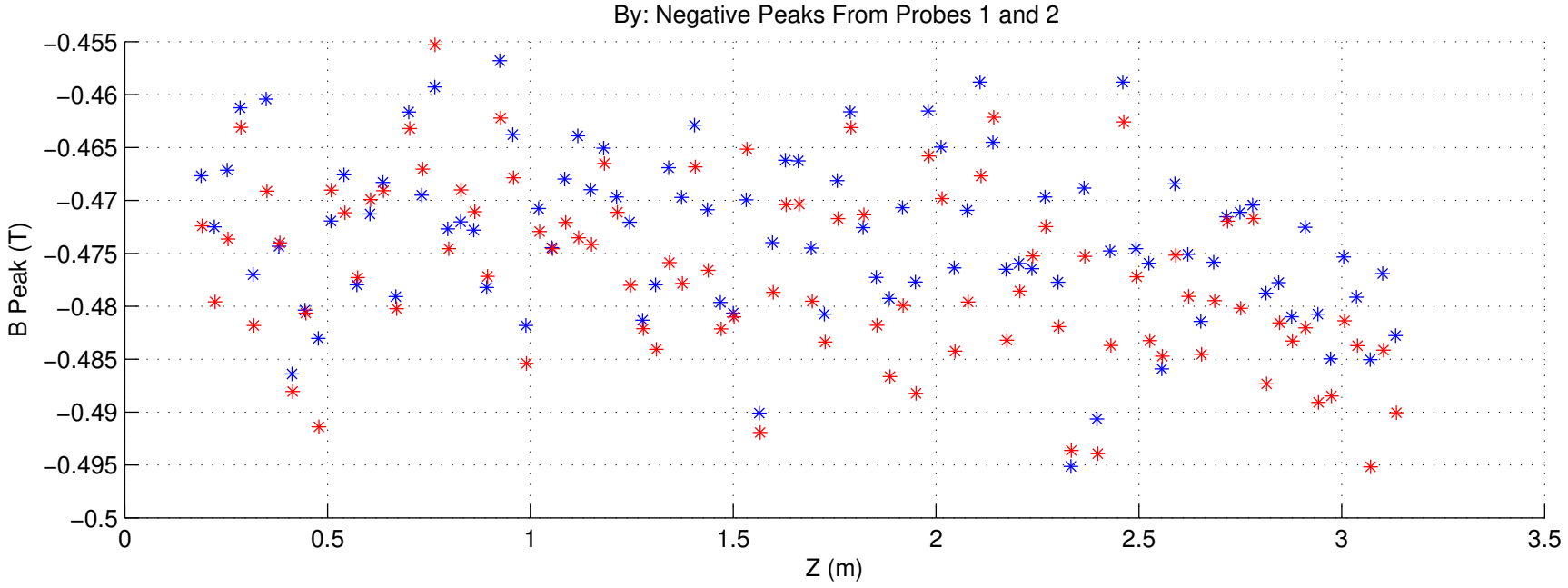

Probe 2: By vs Z With Fitted Peaks And Zeros
By (T)
0.5
0
−0.5
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

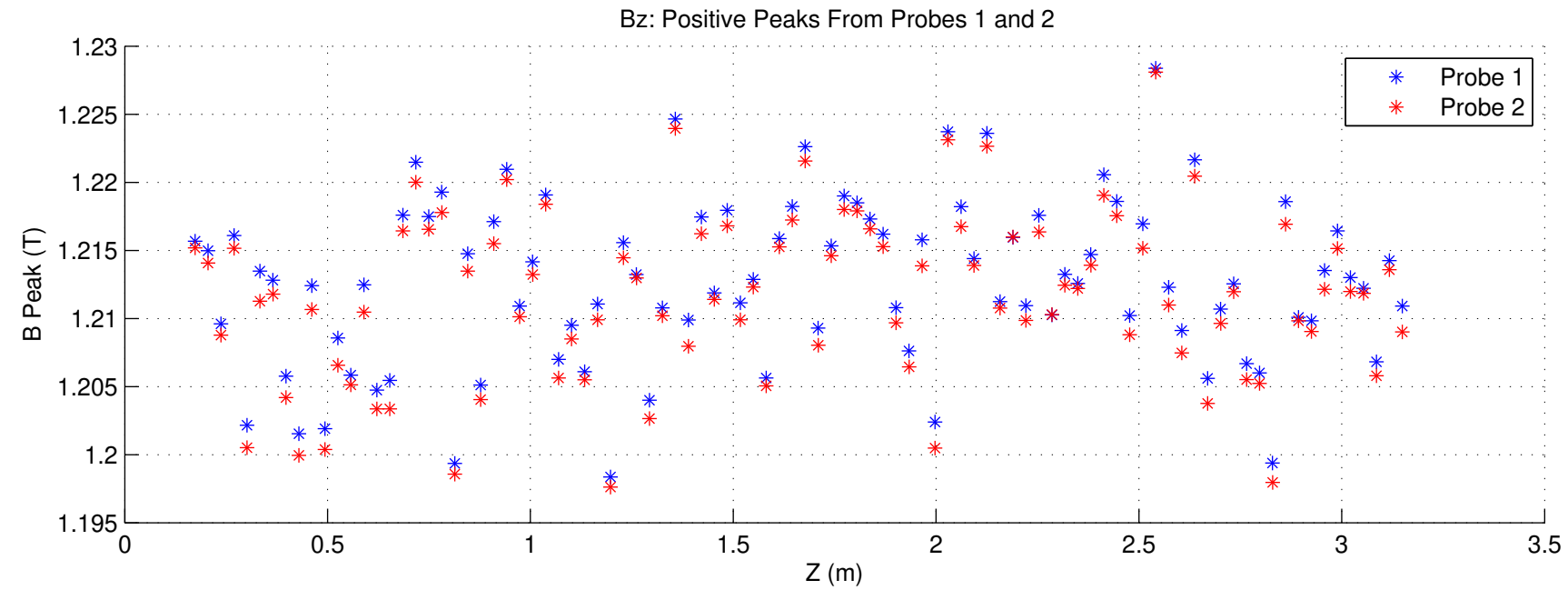

Probe 2: Bz vs Z With Fitted Peaks And Zeros
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

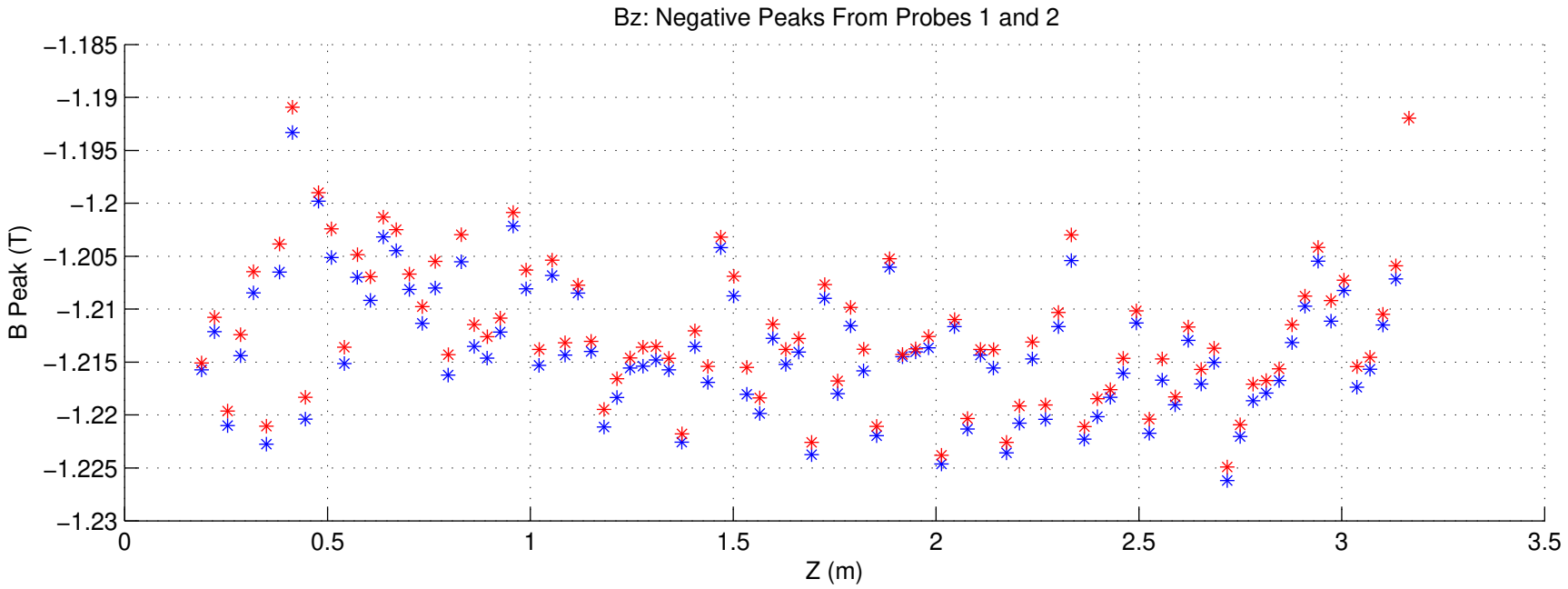

Bx: Positive Peaks From Probes 1 and 2
B Peak (T)
Z (m)
Probe 1
Probe 2
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0
0.5
1
1.5
2
2.5
3
3.5

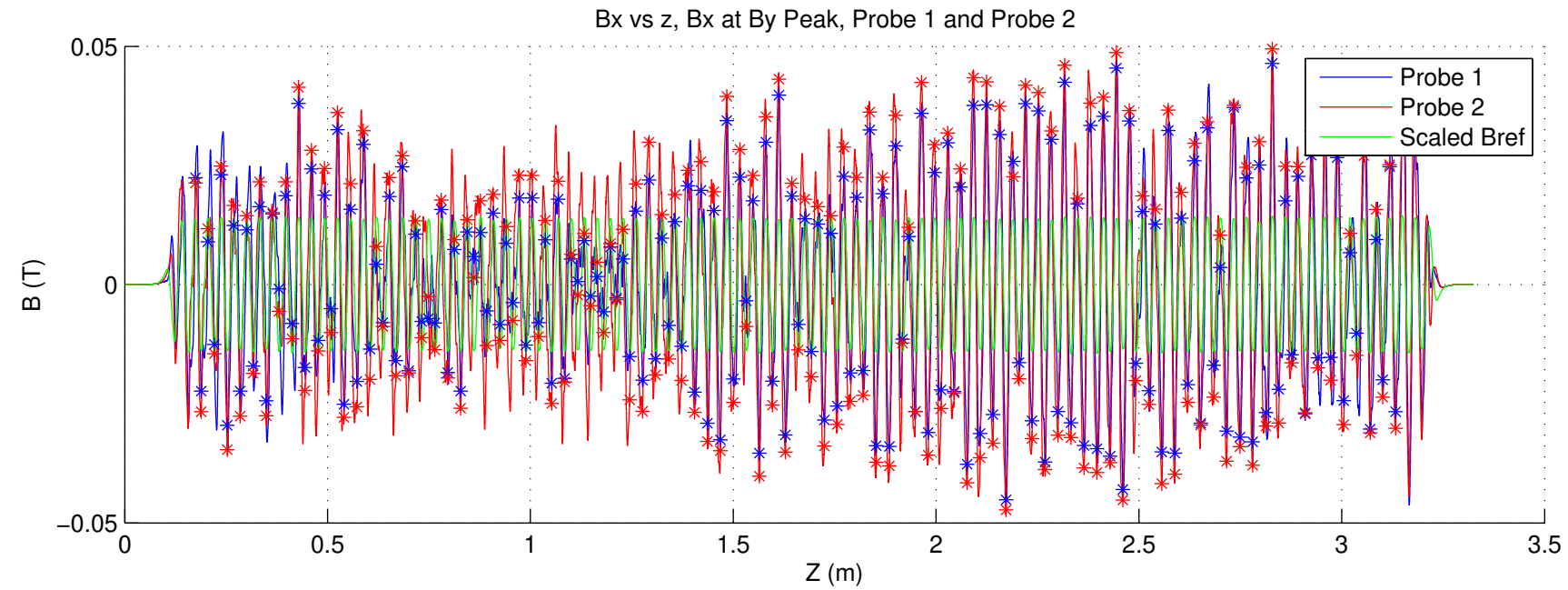

Bx: Negative Peaks From Probes 1 and 2
B Peak (T)
Z (m)
−0.005
−0.01
−0.015
−0.02
−0.025
−0.03
−0.035
−0.04
−0.045
−0.05
0
0.5
1
1.5
2
2.5
3
3.5

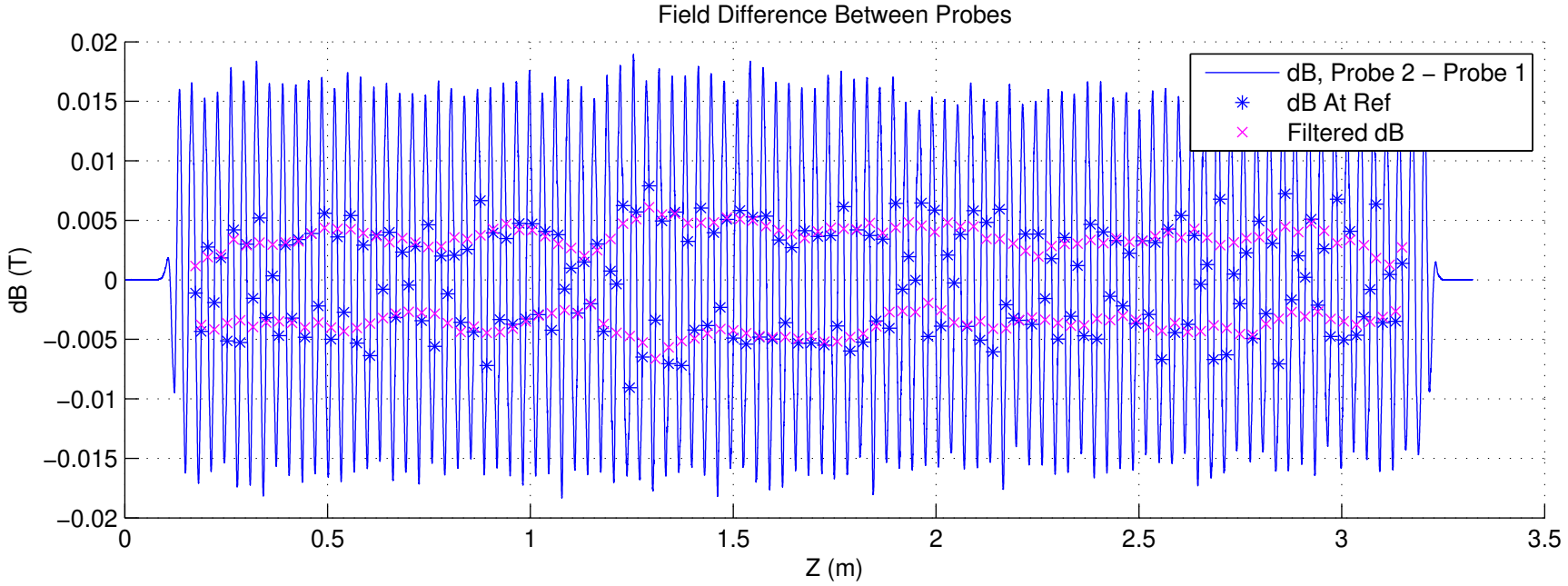

By: Positive Peaks From Probes 1 and 2
Probe 1
Probe 2
B Peak (T)
Z (m)
0.5
0.49
0.48
0.47
0.46
0.45
0.44
0
0.5
1
1.5
2
2.5
3
3.5

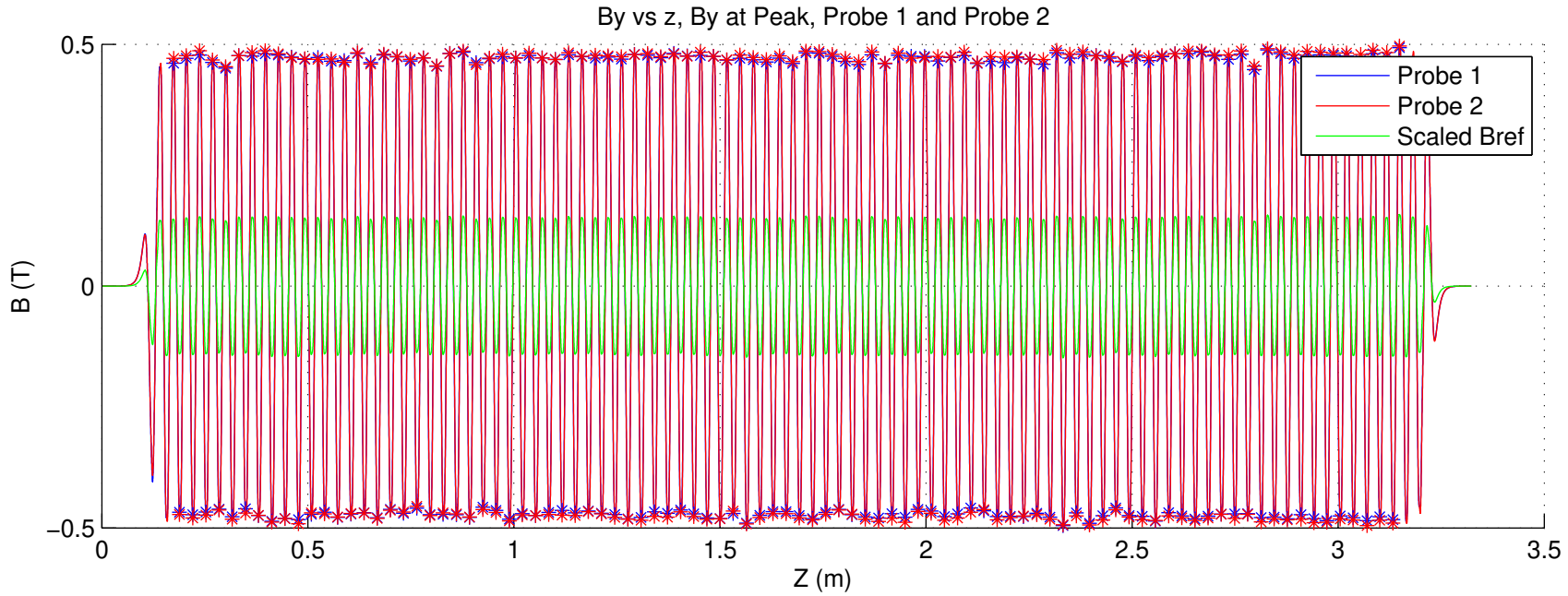

By: Negative Peaks From Probes 1 and 2
B Peak (T)
Z (m)
−0.455
−0.46
−0.465
−0.47
−0.475
−0.48
−0.485
−0.49
−0.495
−0.5
0
0.5
1
1.5
2
2.5
3
3.5

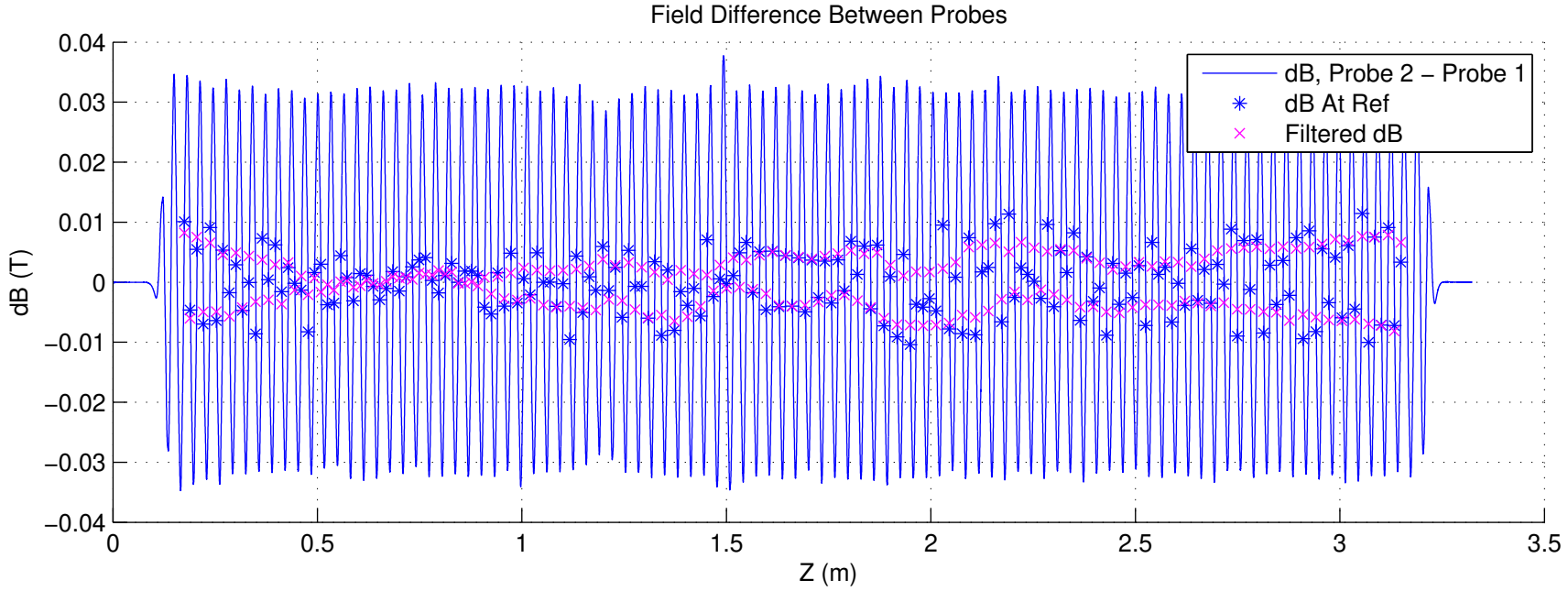

Bz: Positive Peaks From Probes 1 and 2
Probe 1
Probe 2
B Peak (T)
Z (m)
1.23
1.225
1.22
1.215
1.21
1.205
1.2
1.195
0
0.5
1
1.5
2
2.5
3
3.5

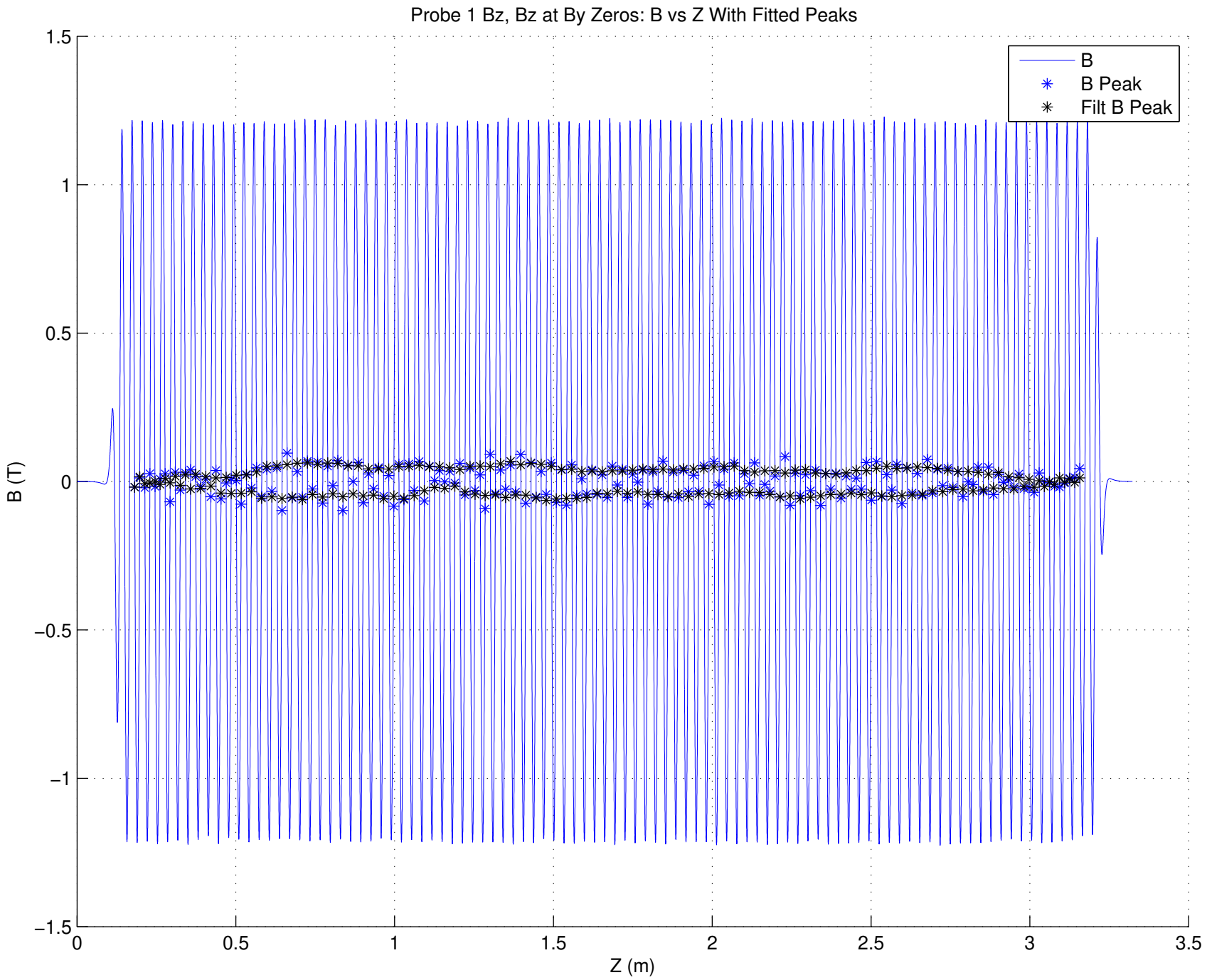

Bz: Negative Peaks From Probes 1 and 2
B Peak (T)
Z (m)
−1.185
−1.19
−1.195
−1.2
−1.205
−1.21
−1.215
−1.22
−1.225
−1.23
0
0.5
1
1.5
2
2.5
3
3.5

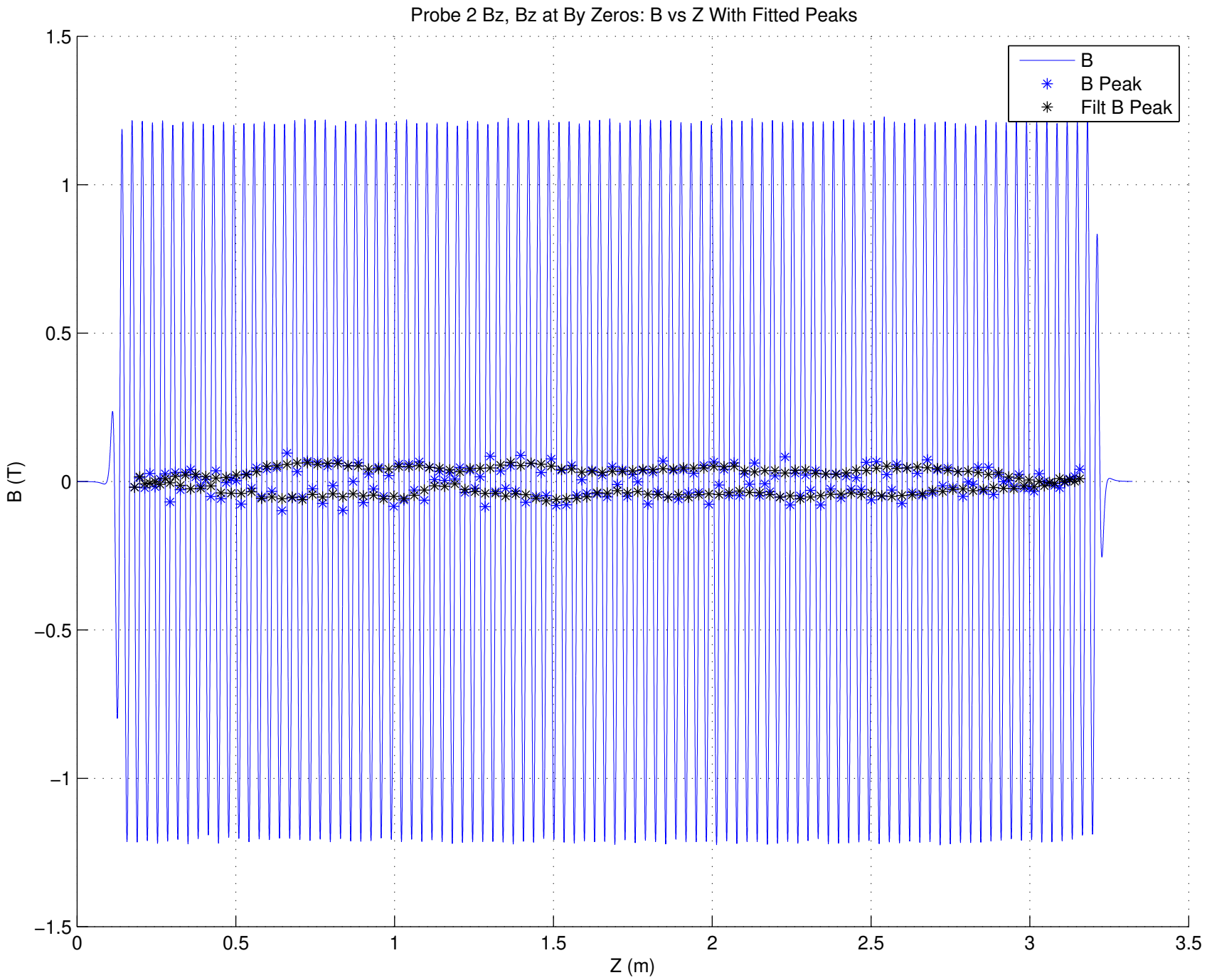

Bx vs z, Bx at By Peak, Probe 1 and Probe 2
B (T)
Z (m)
Probe 1
Probe 2
Scaled Bref
0.05
0
−0.05
0
0.5
1
1.5
2
2.5
3
3.5

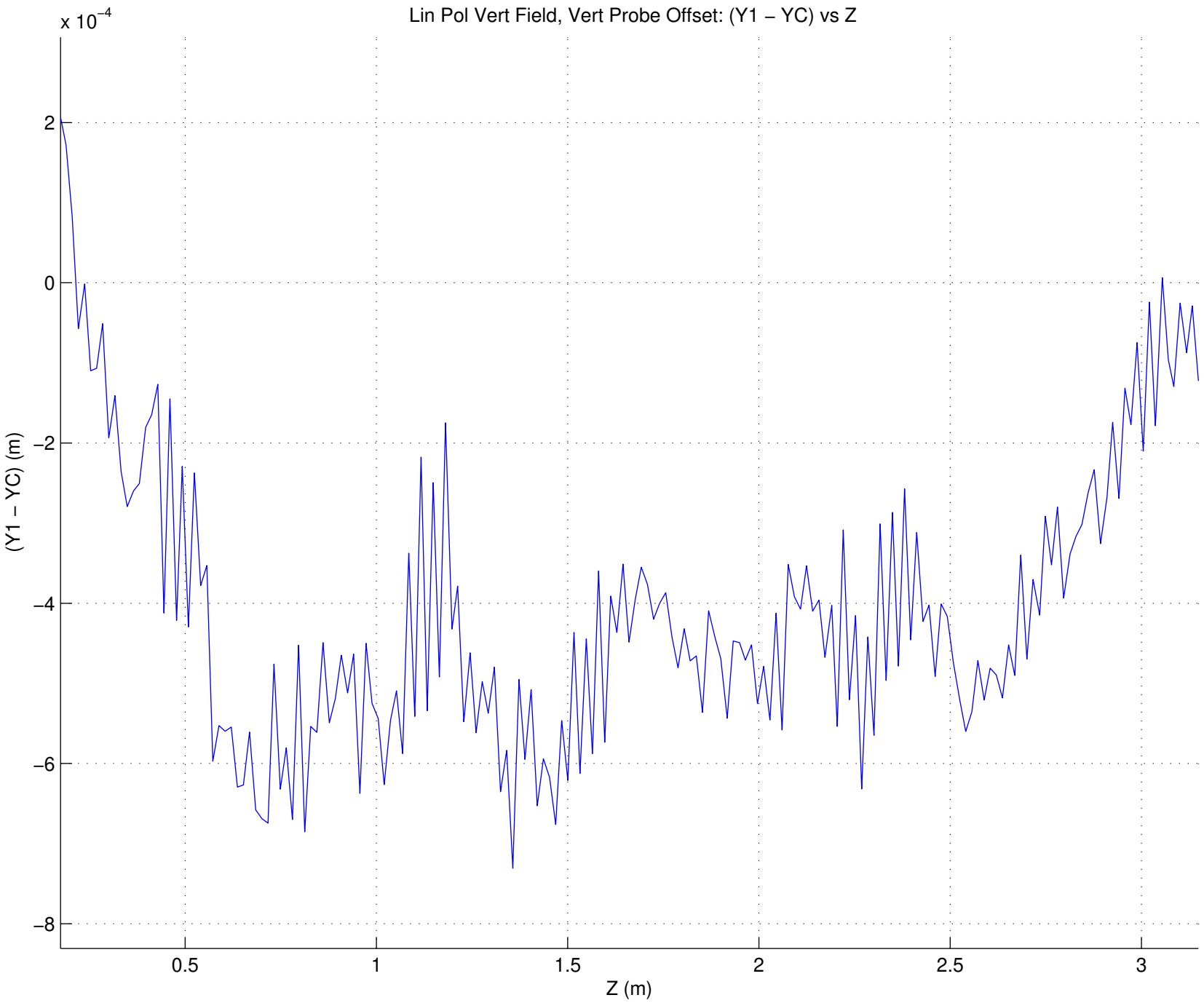

Field Difference Between Probes
dB (T)
Z (m)
dB, Probe 2 – Probe 1
dB At Ref
Filtered dB
0.02
0.015
0.01
0.005
0
−0.005
−0.01
−0.015
−0.02
0
0.5
1
1.5
2
2.5
3
3.5

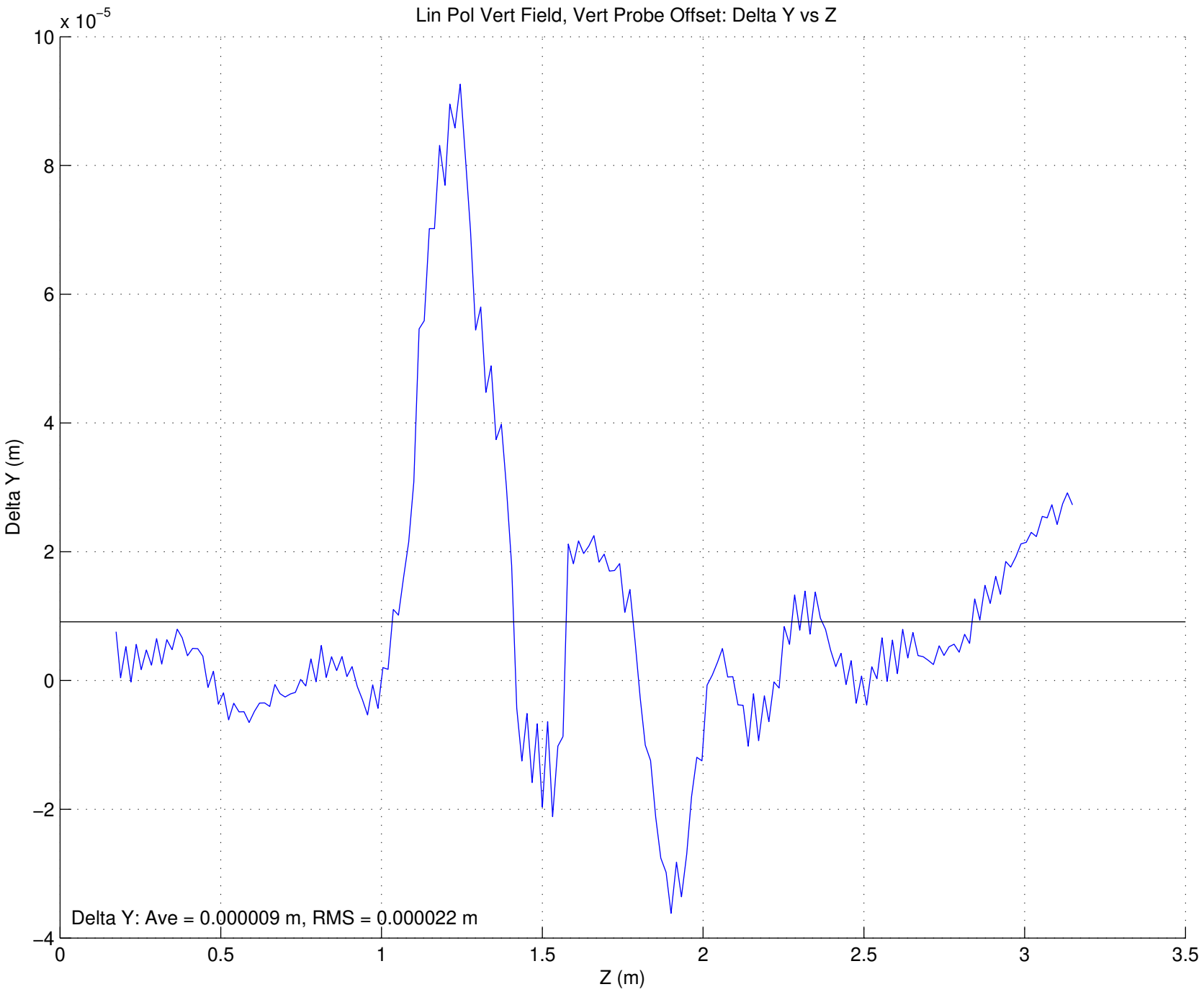

By vs z, By at Peak, Probe 1 and Probe 2
B (T)
Z (m)
Probe 1
Probe 2
Scaled Bref
0.5
0
−0.5
0
0.5
1
1.5
2
2.5
3
3.5

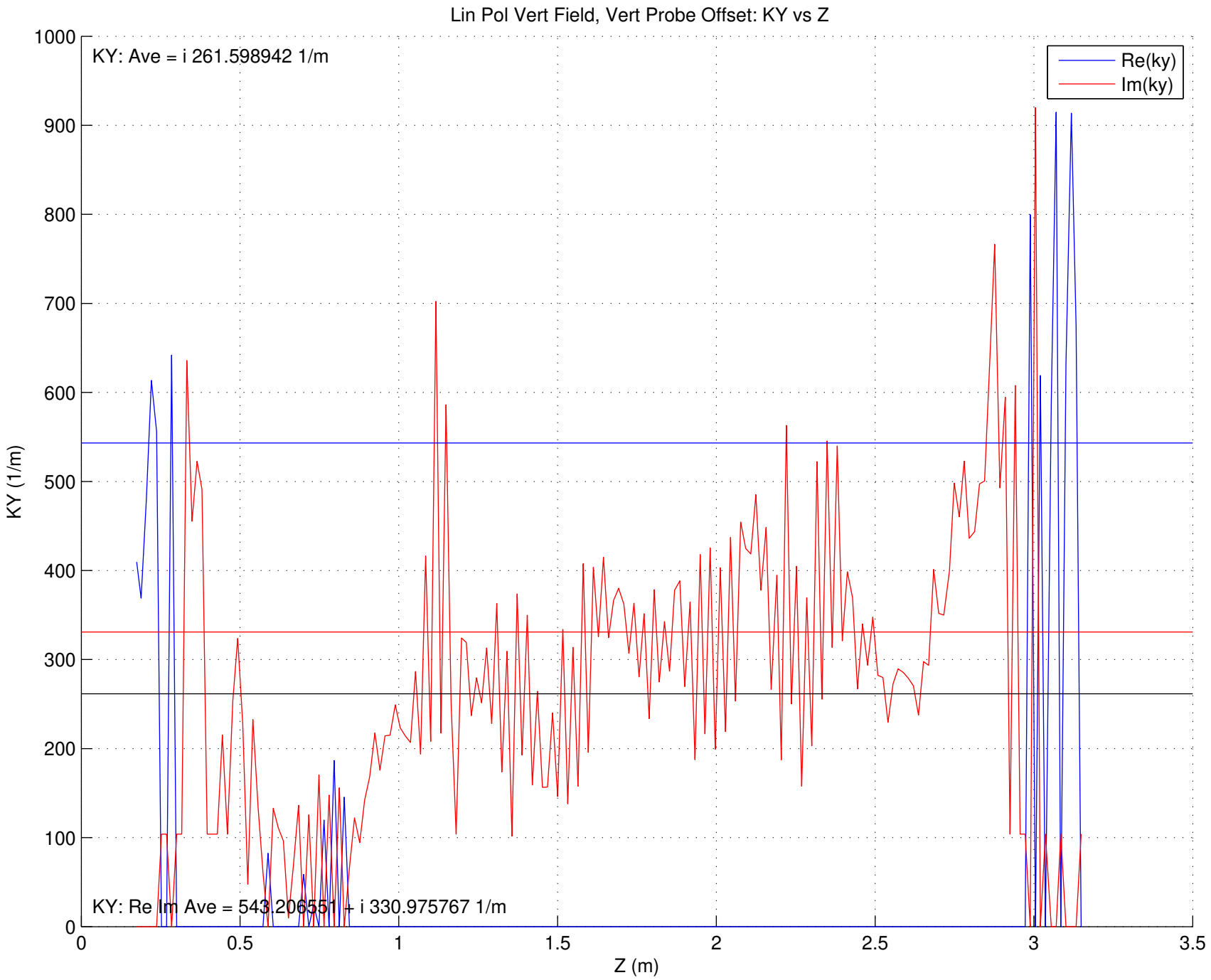

Field Difference Between Probes
dB (T)
Z (m)
dB, Probe 2 – Probe 1
dB At Ref
Filtered dB
0.04
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
−0.04
0
0.5
1
1.5
2
2.5
3
3.5

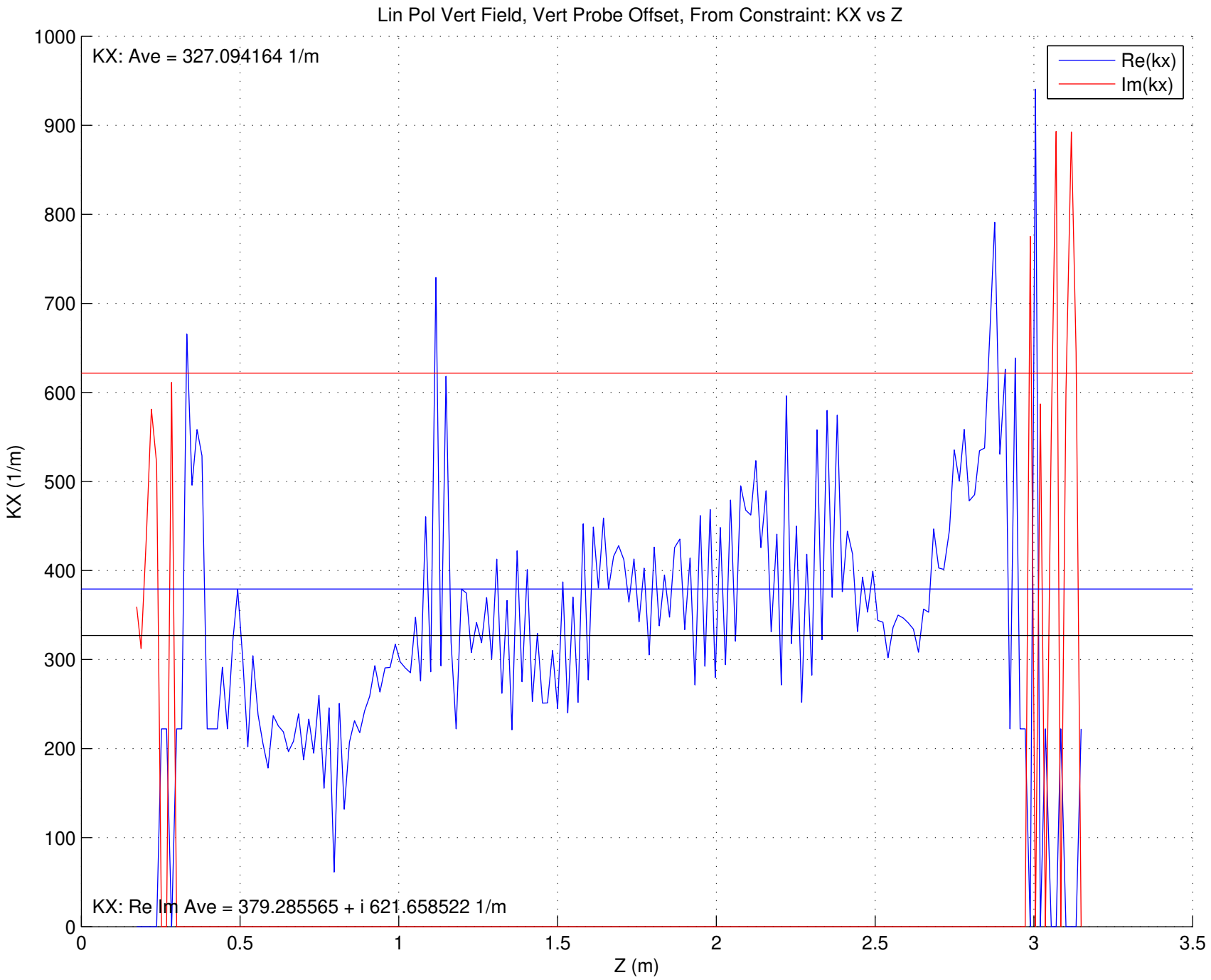

Probe 1 Bz, Bz at By Zeros: B vs Z With Fitted Peaks
B
B Peak
Filt B Peak
B (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

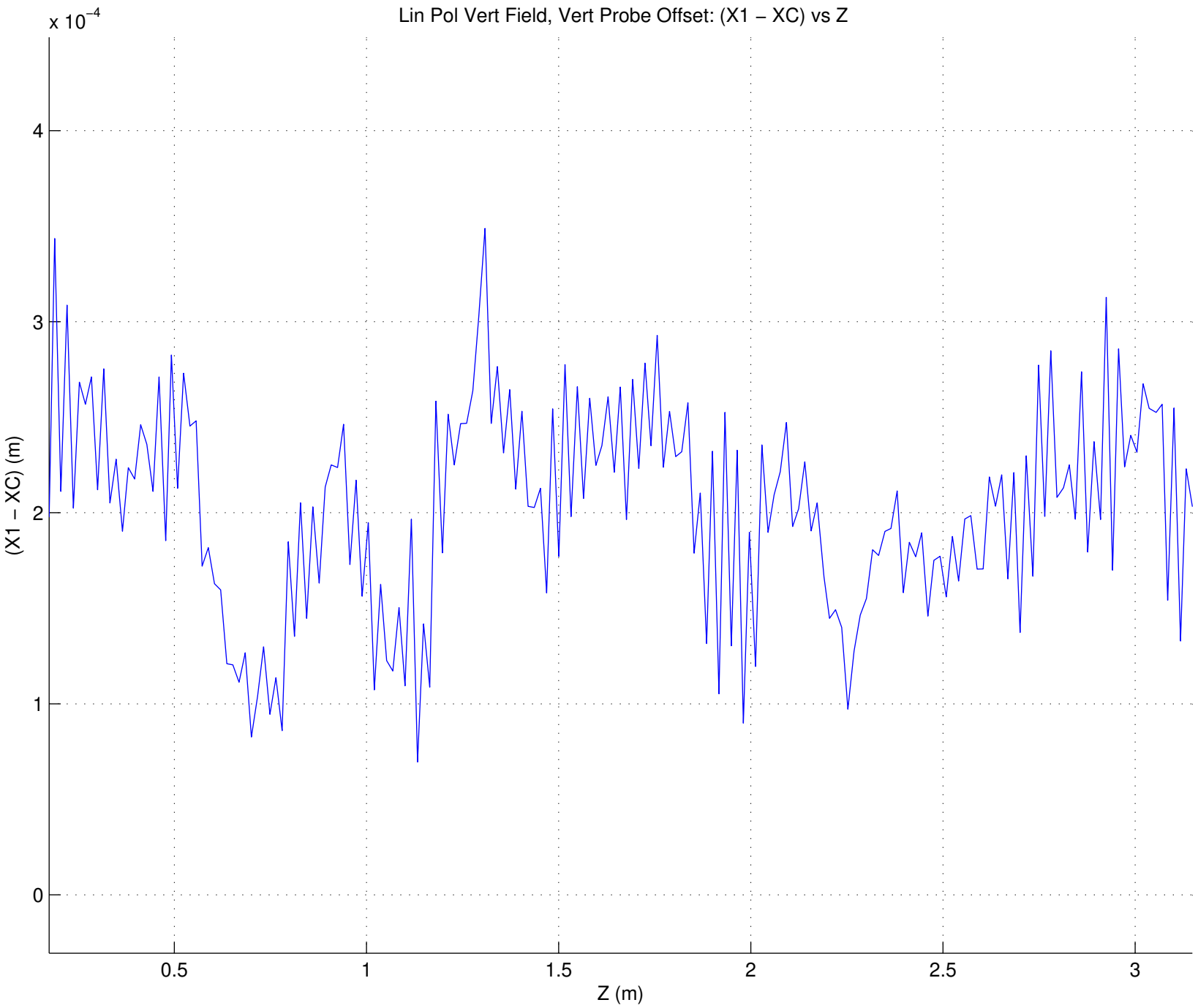

Probe 2 Bz, Bz at By Zeros: B vs Z With Fitted Peaks
B
B Peak
Filt B Peak
B (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

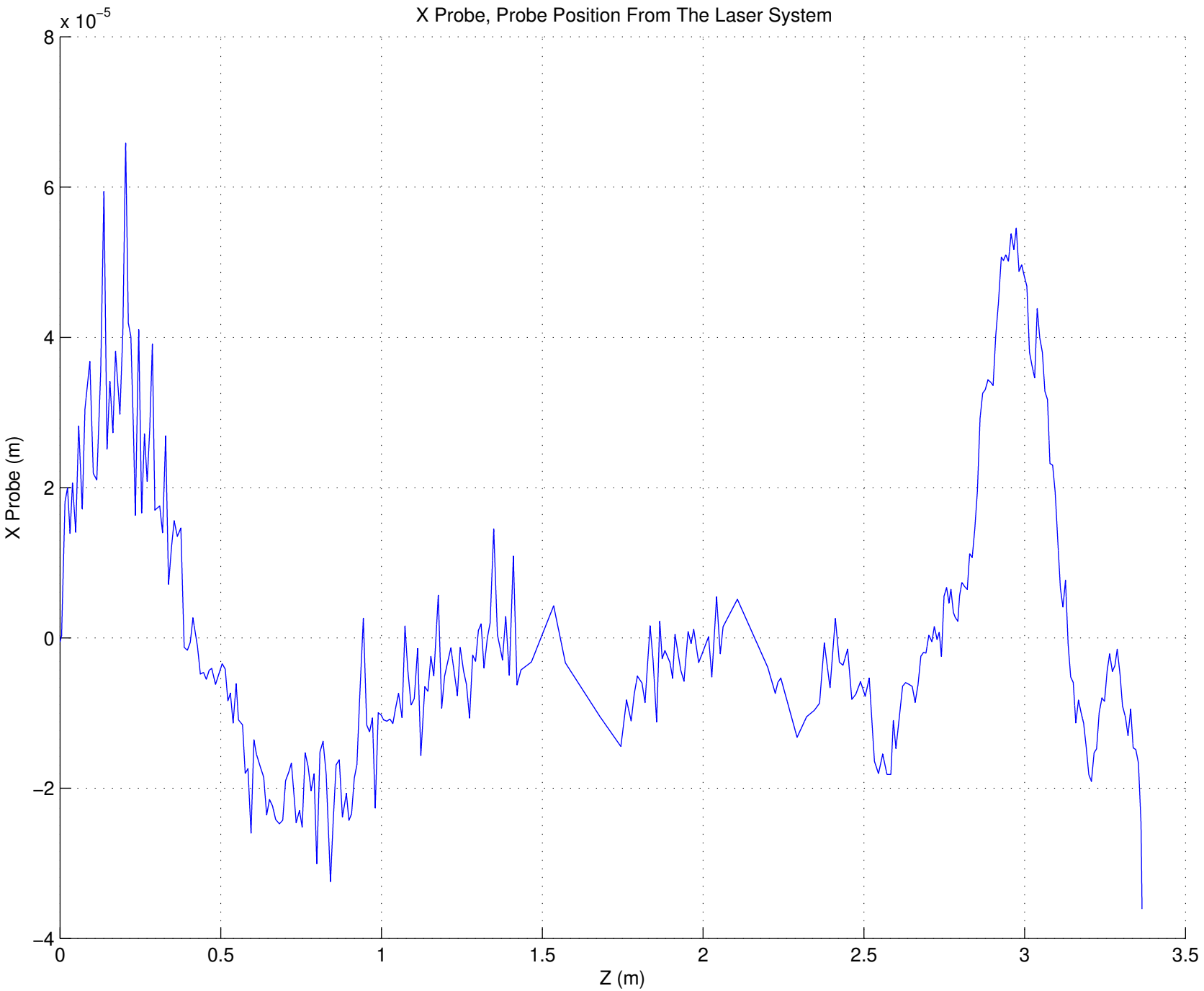

Lin Pol Vert Field, Vert Probe Offset: (Y1 – YC) vs Z
x 10^-4
2
0
−2
−4
−6
−8
(Y1 – YC) (m)
0.5
1
1.5
2
2.5
3
Z (m)

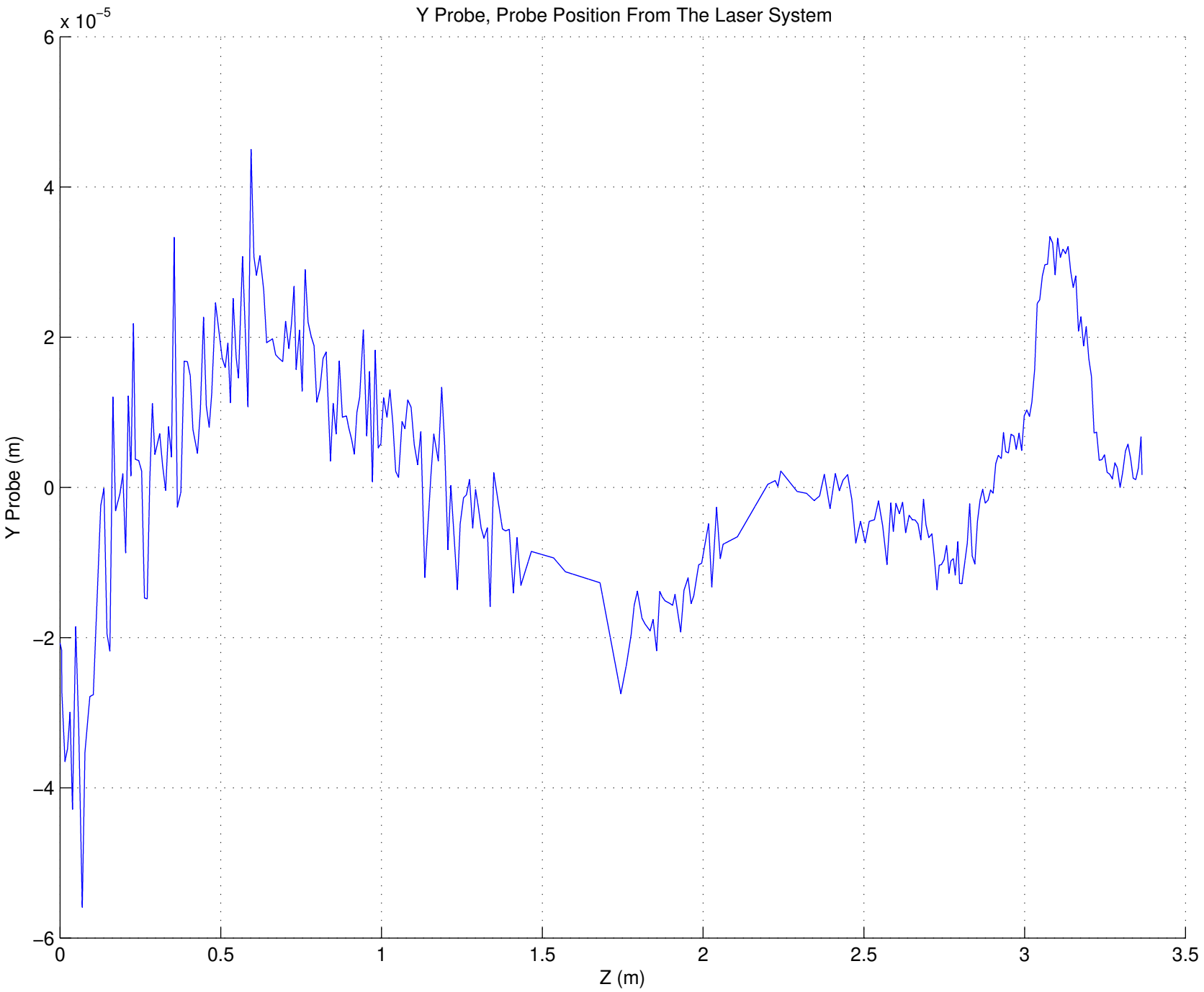

Lin Pol Vert Field, Vert Probe Offset: Delta Y vs Z
x 10^-5
10
8
6
4
2
0
−2
−4
Delta Y (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)
Delta Y: Ave = 0.000009 m, RMS = 0.000022 m

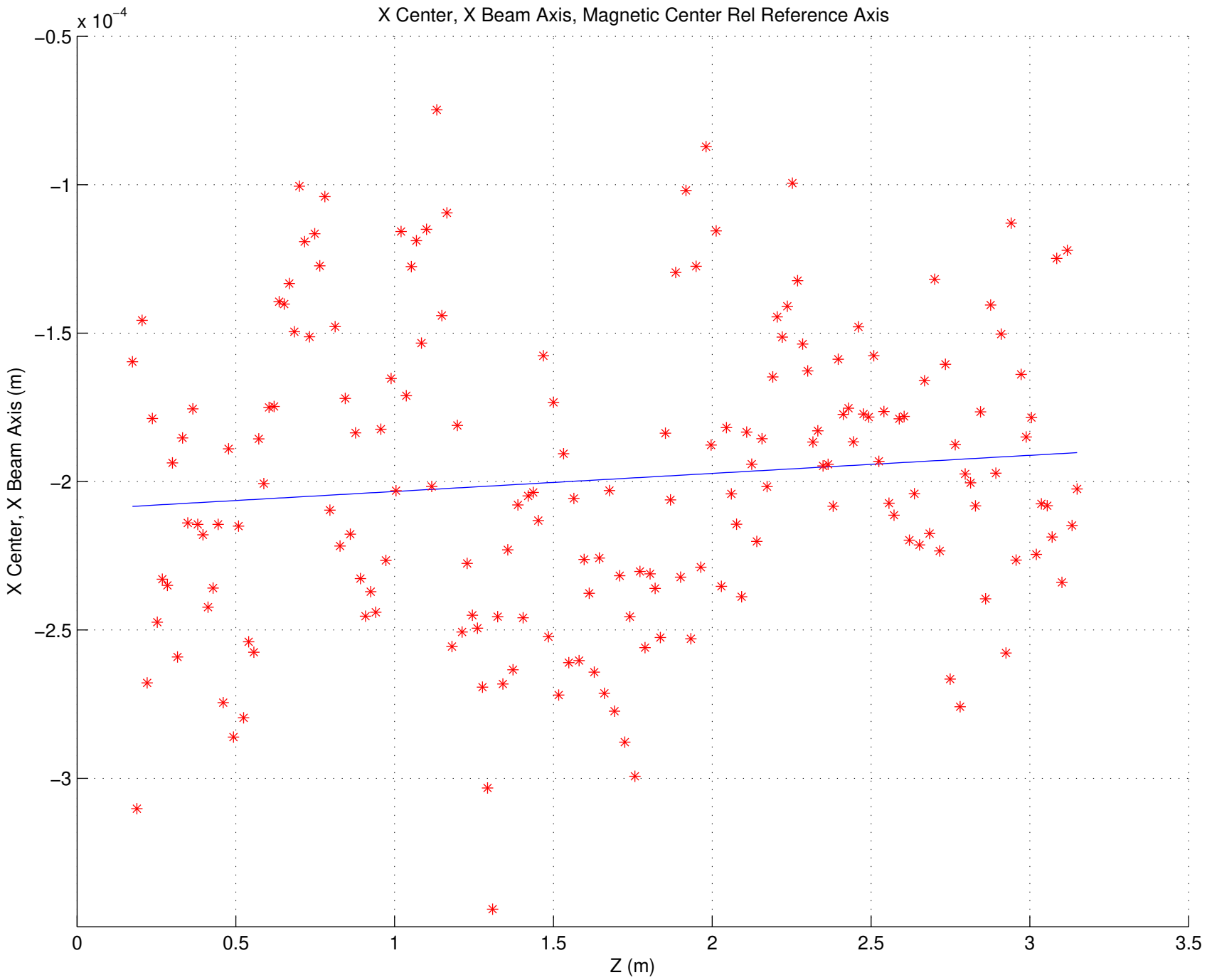

Lin Pol Vert Field, Vert Probe Offset: KY vs Z
KY: Ave = i 261.598942 1/m
KY: Re Im Ave = 543.206551 + i 330.975767 1/m
Re(ky)
Im(ky)
KY (1/m)
Z (m)
0
100
200
300
400
500
600
700
800
900
1000
0
0.5
1
1.5
2
2.5
3
3.5

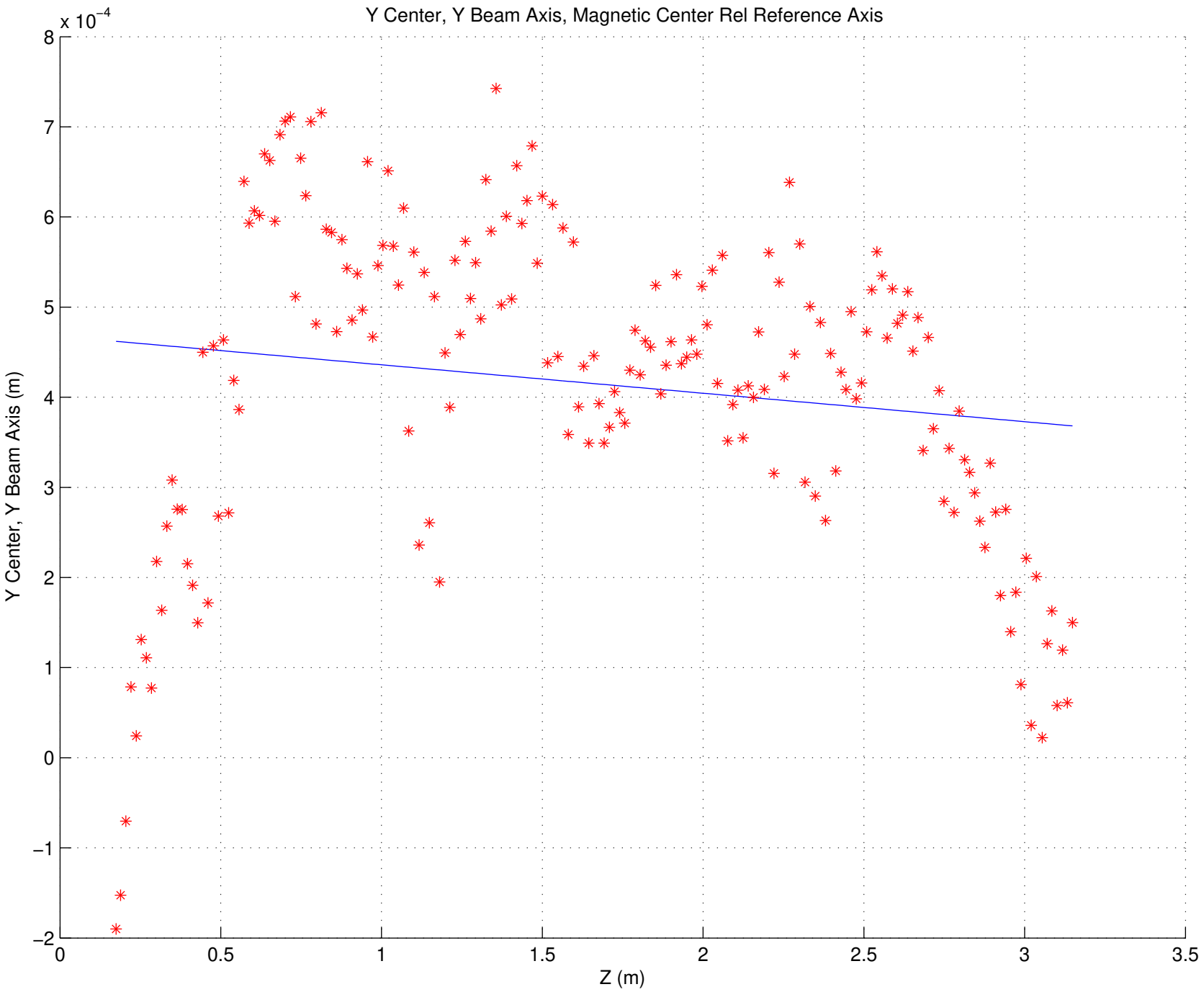

Lin Pol Vert Field, Vert Probe Offset, From Constraint: KX vs Z
KX: Ave = 327.094164 1/m
KX: Re Im Ave = 379.285565 + i 621.658522 1/m
Re(kx)
Im(kx)
KX (1/m)
Z (m)
0
100
200
300
400
500
600
700
800
900
1000
0
0.5
1
1.5
2
2.5
3
3.5

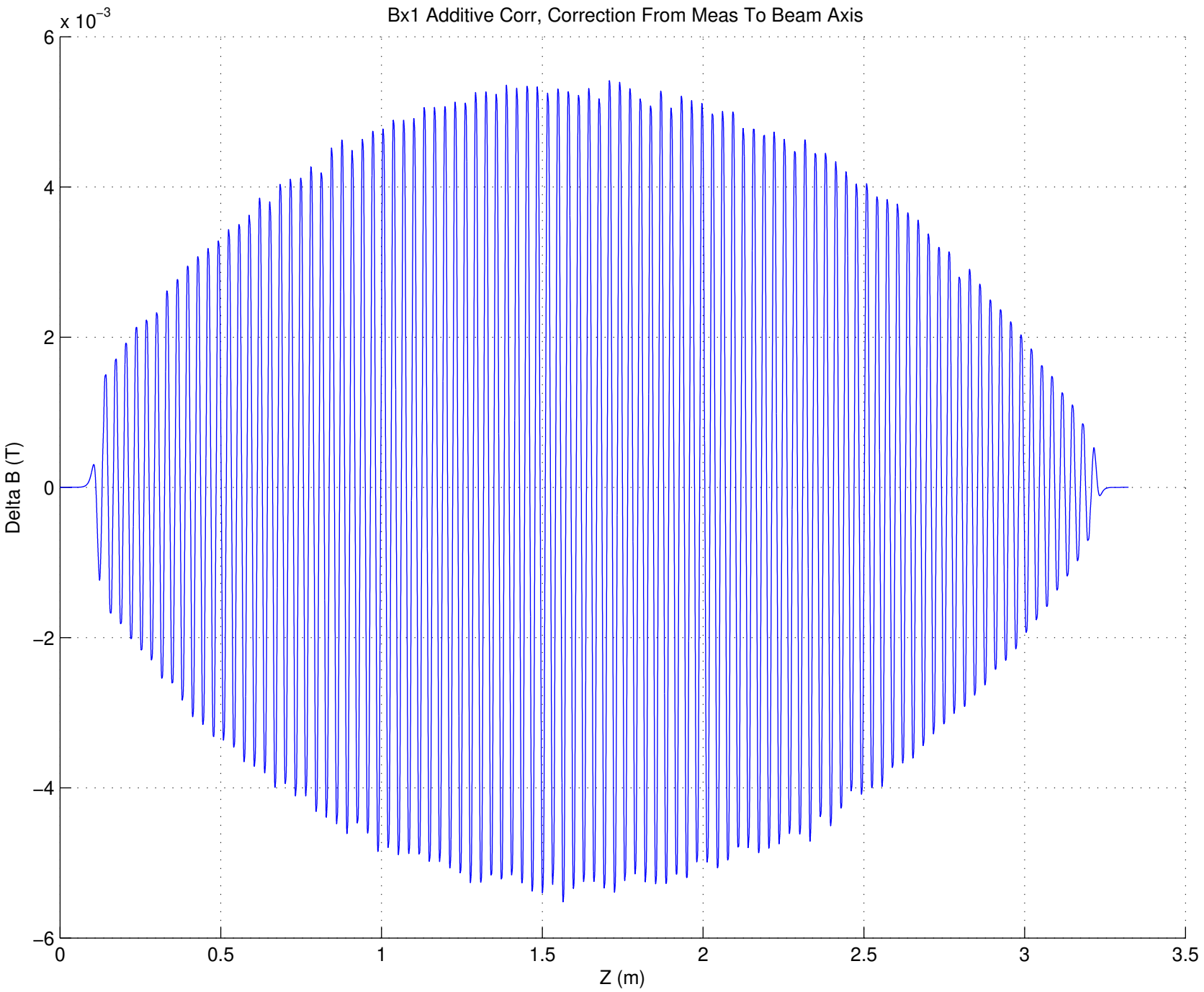

Lin Pol Vert Field, Vert Probe Offset: (X1 – XC) vs Z
x 10^-4
4
3
2
1
0
(X1 – XC) (m)
0.5
1
1.5
2
2.5
3
Z (m)

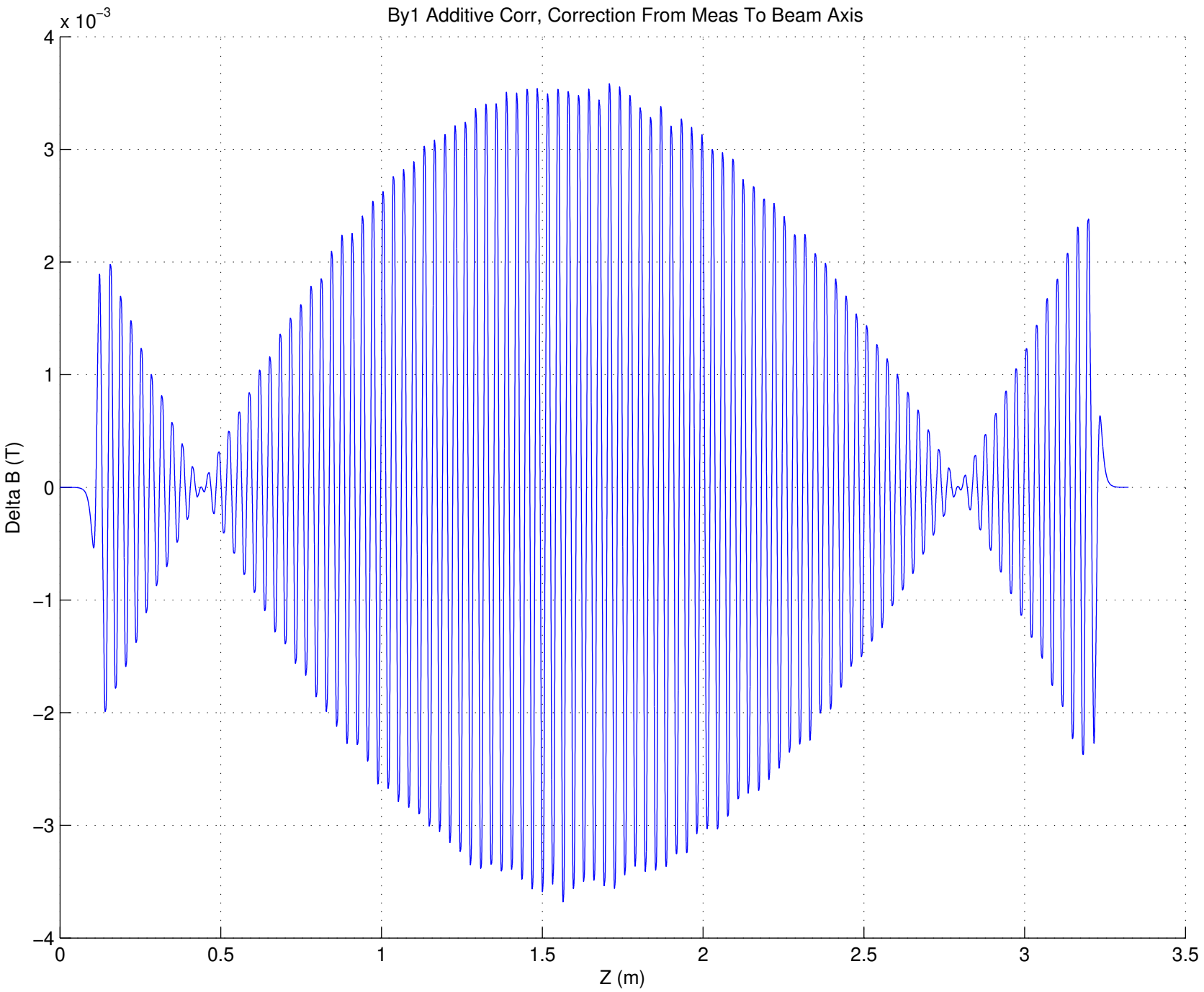

X Probe, Probe Position From The Laser System
x 10^-5
8
6
4
2
0
−2
−4
X Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

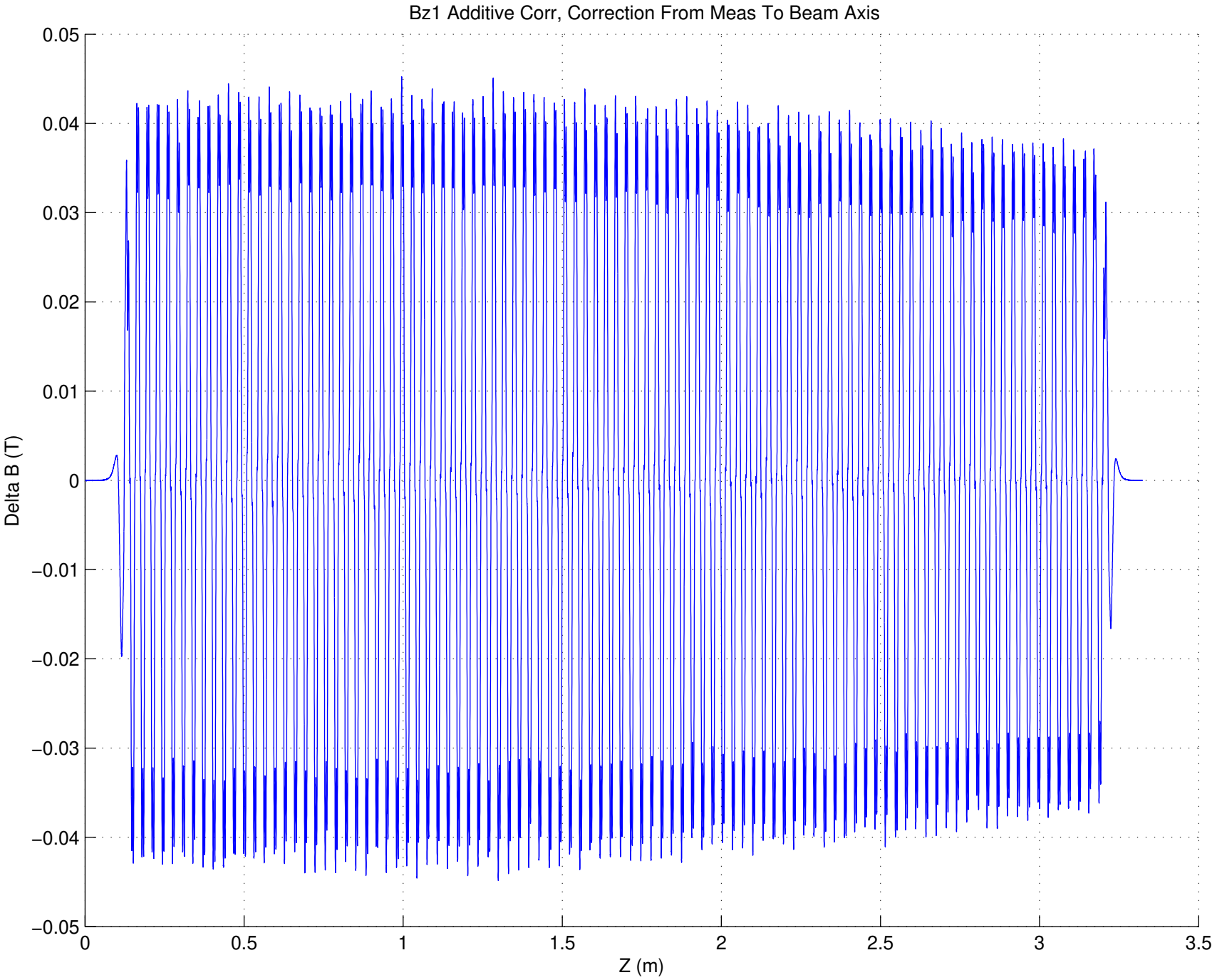

Y Probe, Probe Position From The Laser System
x 10^-5
6
4
2
0
−2
−4
−6
Y Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

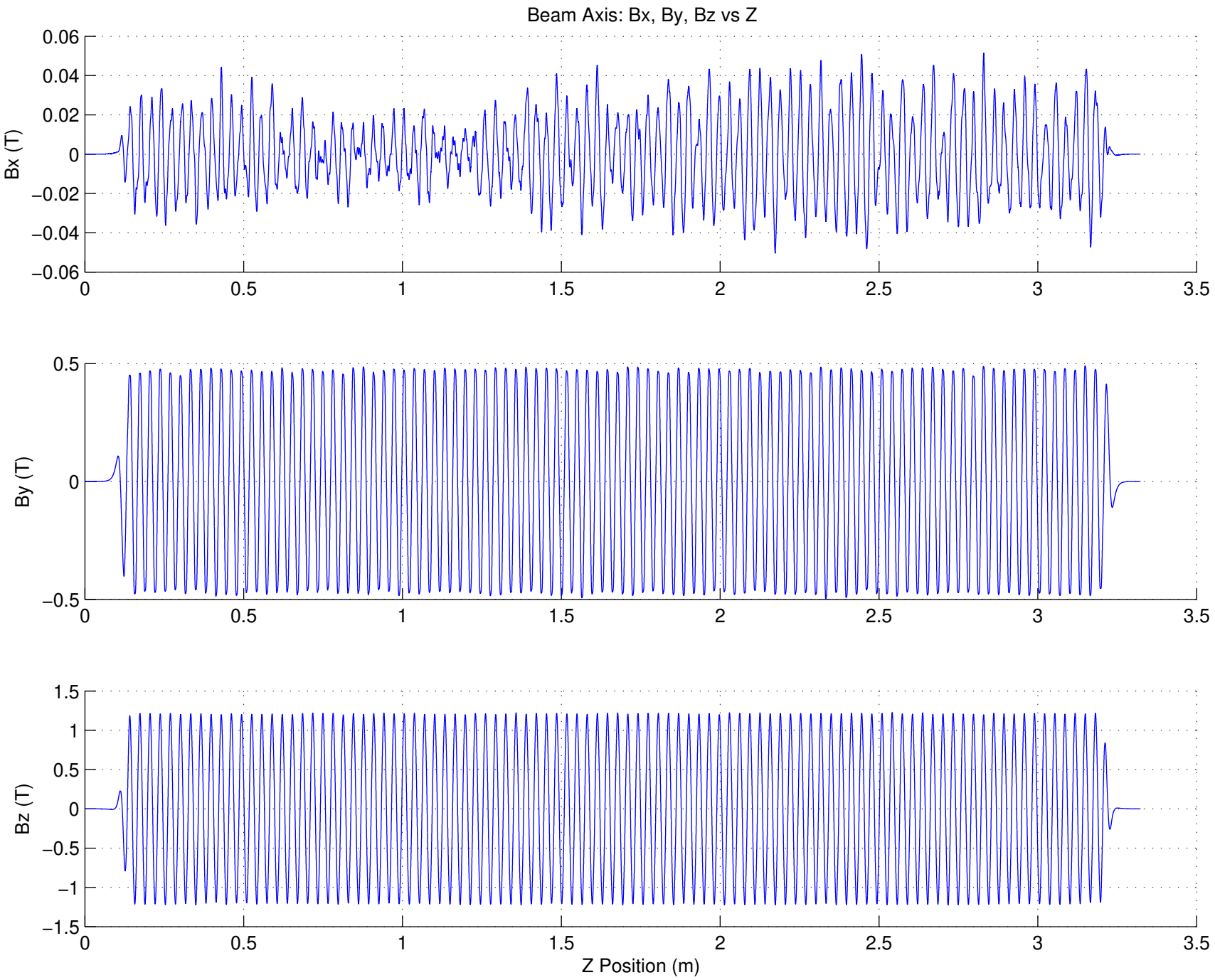

X Center, X Beam Axis, Magnetic Center Rel Reference Axis
x 10^-4
−0.5
−1
−1.5
−2
−2.5
−3
X Center, X Beam Axis (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)


Y Center, Y Beam Axis, Magnetic Center Rel Reference Axis
x 10^-4
8
7
6
5
4
3
2
1
0
−1
−2
Y Center, Y Beam Axis (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)


Bx1 Additive Corr, Correction From Meas To Beam Axis
x 10^-3
6
4
2
0
−2
−4
−6
Delta B (T)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)


By1 Additive Corr, Correction From Meas To Beam Axis
x 10^-3
4
3
2
1
0
−1
−2
−3
−4
Delta B (T)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)


Bz1 Additive Corr, Correction From Meas To Beam Axis
Delta B (T)
Z (m)
0.05
0.04
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
−0.04
−0.05
0
0.5
1
1.5
2
2.5
3
3.5


Beam Axis: Bx, By, Bz vs Z
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
By (T)
0.5
0
−0.5
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z Position (m)