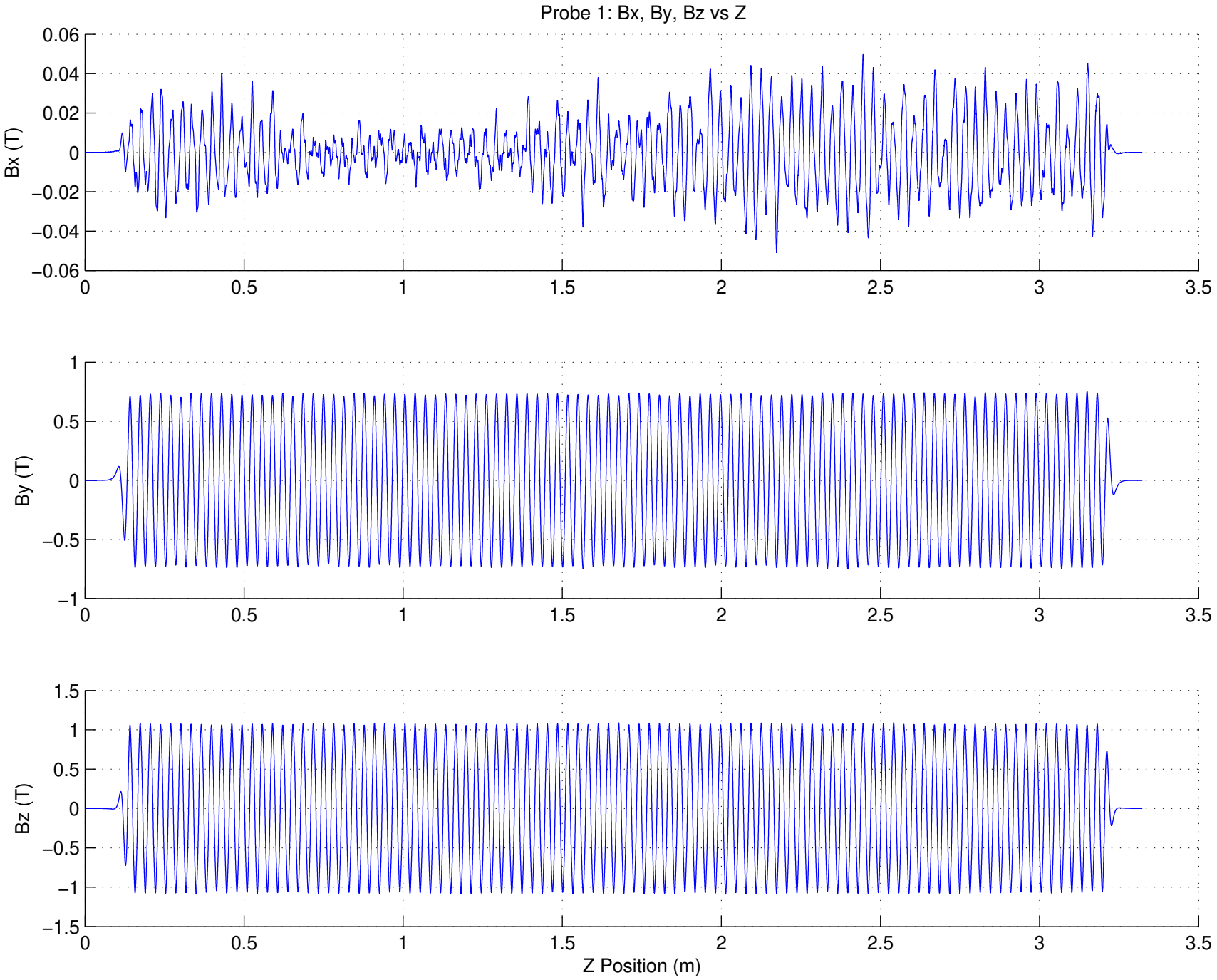
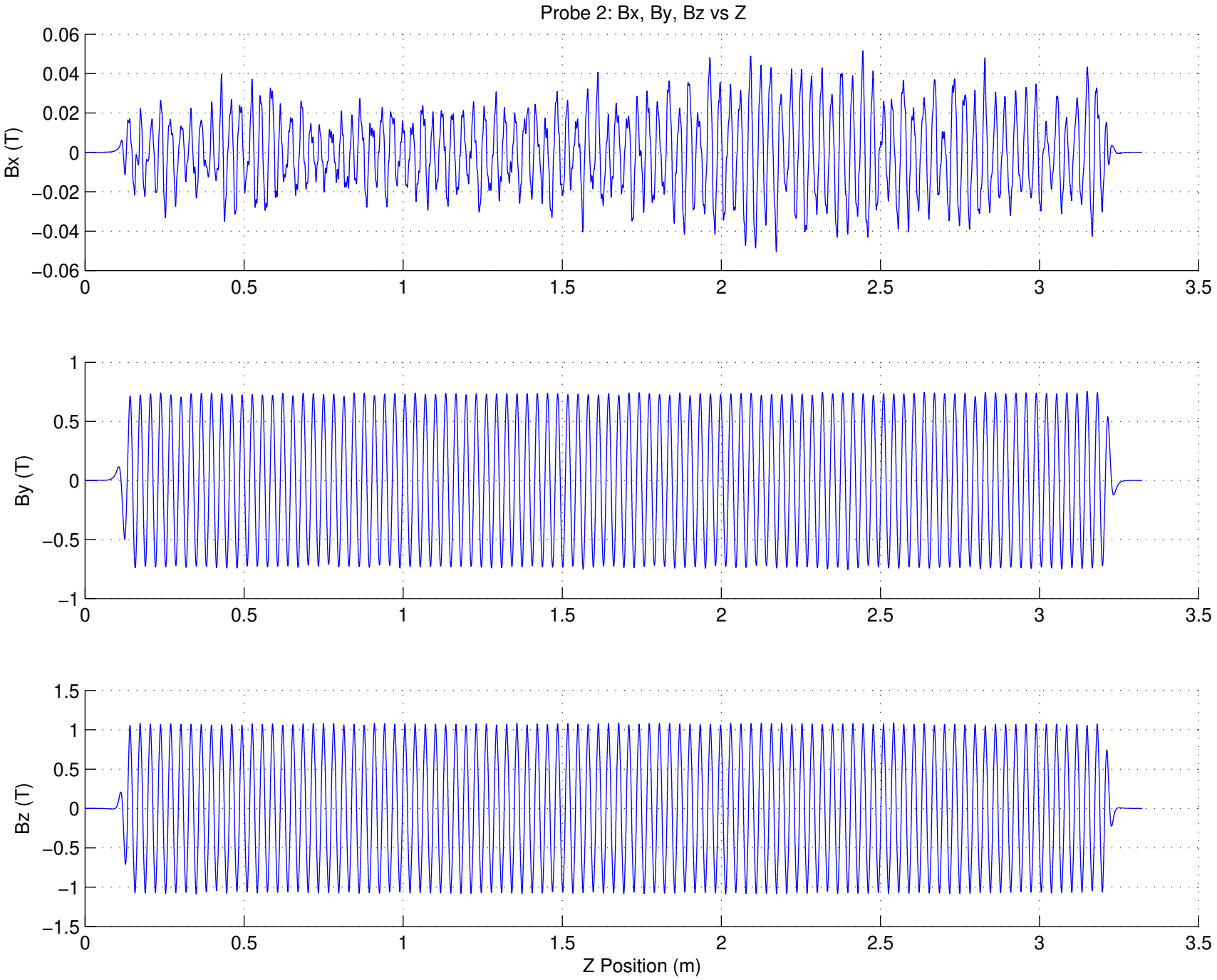
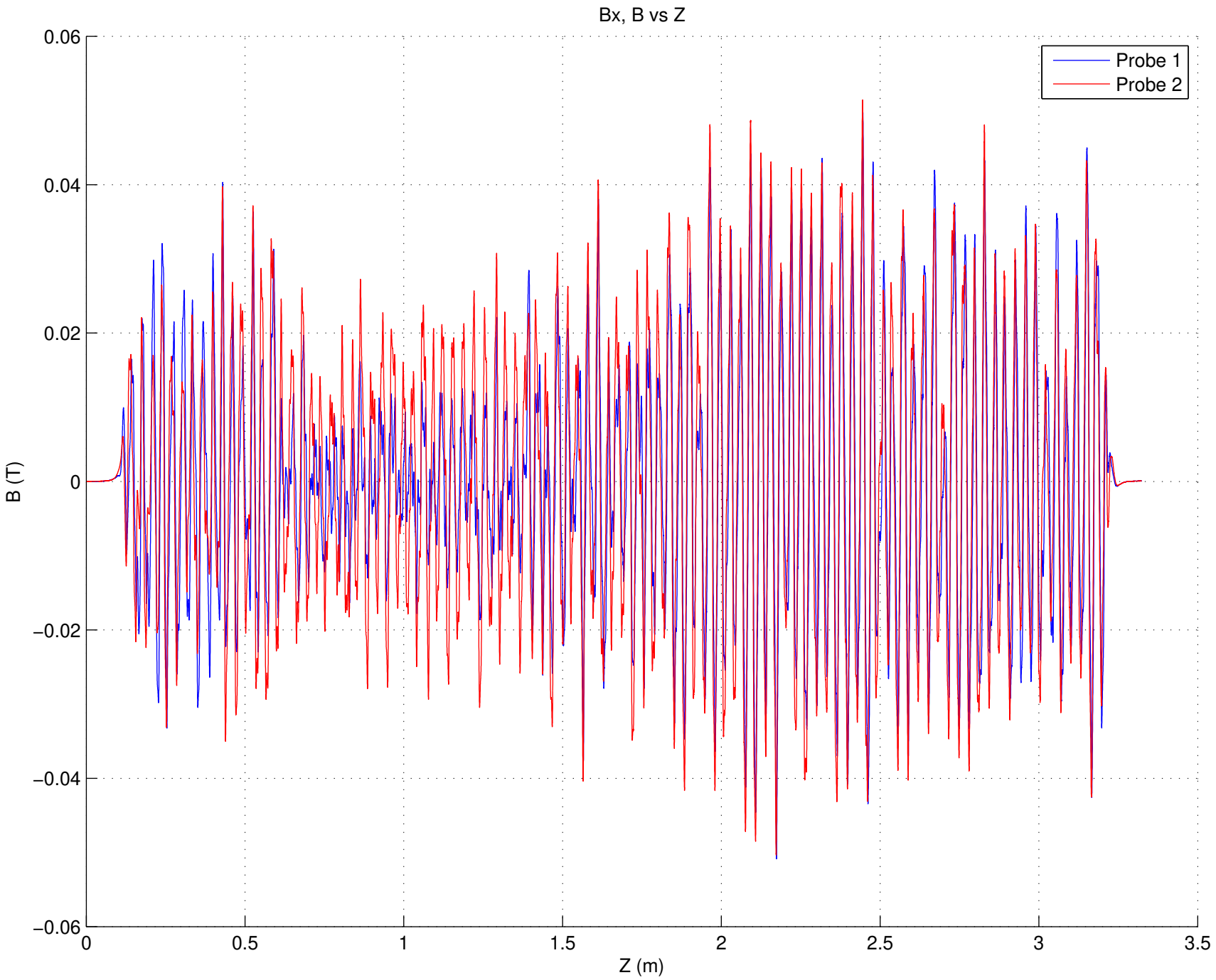
SLAC Magnetic Measurements

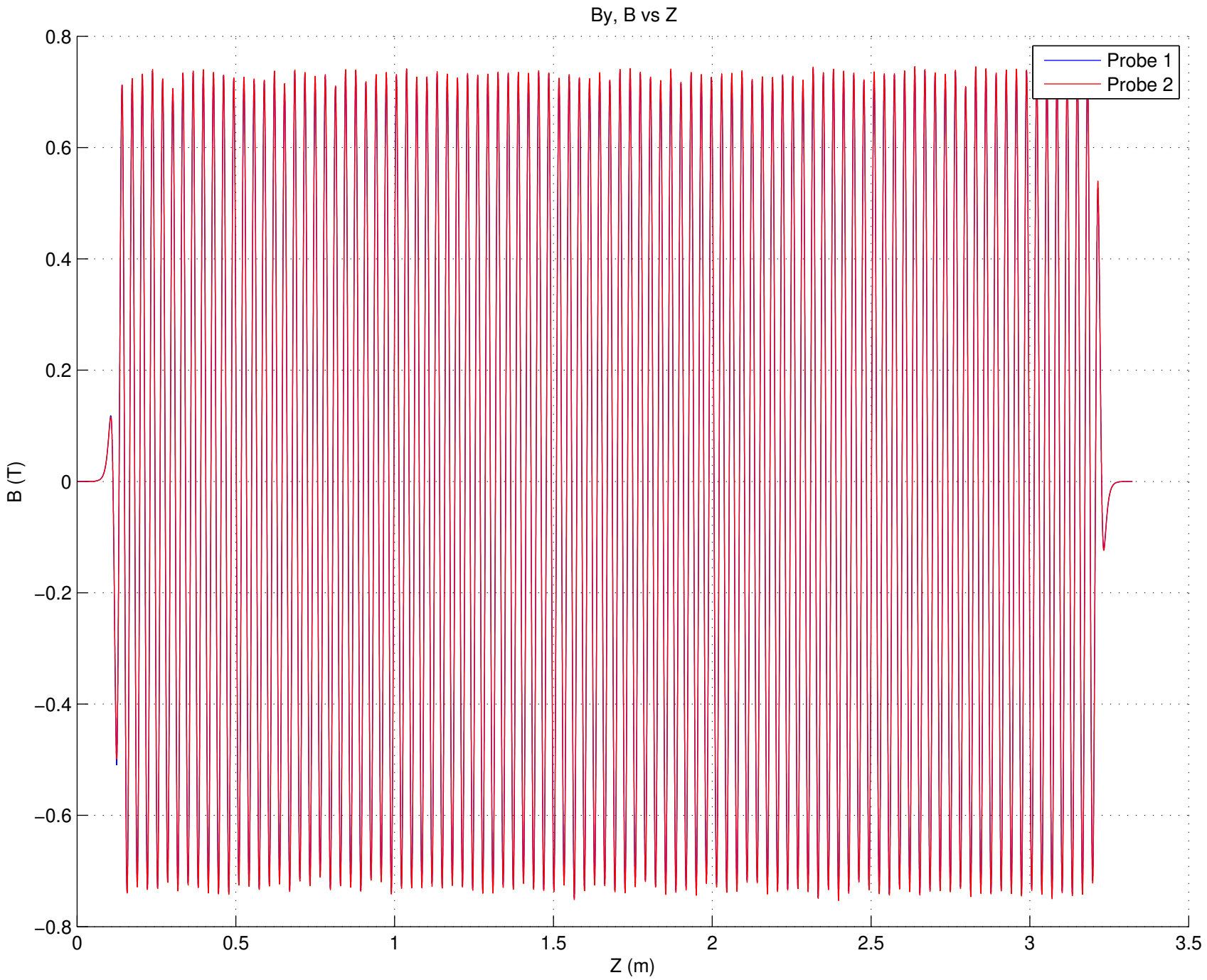
Hall Probe Array Analysis
****

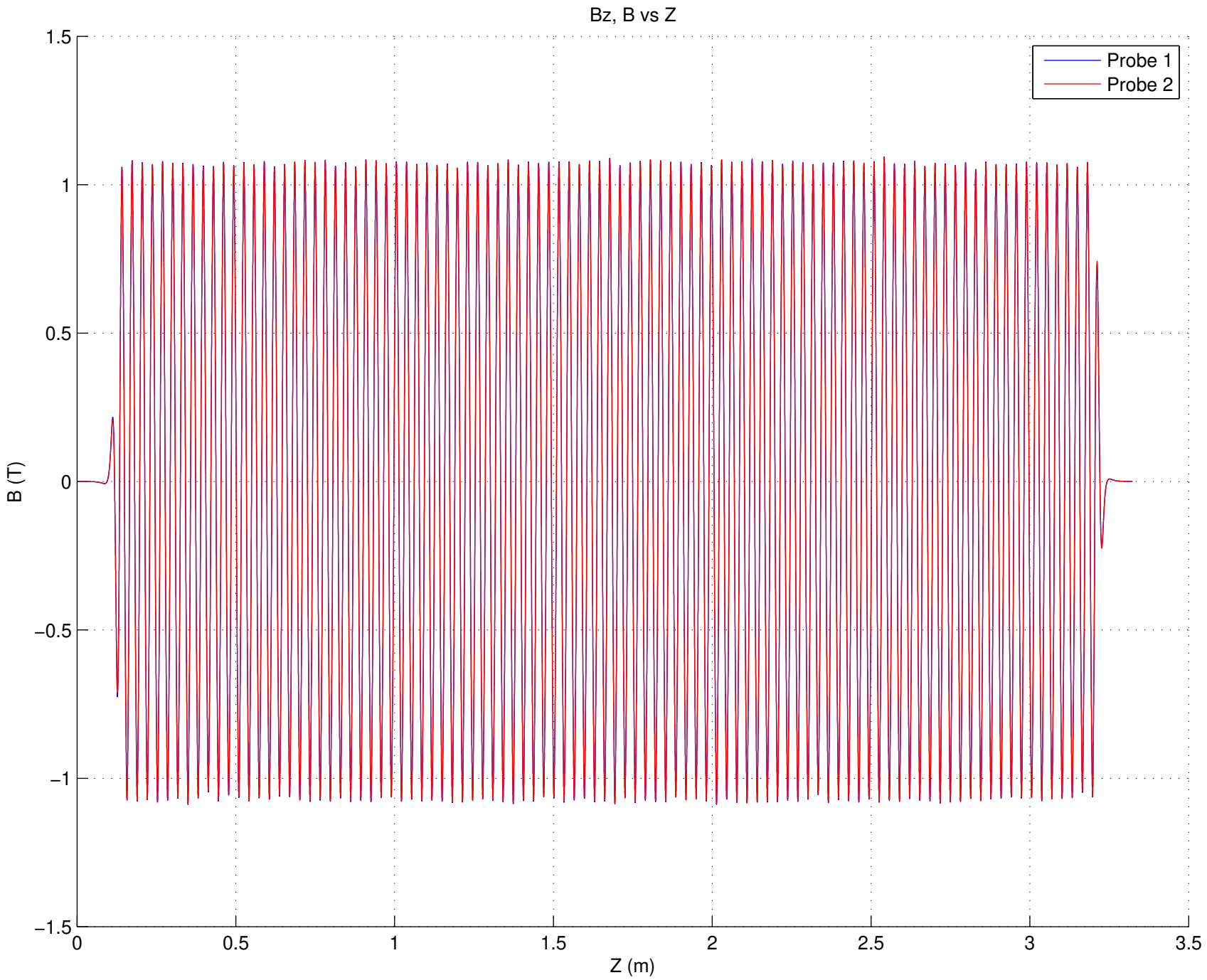
Parameters:
INPUT−FILE−DIR =V:\MET\MagServe\MagData\DELTA\Delta data\Assembled Measurements\Final Measurements\LPVMF\KR0
INPUT−FILE−NAME =DUTestOutput.dat
INPUT−FILE−TYPE =ZVXYZVXYZH
UND−POL−MODE =LIN−POL−VERT−FIELD
PROBE1−BX−CALIB−FILE =v:\MET\MagServe\MagData\LCLS\Hall probe\SENIS−119−12\SENIS−119−12−X.ini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

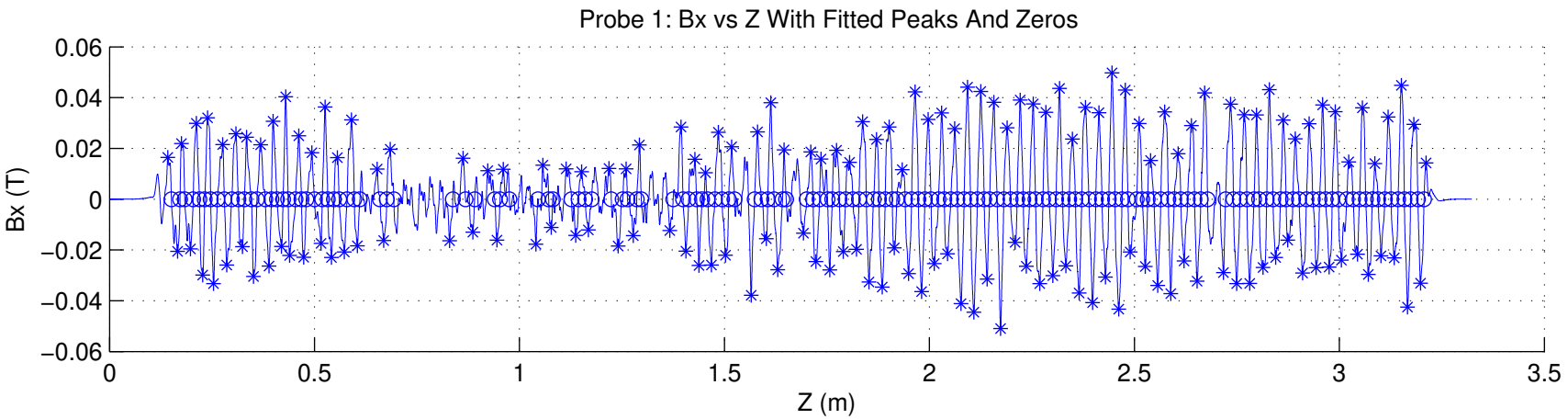

Probe 1: Bx, By, Bz vs Z
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
By (T)
1
0.5
0
−0.5
−1
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z Position (m)

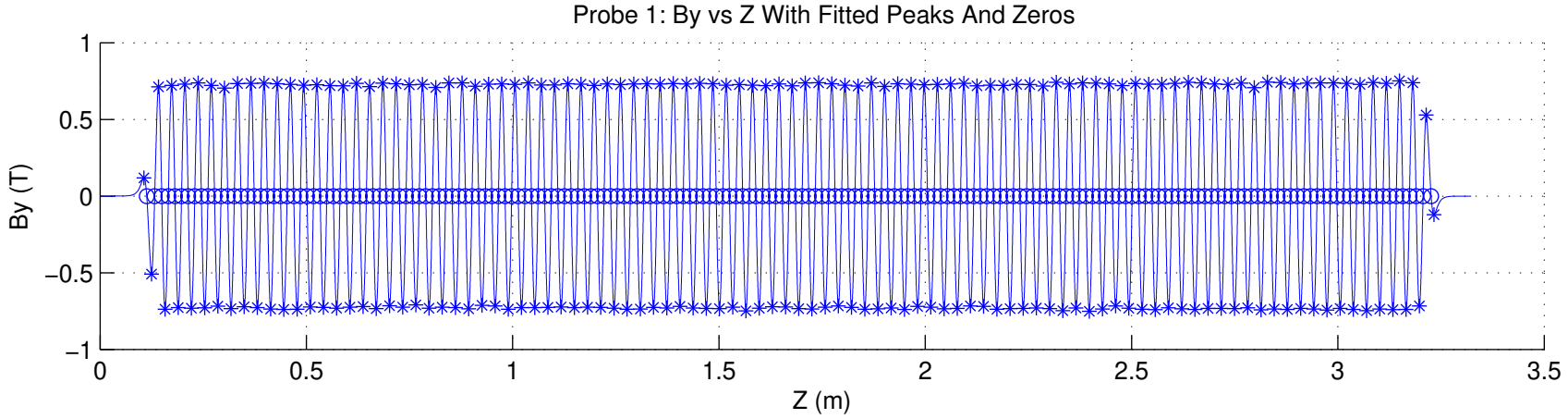

Probe 2: Bx, By, Bz vs Z
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
By (T)
1
0.5
0
−0.5
−1
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z Position (m)

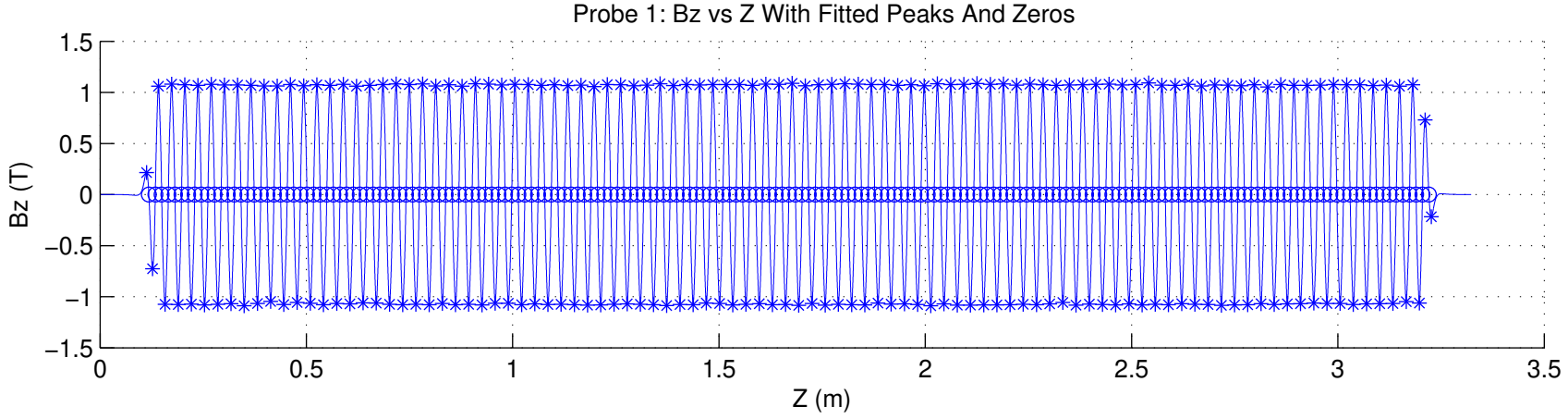

Bx, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
0
0.5
1
1.5
2
2.5
3
3.5

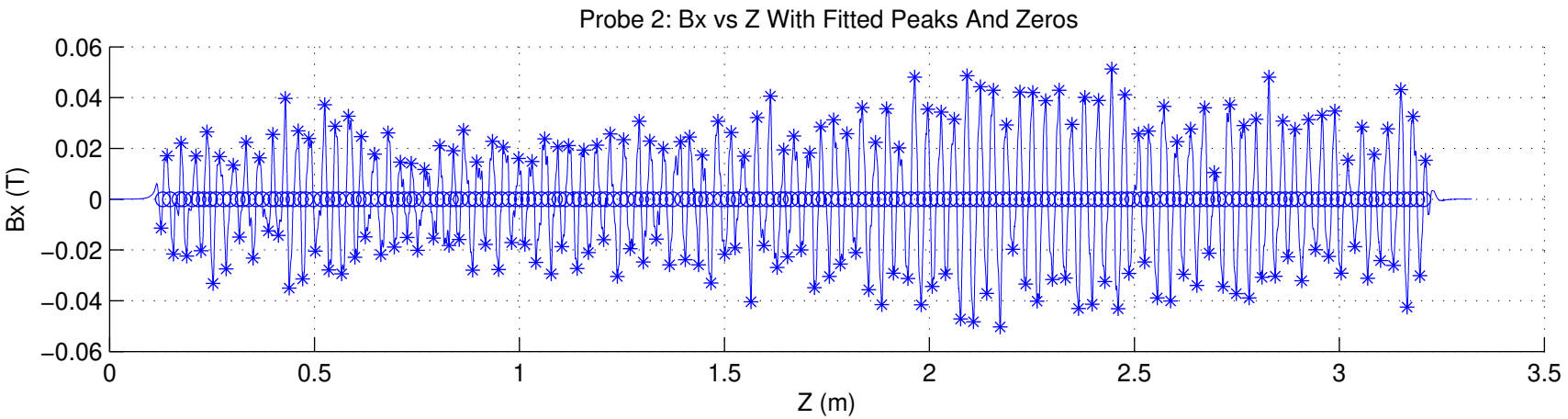

By, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
0
0.5
1
1.5
2
2.5
3
3.5

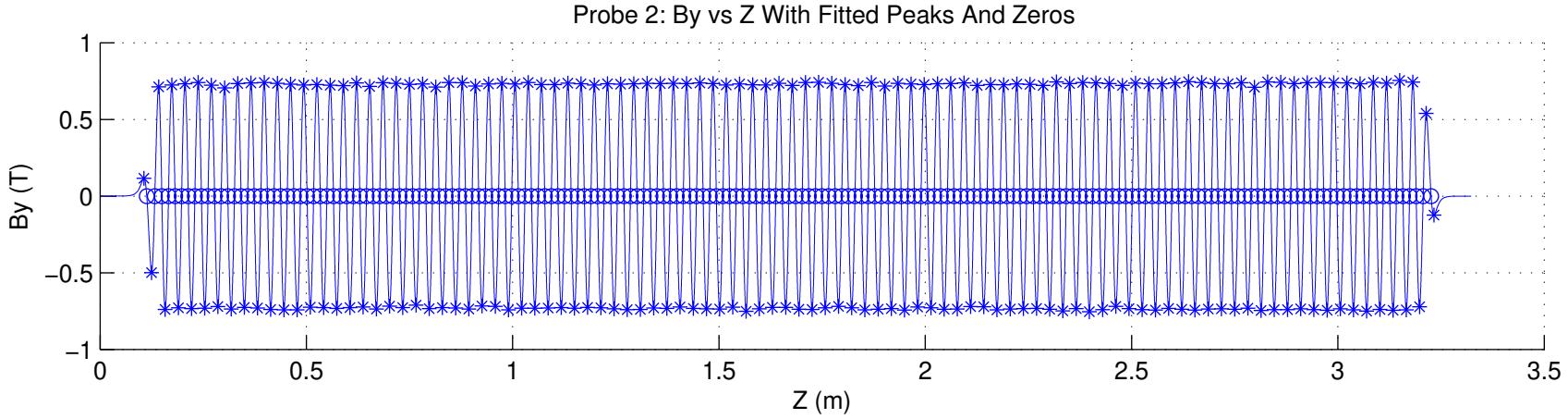

Bz, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

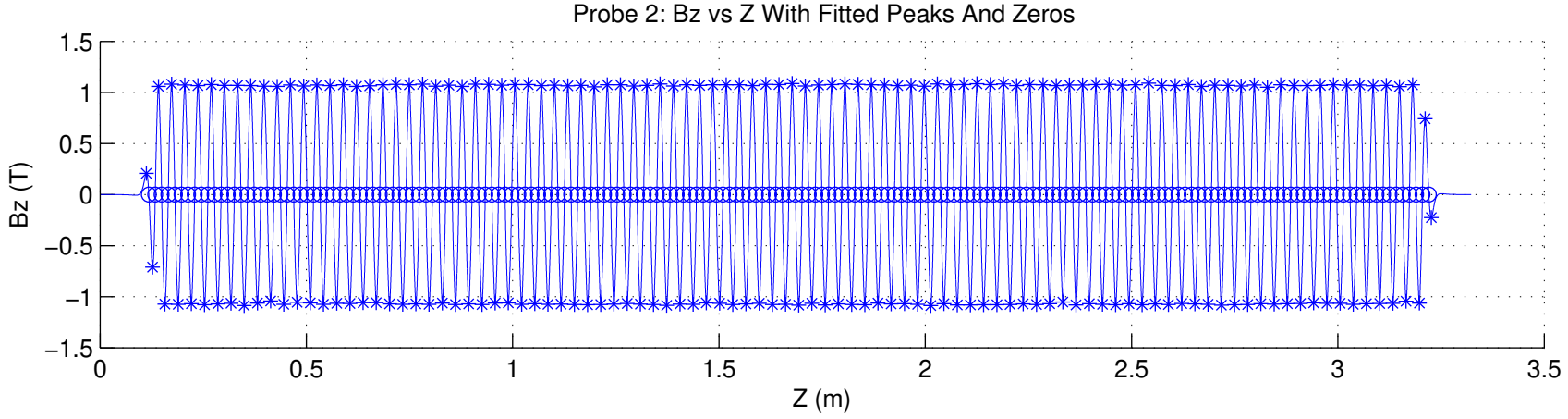

Probe 1: Bx vs Z With Fitted Peaks And Zeros
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

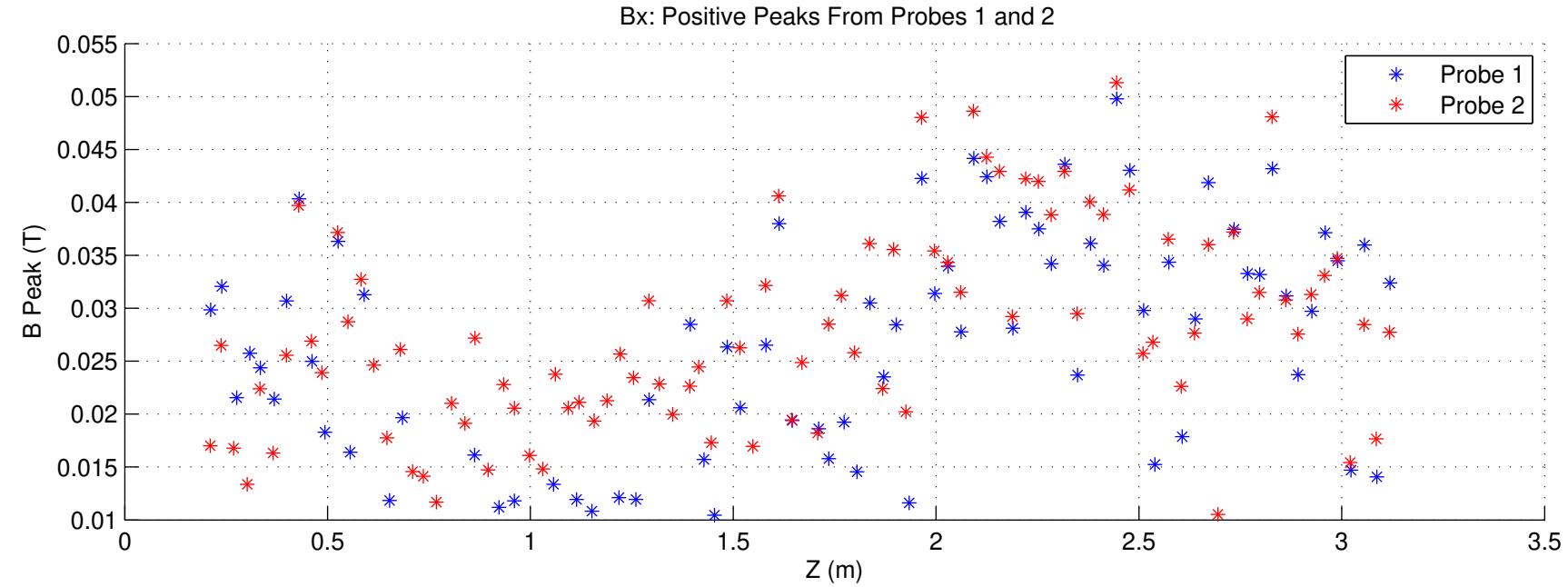

Probe 1: By vs Z With Fitted Peaks And Zeros
By (T)
1
0.5
0
−0.5
−1
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

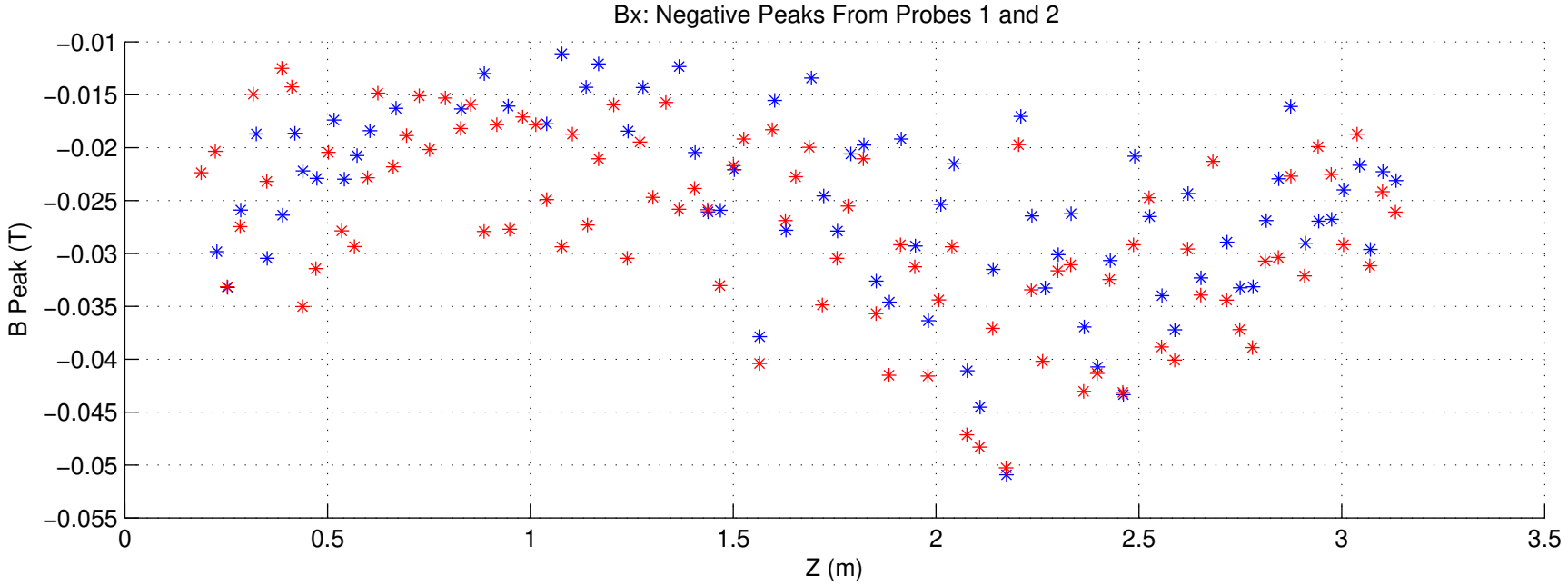

Probe 1: Bz vs Z With Fitted Peaks And Zeros
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

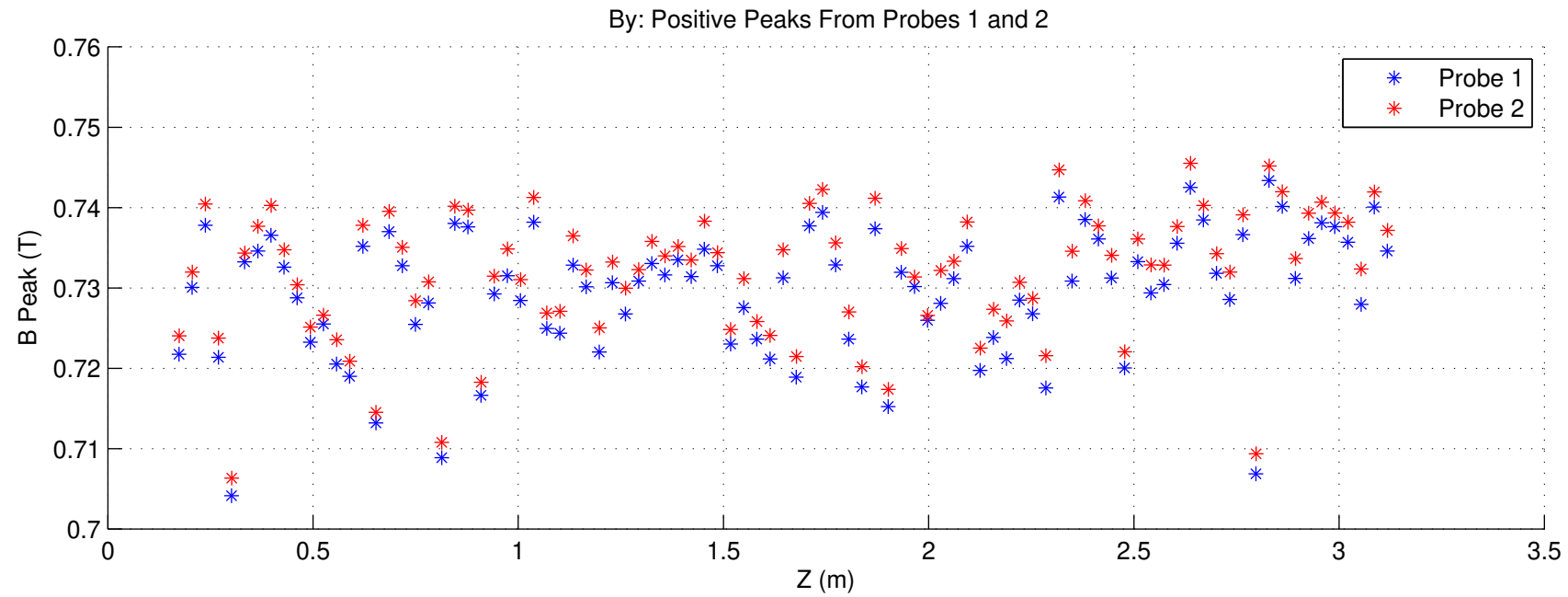

Probe 2: Bx vs Z With Fitted Peaks And Zeros
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

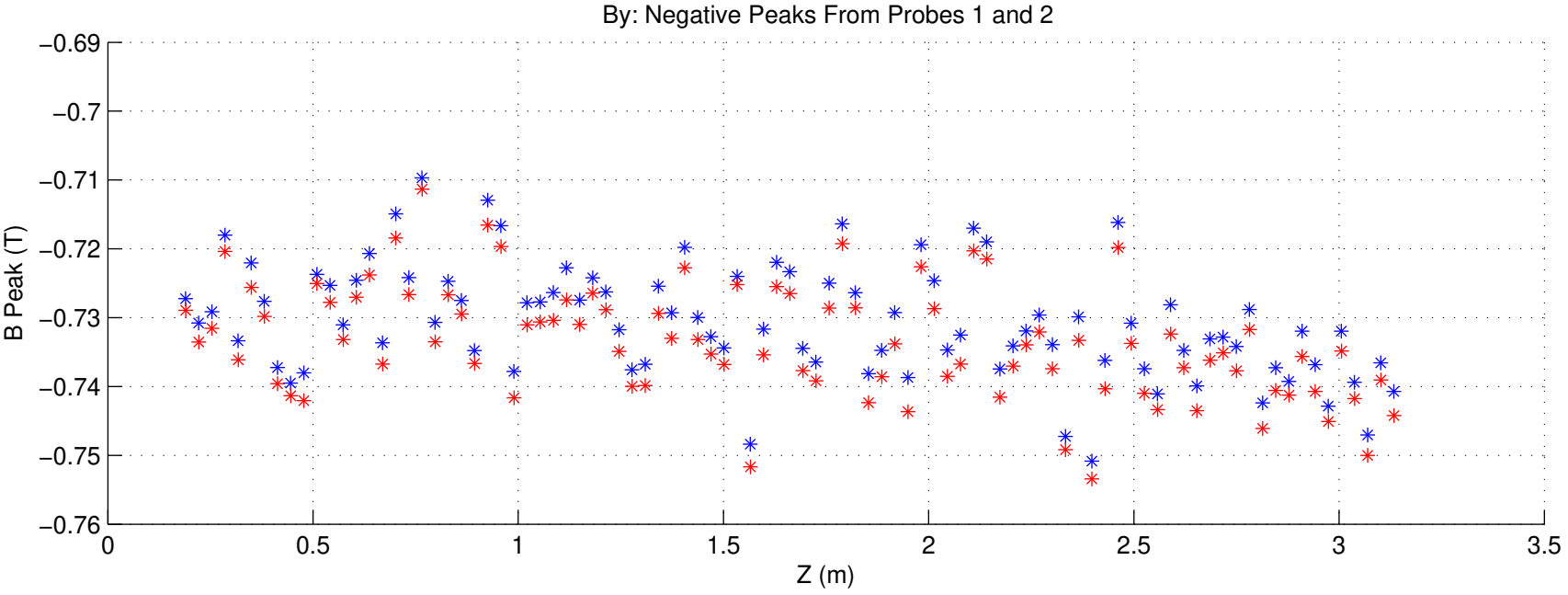

Probe 2: By vs Z With Fitted Peaks And Zeros
By (T)
1
0.5
0
−0.5
−1
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

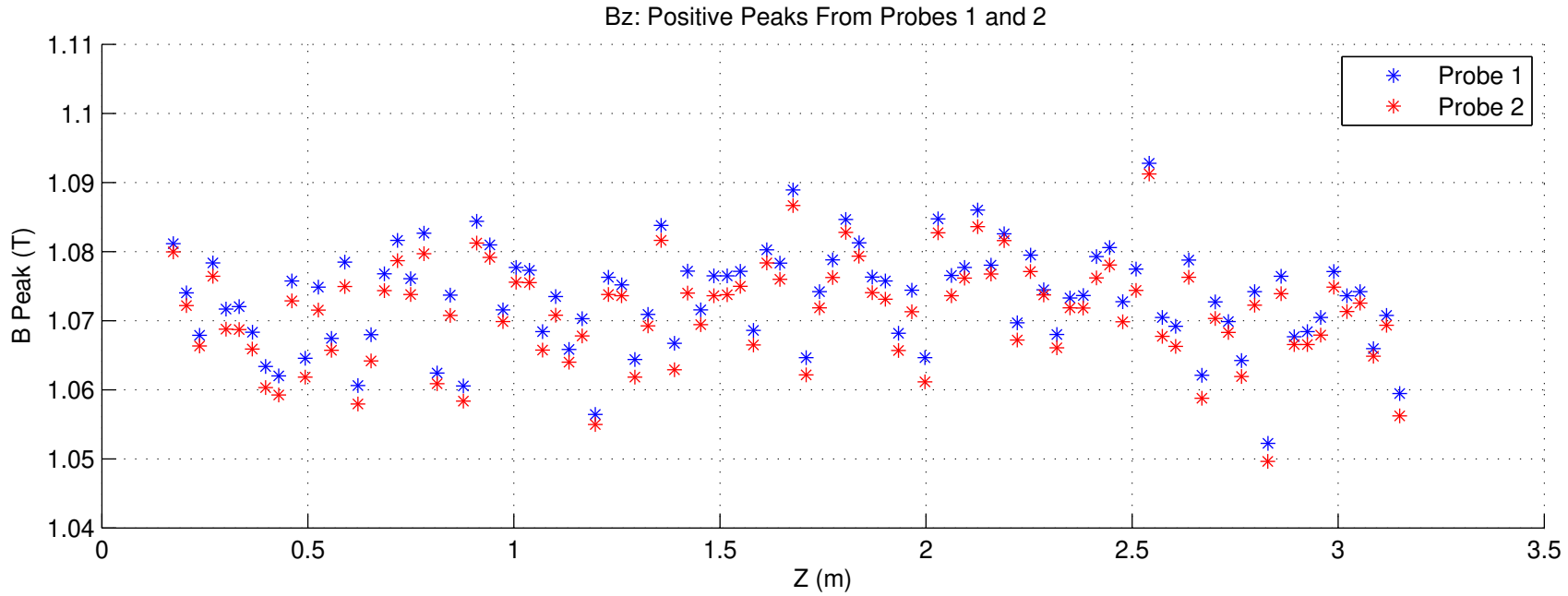

Probe 2: Bz vs Z With Fitted Peaks And Zeros
Bz (T)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

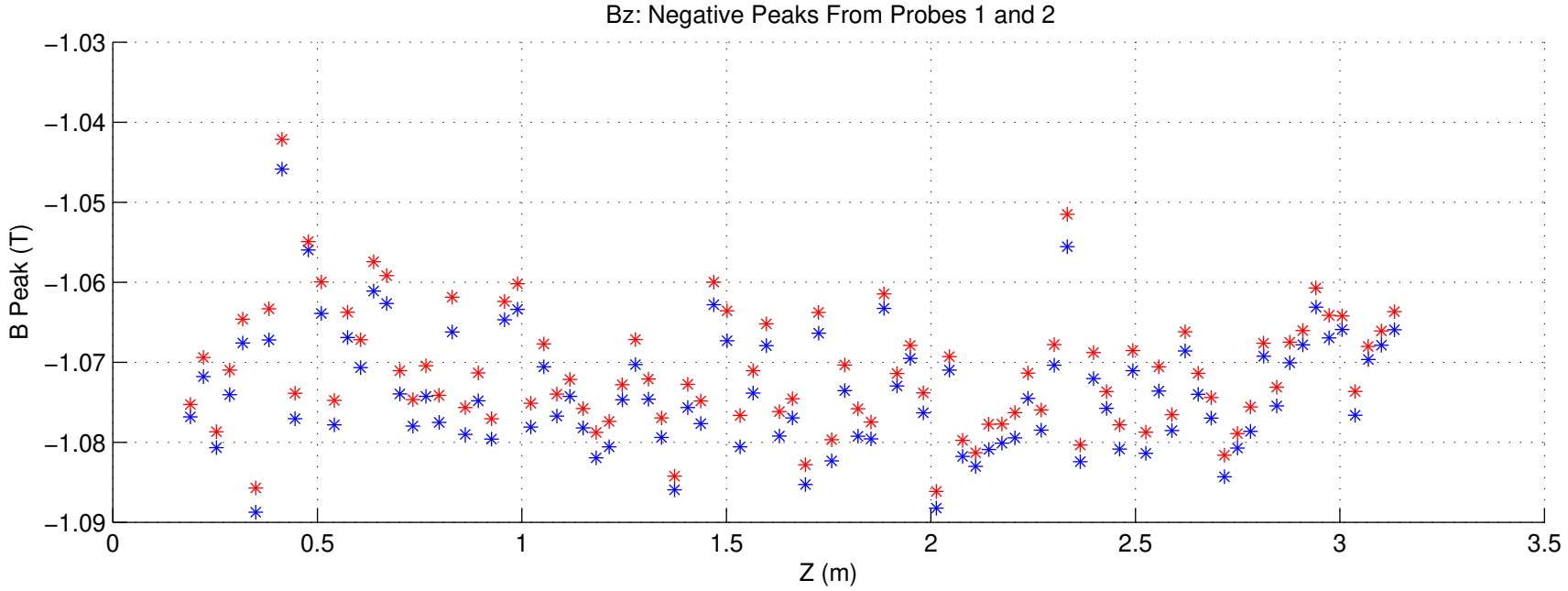

Bx: Positive Peaks From Probes 1 and 2
Probe 1
Probe 2
B Peak (T)
Z (m)
0.055
0.05
0.045
0.04
0.035
0.03
0.025
0.02
0.015
0.01
0
0.5
1
1.5
2
2.5
3
3.5

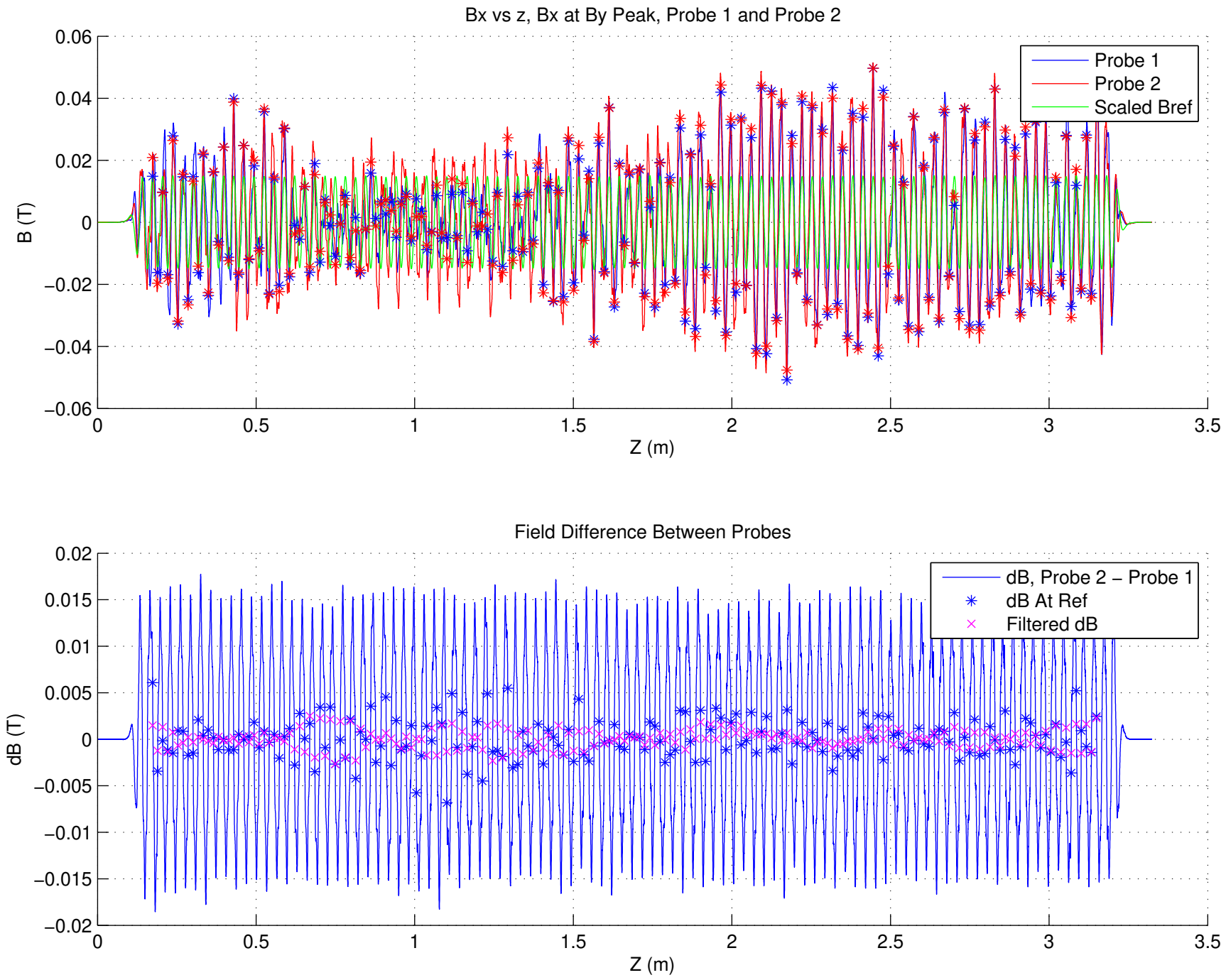

Bx: Negative Peaks From Probes 1 and 2
B Peak (T)
Z (m)
−0.01
−0.015
−0.02
−0.025
−0.03
−0.035
−0.04
−0.045
−0.05
−0.055
0
0.5
1
1.5
2
2.5
3
3.5

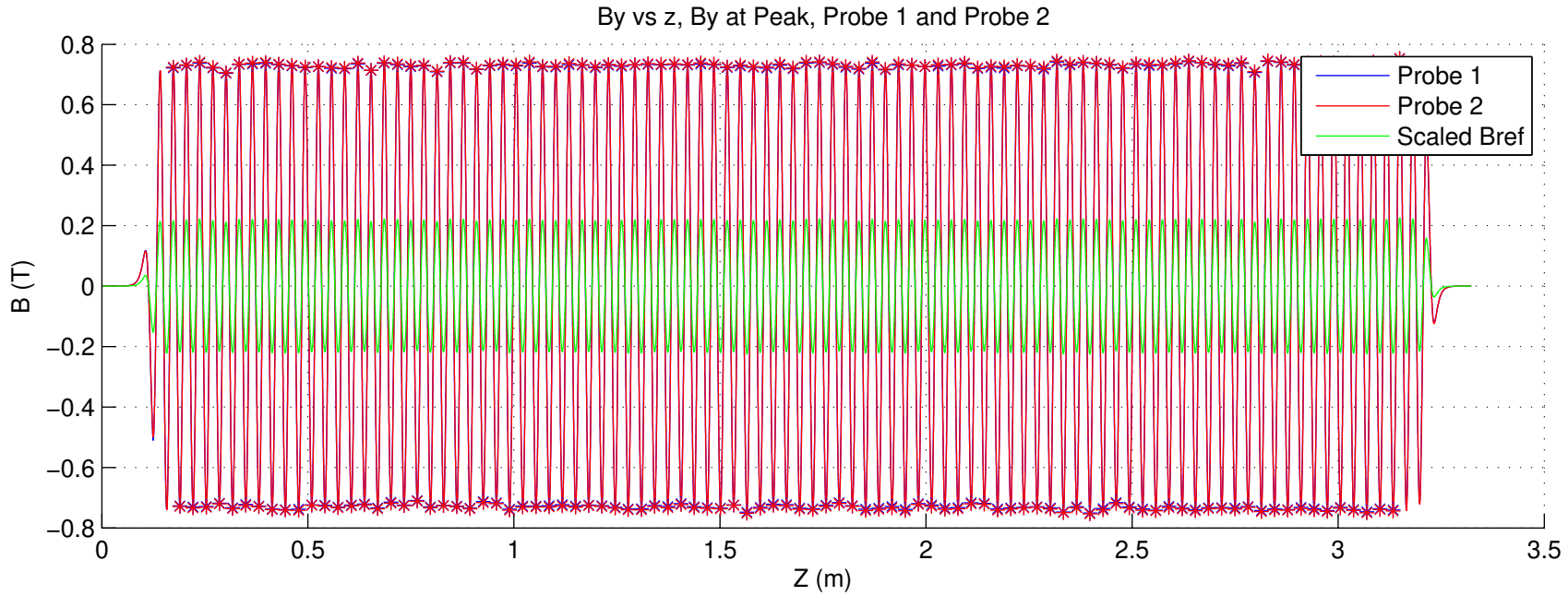

By: Positive Peaks From Probes 1 and 2
Probe 1
Probe 2
B Peak (T)
Z (m)
0.76
0.75
0.74
0.73
0.72
0.71
0.7
0
0.5
1
1.5
2
2.5
3
3.5

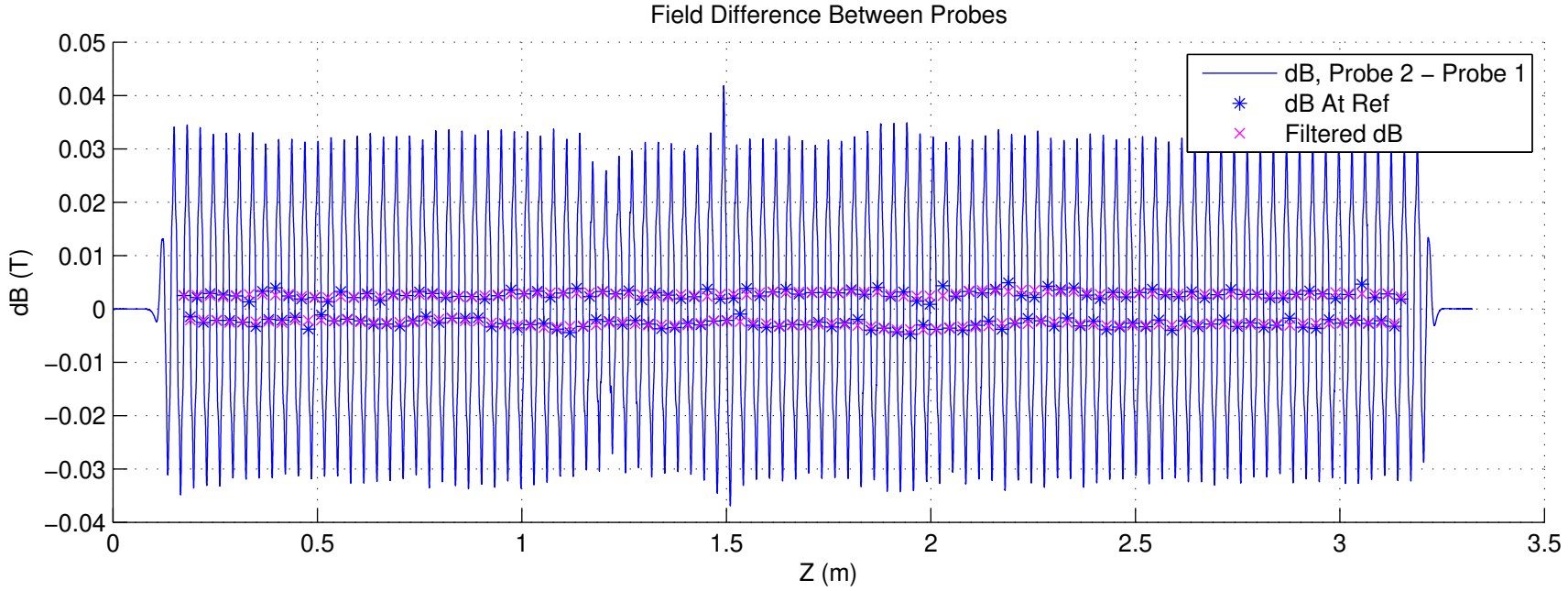

By: Negative Peaks From Probes 1 and 2
B Peak (T)
Z (m)
−0.69
−0.7
−0.71
−0.72
−0.73
−0.74
−0.75
−0.76
0
0.5
1
1.5
2
2.5
3
3.5

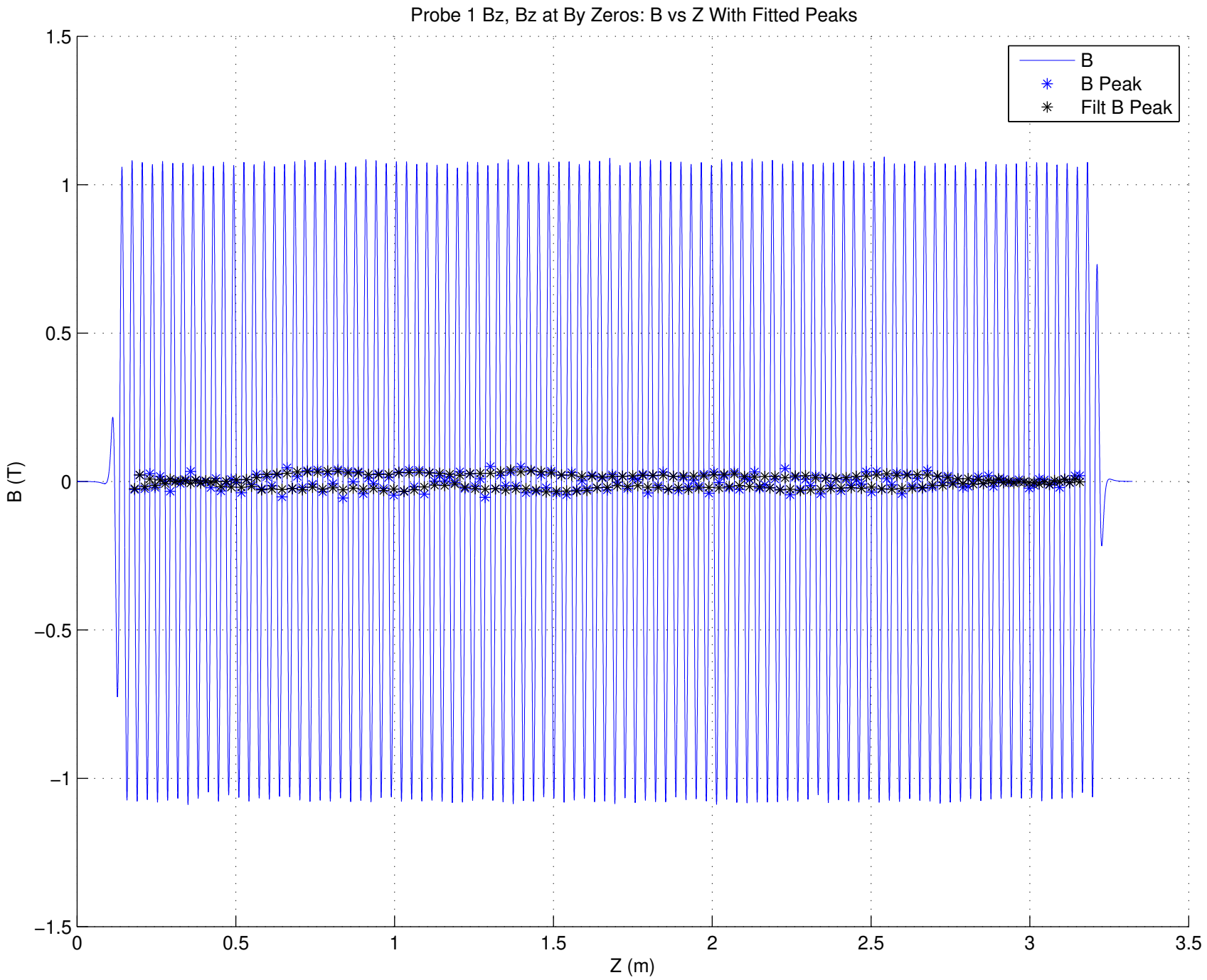

Bz: Positive Peaks From Probes 1 and 2
Probe 1
Probe 2
B Peak (T)
Z (m)
1.11
1.1
1.09
1.08
1.07
1.06
1.05
1.04
0
0.5
1
1.5
2
2.5
3
3.5

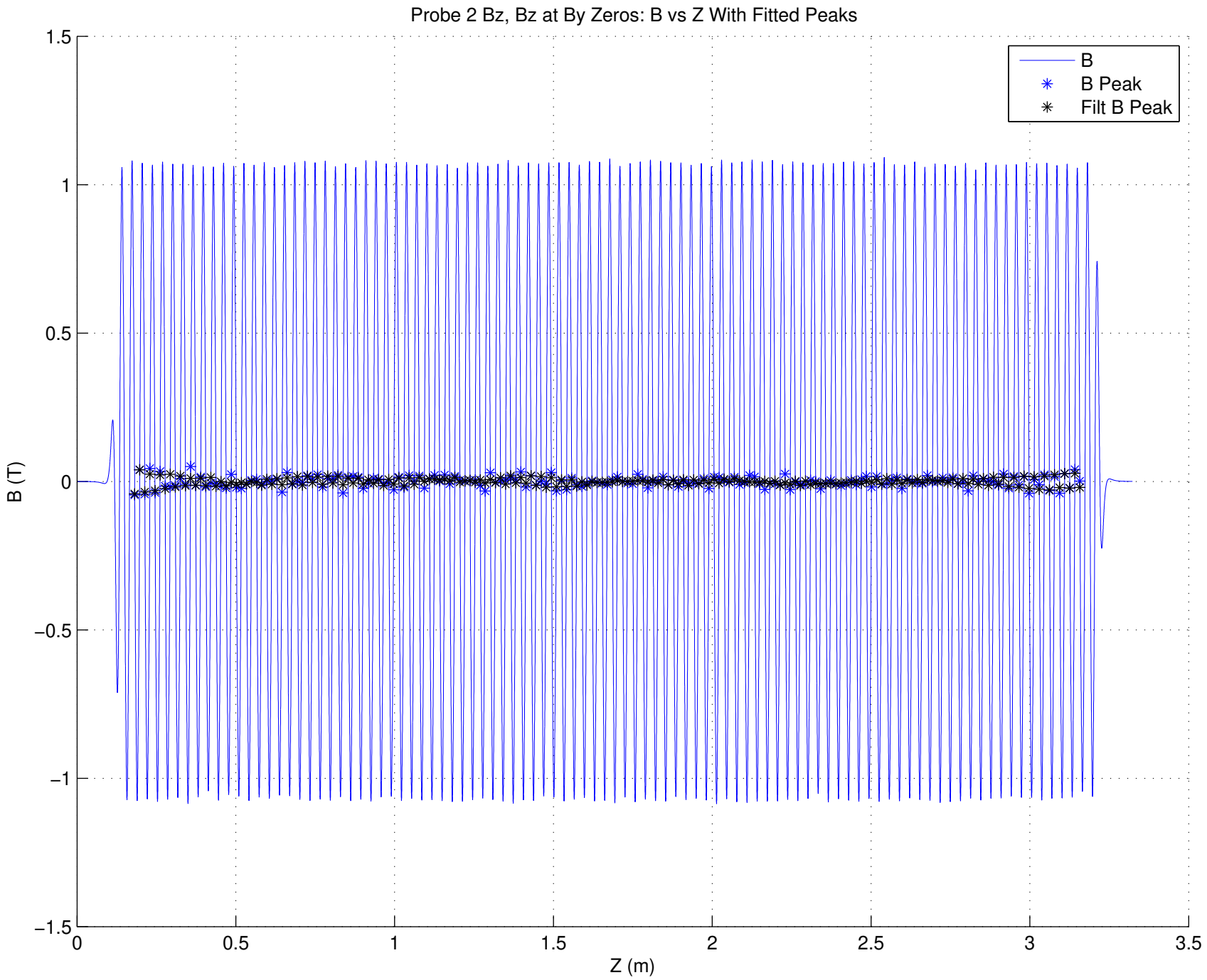

Bz: Negative Peaks From Probes 1 and 2
B Peak (T)
Z (m)
−1.03
−1.04
−1.05
−1.06
−1.07
−1.08
−1.09
0
0.5
1
1.5
2
2.5
3
3.5

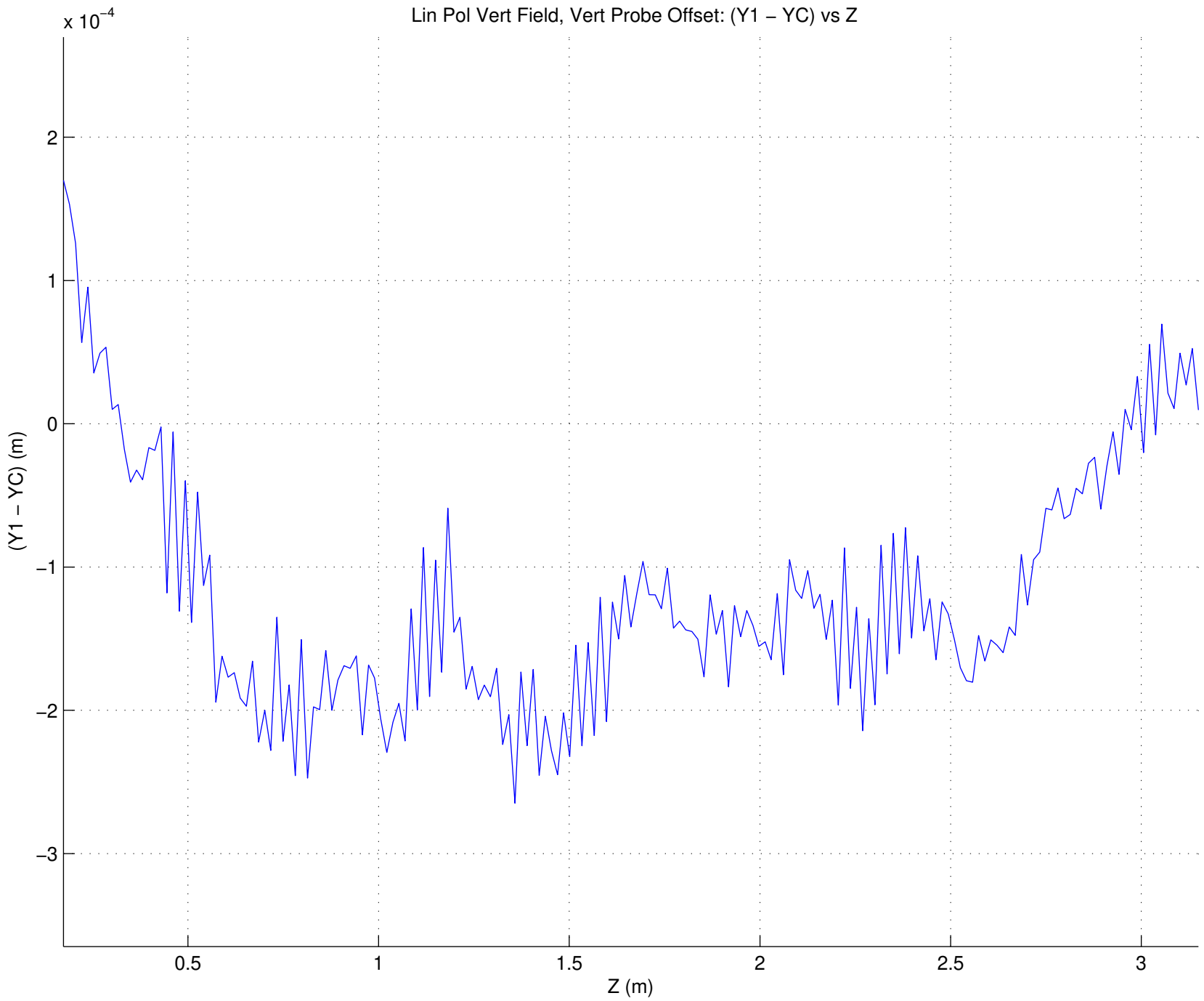

Bx vs z, Bx at By Peak, Probe 1 and Probe 2
B (T)
Z (m)
Probe 1
Probe 2
Scaled Bref
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
0
0.5
1
1.5
2
2.5
3
3.5
Field Difference Between Probes
dB (T)
Z (m)
dB, Probe 2 – Probe 1
dB At Ref
Filtered dB
0.02
0.015
0.01
0.005
0
−0.005
−0.01
−0.015
−0.02

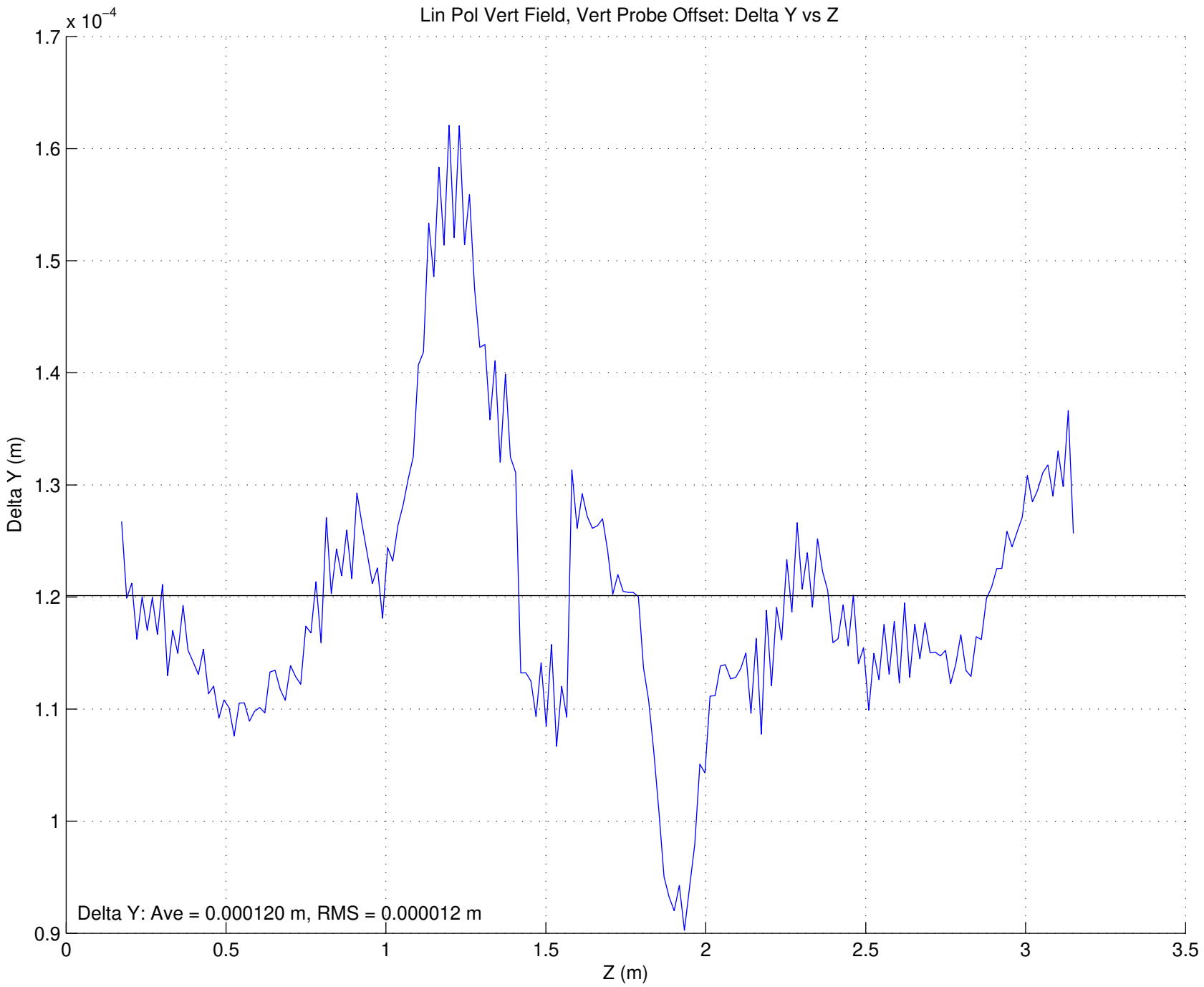

By vs z, By at Peak, Probe 1 and Probe 2
B (T)
Z (m)
Probe 1
Probe 2
Scaled Bref
0.8
0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−0.8
0
0.5
1
1.5
2
2.5
3
3.5

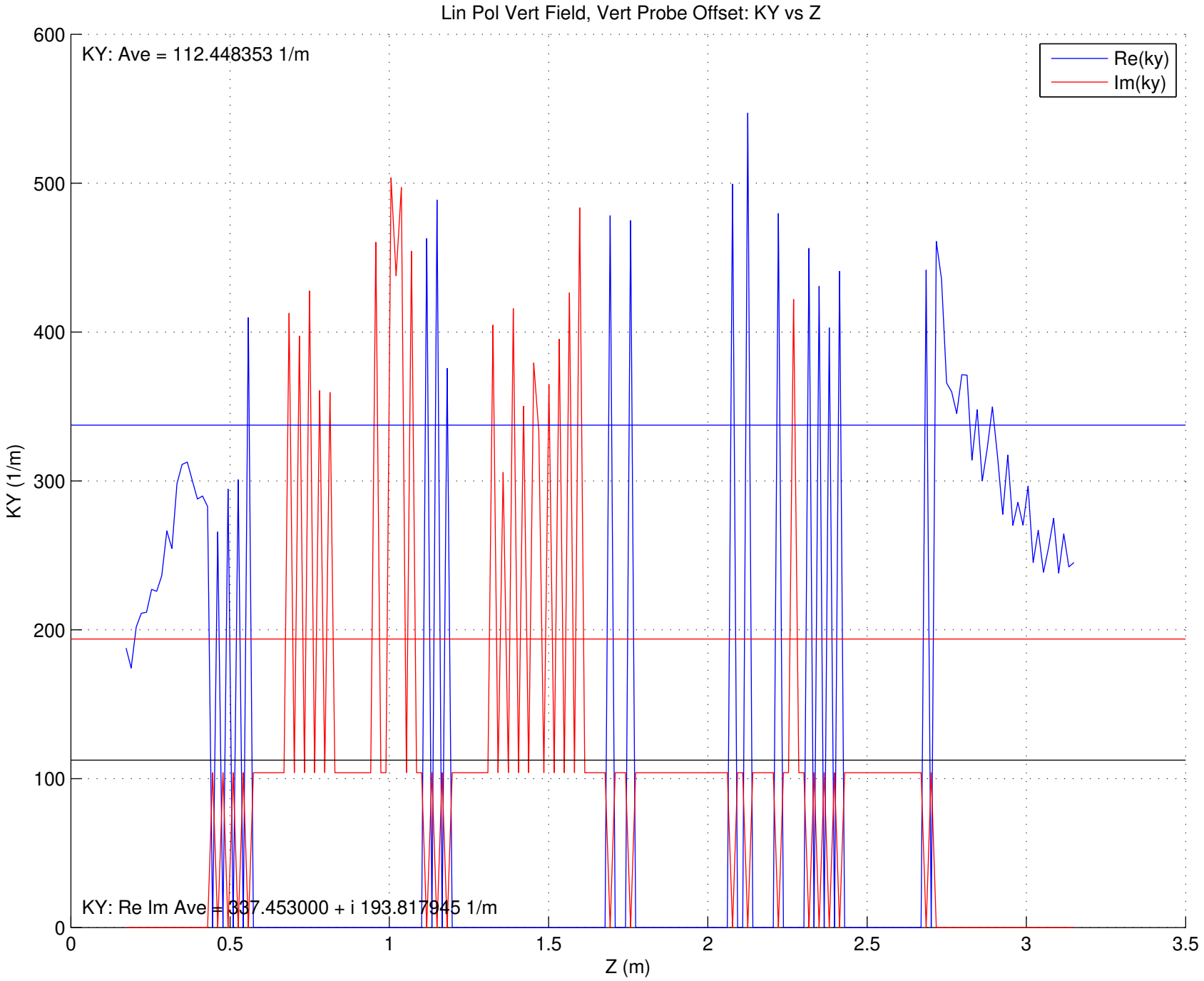

Field Difference Between Probes
dB (T)
Z (m)
dB, Probe 2 – Probe 1
dB At Ref
Filtered dB
0.05
0.04
0.03
0.02
0.01
0
−0.01
−0.02
−0.03
−0.04
0
0.5
1
1.5
2
2.5
3
3.5

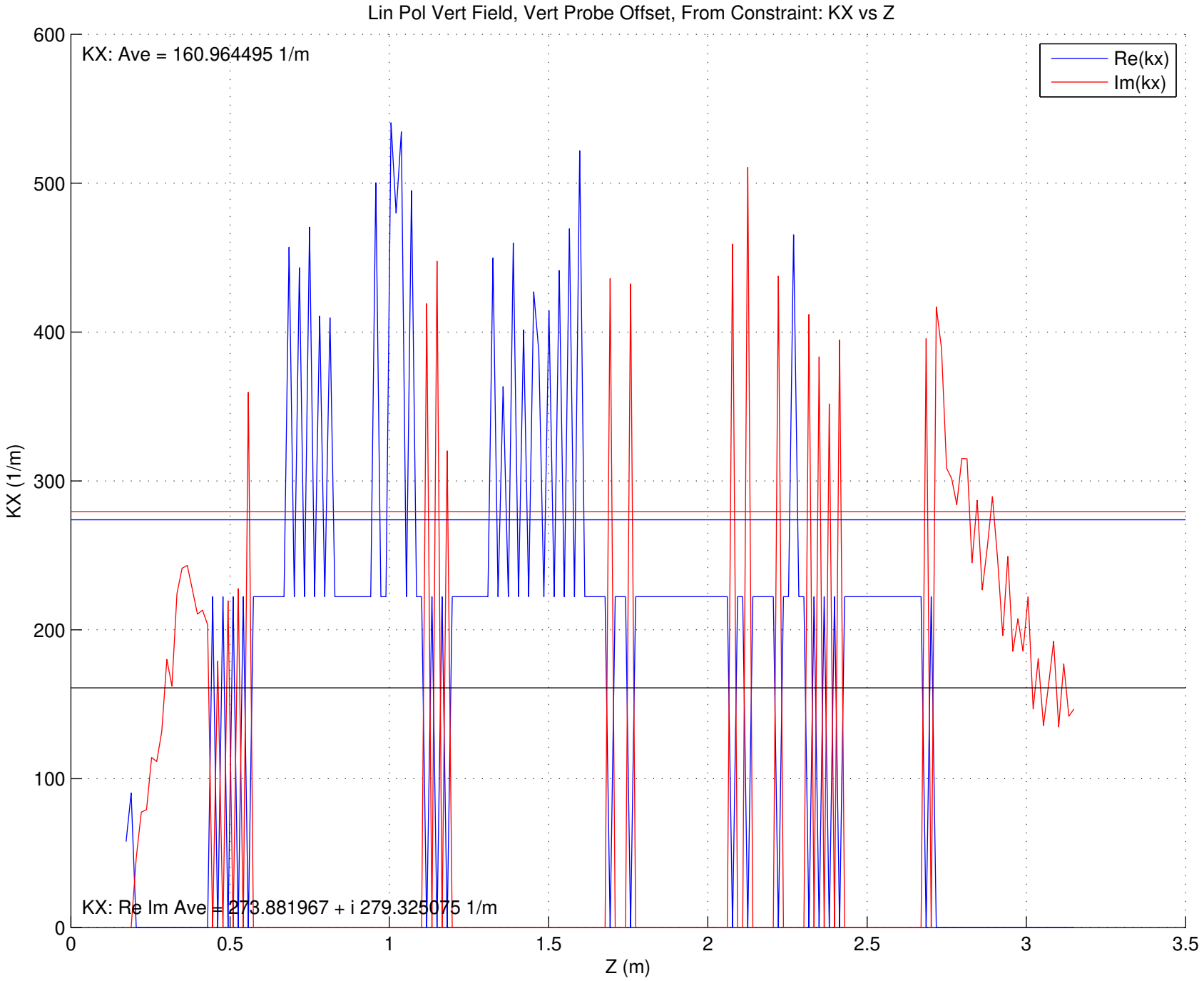

Probe 1 Bz, Bz at By Zeros: B vs Z With Fitted Peaks
B
B Peak
Filt B Peak
B (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

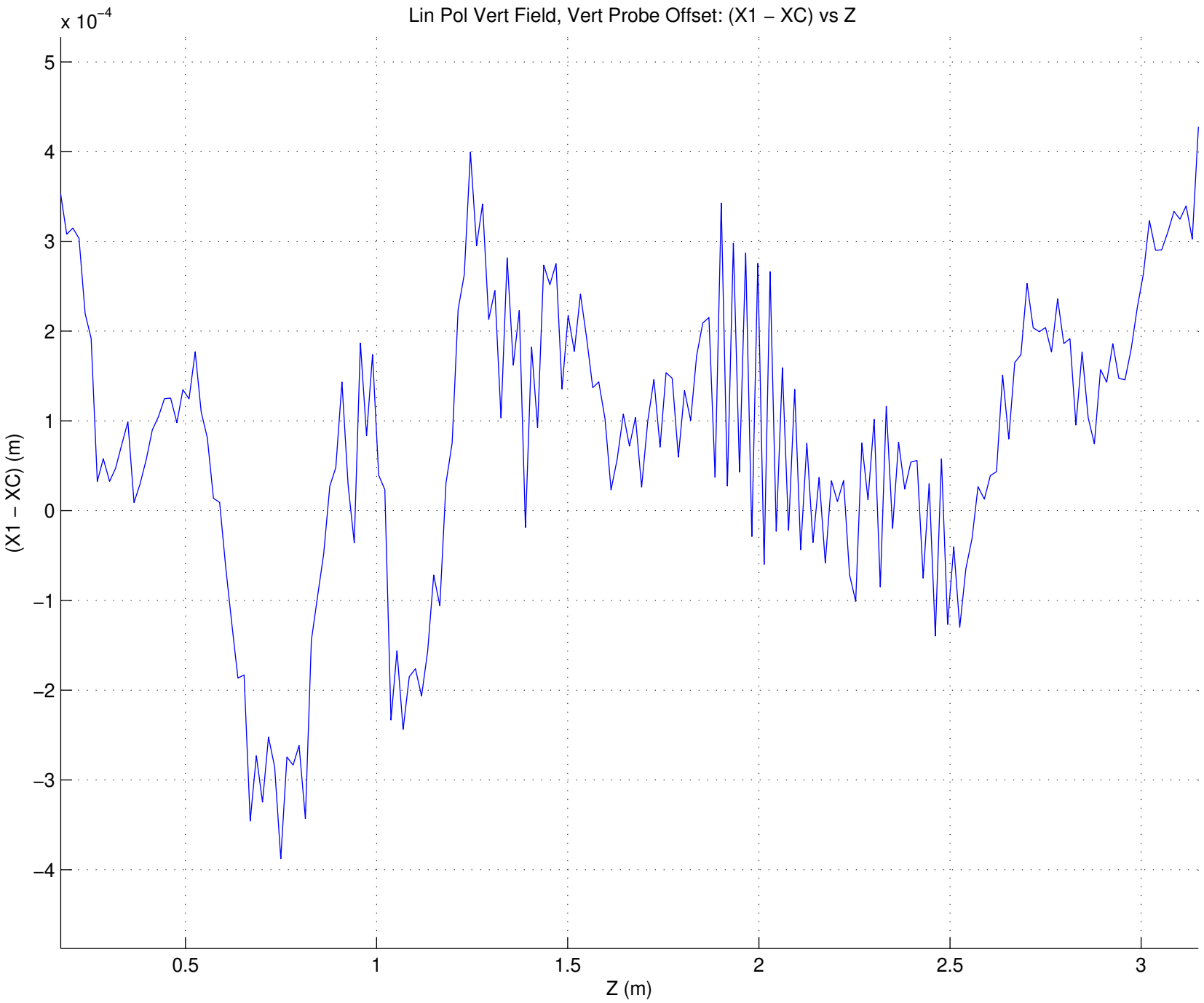

Probe 2 Bz, Bz at By Zeros: B vs Z With Fitted Peaks
B
B Peak
Filt B Peak
B (T)
Z (m)
1.5
1
0.5
0
−0.5
−1
−1.5
0
0.5
1
1.5
2
2.5
3
3.5

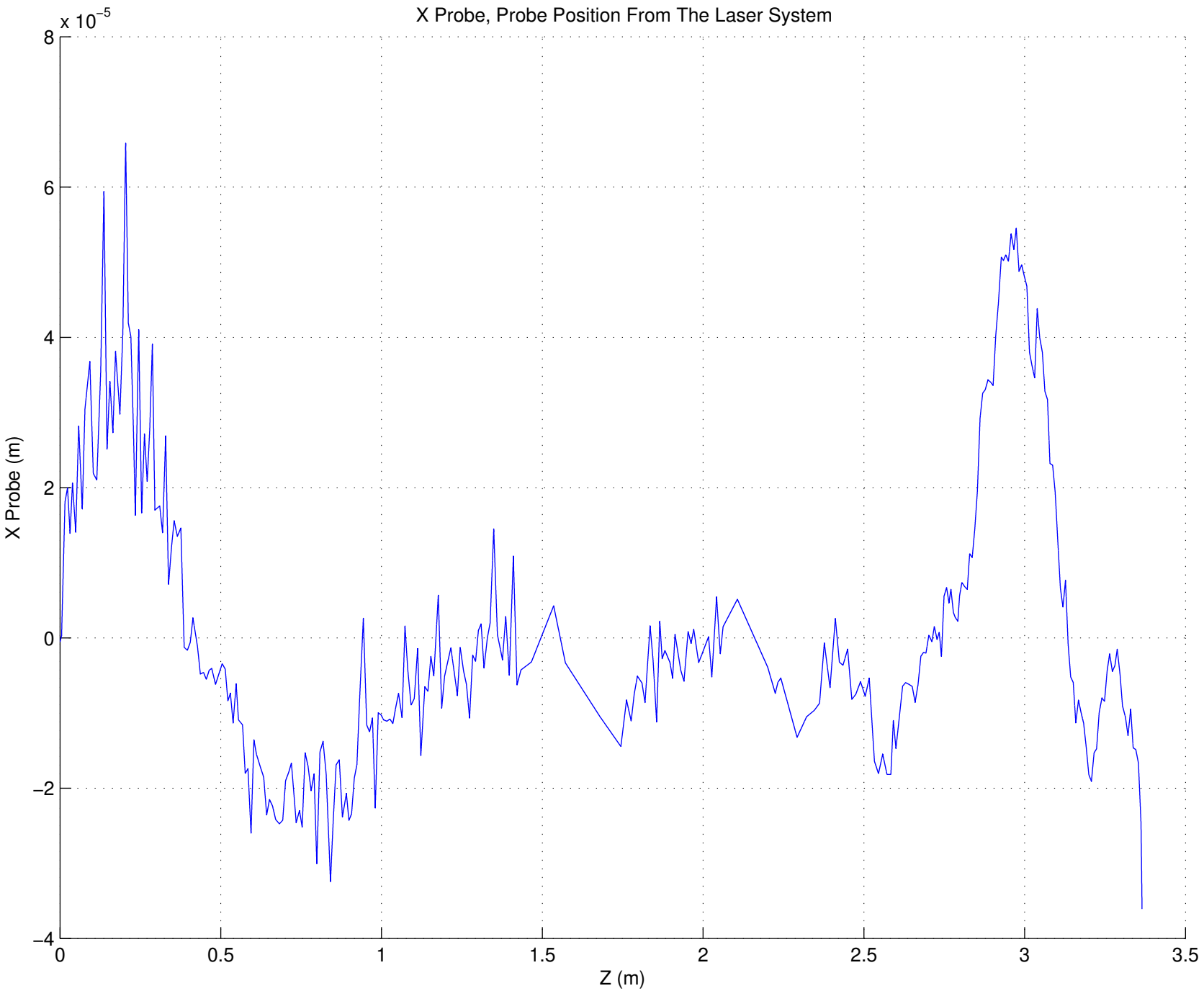

Lin Pol Vert Field, Vert Probe Offset: (Y1 – YC) vs Z
x 10^-4
2
1
0
–1
–2
–3
(Y1 – YC) (m)
0.5
1
1.5
2
2.5
3
Z (m)

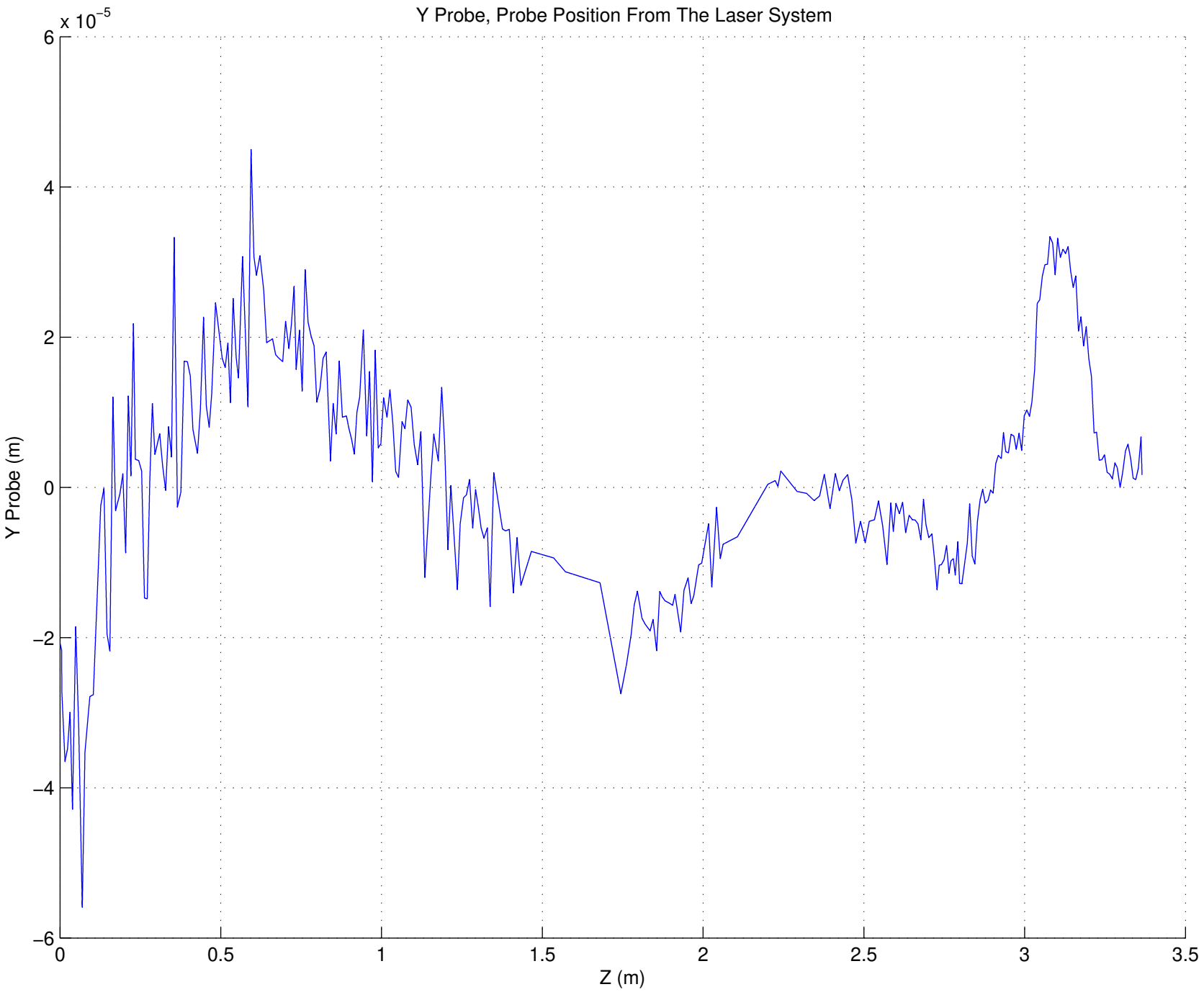

Lin Pol Vert Field, Vert Probe Offset: Delta Y vs Z
x 10^-4
1.7
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
Delta Y (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)
Delta Y: Ave = 0.000120 m, RMS = 0.000012 m

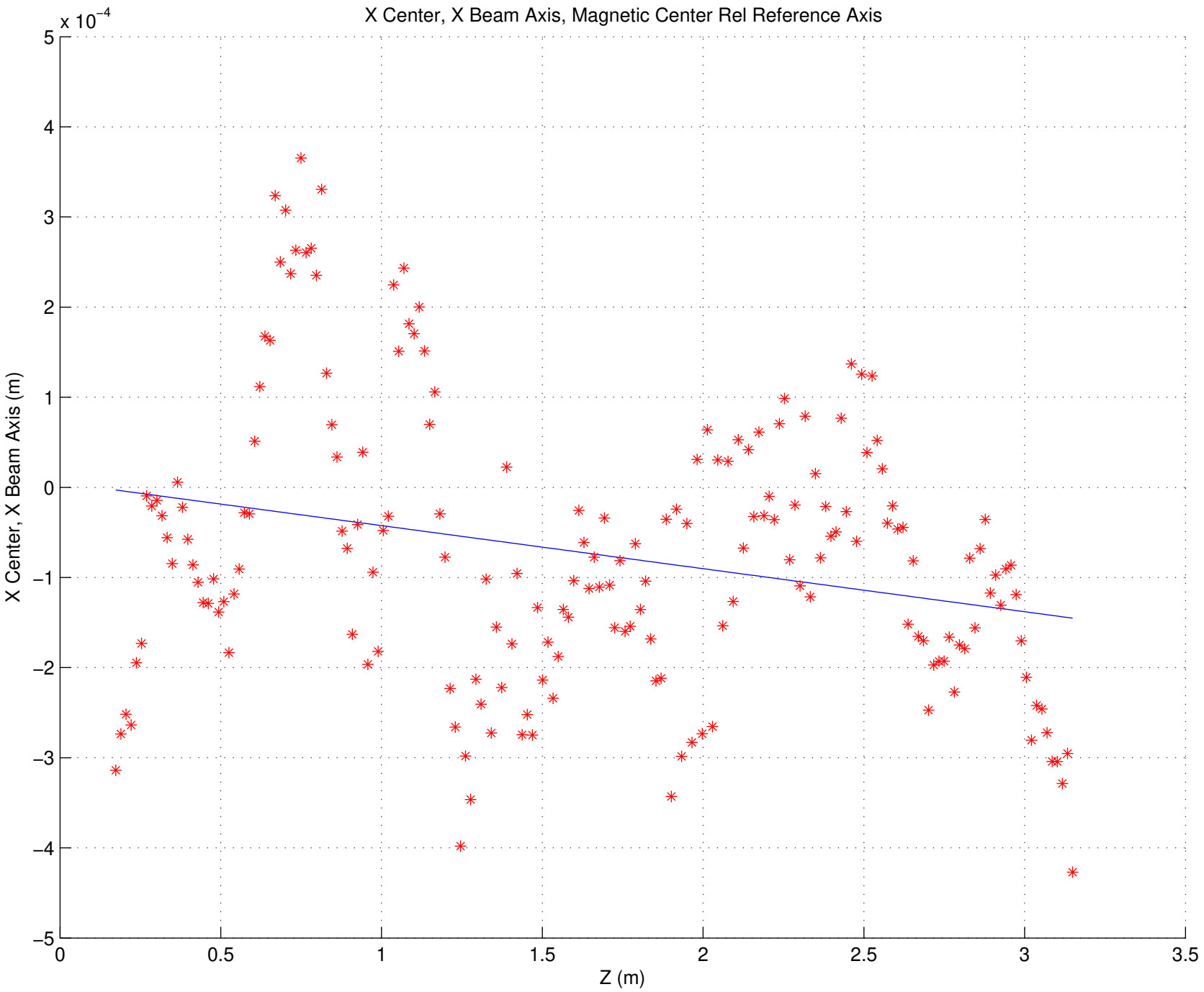

Lin Pol Vert Field, Vert Probe Offset: KY vs Z
KY: Ave = 112.448353 1/m
KY: Re Im Ave = 337.453000 + i 193.817945 1/m
Re(ky)
Im(ky)
KY (1/m)
Z (m)
600
500
400
300
200
100
0
0
0.5
1
1.5
2
2.5
3
3.5

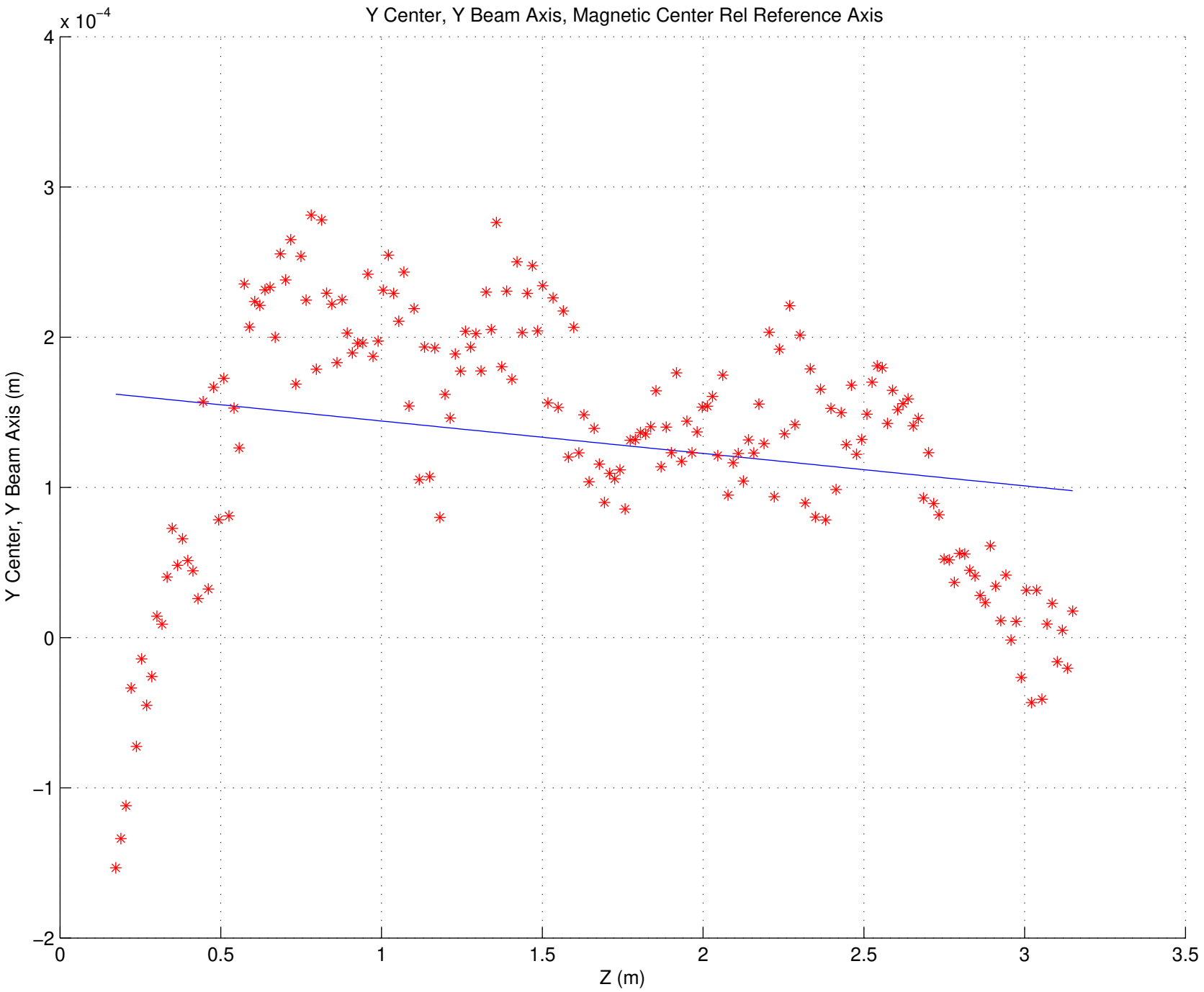

Lin Pol Vert Field, Vert Probe Offset, From Constraint: KX vs Z
KX: Ave = 160.964495 1/m
Re(kx)
Im(kx)
KX: Re Im Ave = 273.881967 + i 279.325075 1/m
KX (1/m)
Z (m)
0
100
200
300
400
500
600
0
0.5
1
1.5
2
2.5
3
3.5

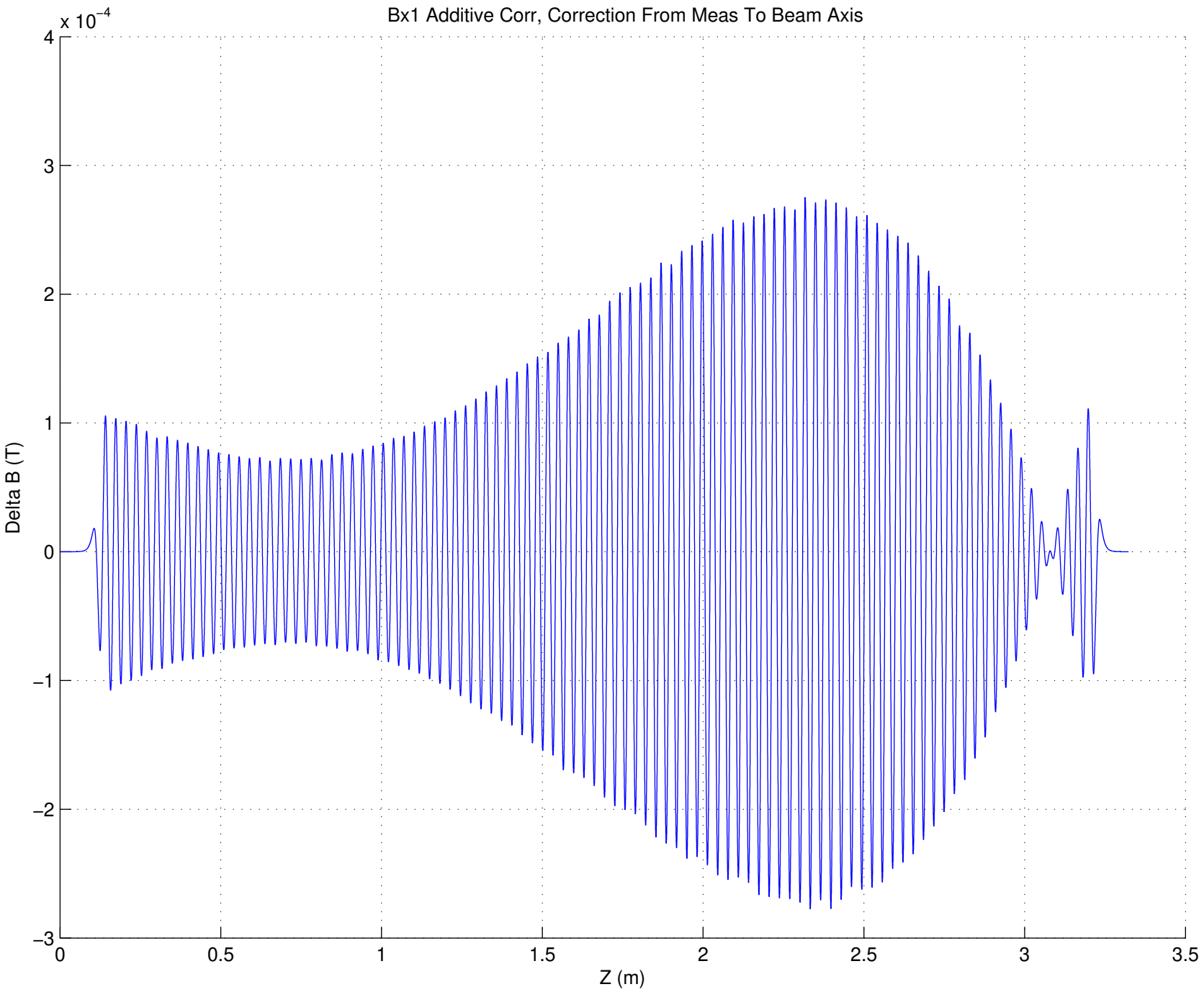

Lin Pol Vert Field, Vert Probe Offset: (X1 – XC) vs Z
x 10^-4
5
4
3
2
1
0
–1
–2
–3
–4
(X1 – XC) (m)
0.5
1
1.5
2
2.5
3
Z (m)

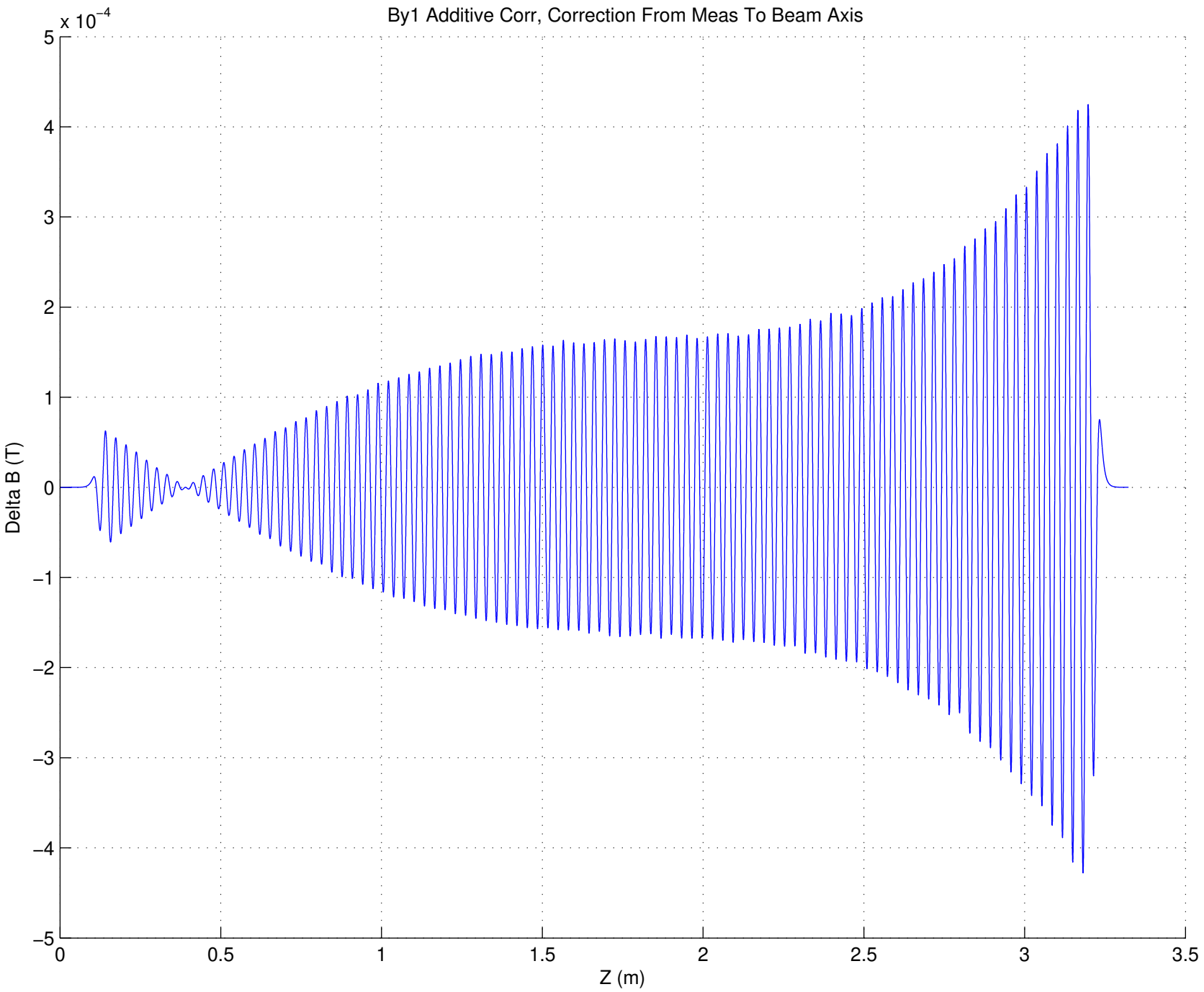

X Probe, Probe Position From The Laser System
x 10^-5
8
6
4
2
0
−2
−4
X Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

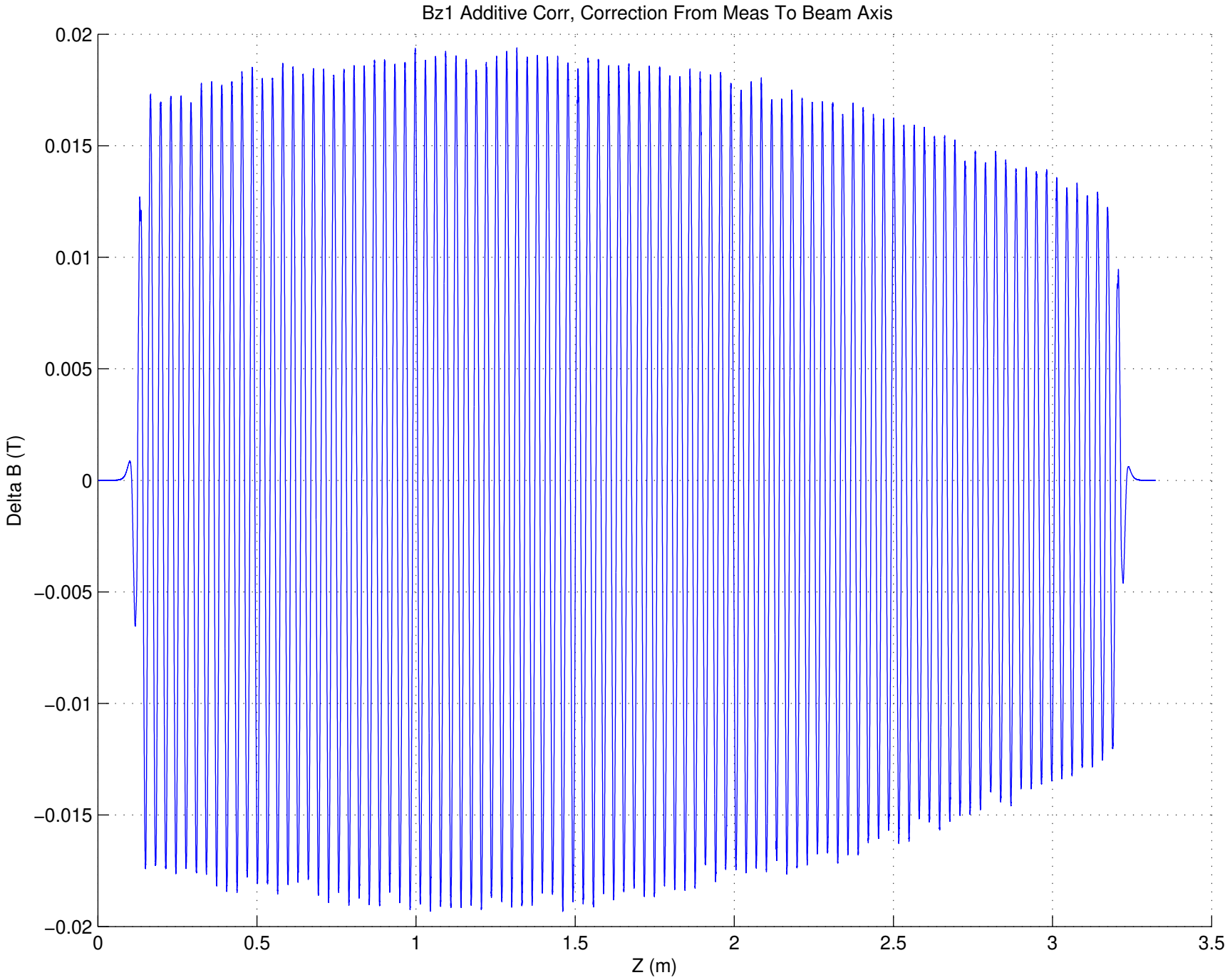

Y Probe, Probe Position From The Laser System
x 10^-5
6
4
2
0
−2
−4
−6
Y Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)

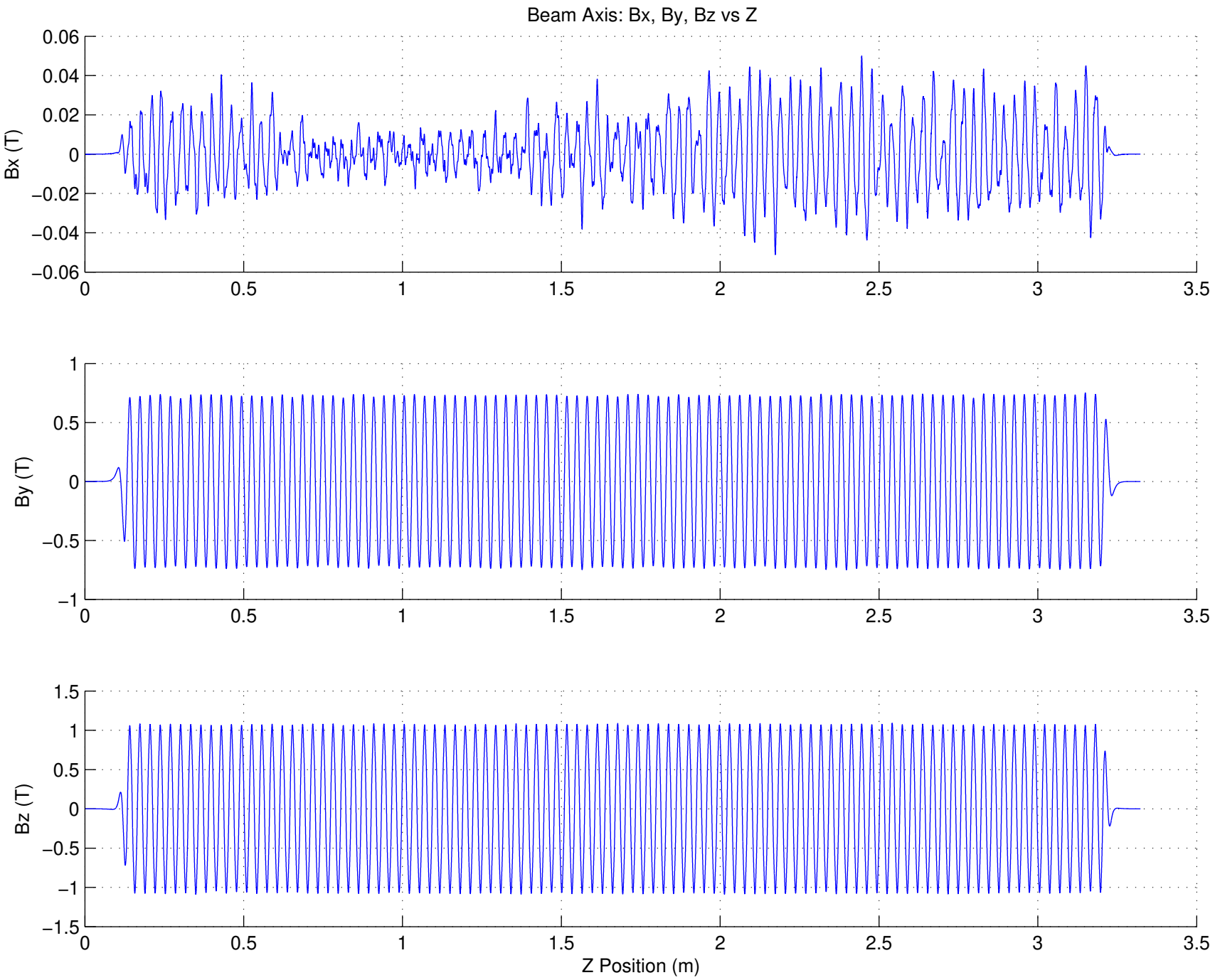

X Center, X Beam Axis, Magnetic Center Rel Reference Axis
x 10^-4
5
4
3
2
1
0
−1
−2
−3
−4
−5
X Center, X Beam Axis (m)
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)


Y Center, Y Beam Axis, Magnetic Center Rel Reference Axis
x 10^-4
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^-4
4
3
2
1
0
−1
−2
−3
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^-4
5
4
3
2
1
0
−1
−2
−3
−4
−5
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)
0.02
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


Beam Axis: Bx, By, Bz vs Z
Bx (T)
0.06
0.04
0.02
0
−0.02
−0.04
−0.06
By (T)
1
0.5
0
−0.5
−1
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)