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SLAC Magnetic Measurements

Hall Probe Array Analysis
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INPUT-FILE-NAME =DUTestOutput.dat
INPUT-FILE-TYPE =ZVXYZVXYZH
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PROBE1-BY-CALIB-FILE =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Yurii Hall Probe Calibrations\
PROBE2-BX-CALIB-FILE =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Yurii Hall Probe Calibrations\
PROBE2-BY-CALIB-FILE =V:\MET\MagServe\MagData\DELTA\Delta Data 2015\New Measurements\Yurii Hall Probe Calibrations\
NUM-ZERO-GAUSS-MEAS =200
PROBE2-OFFSET-DIR =Y
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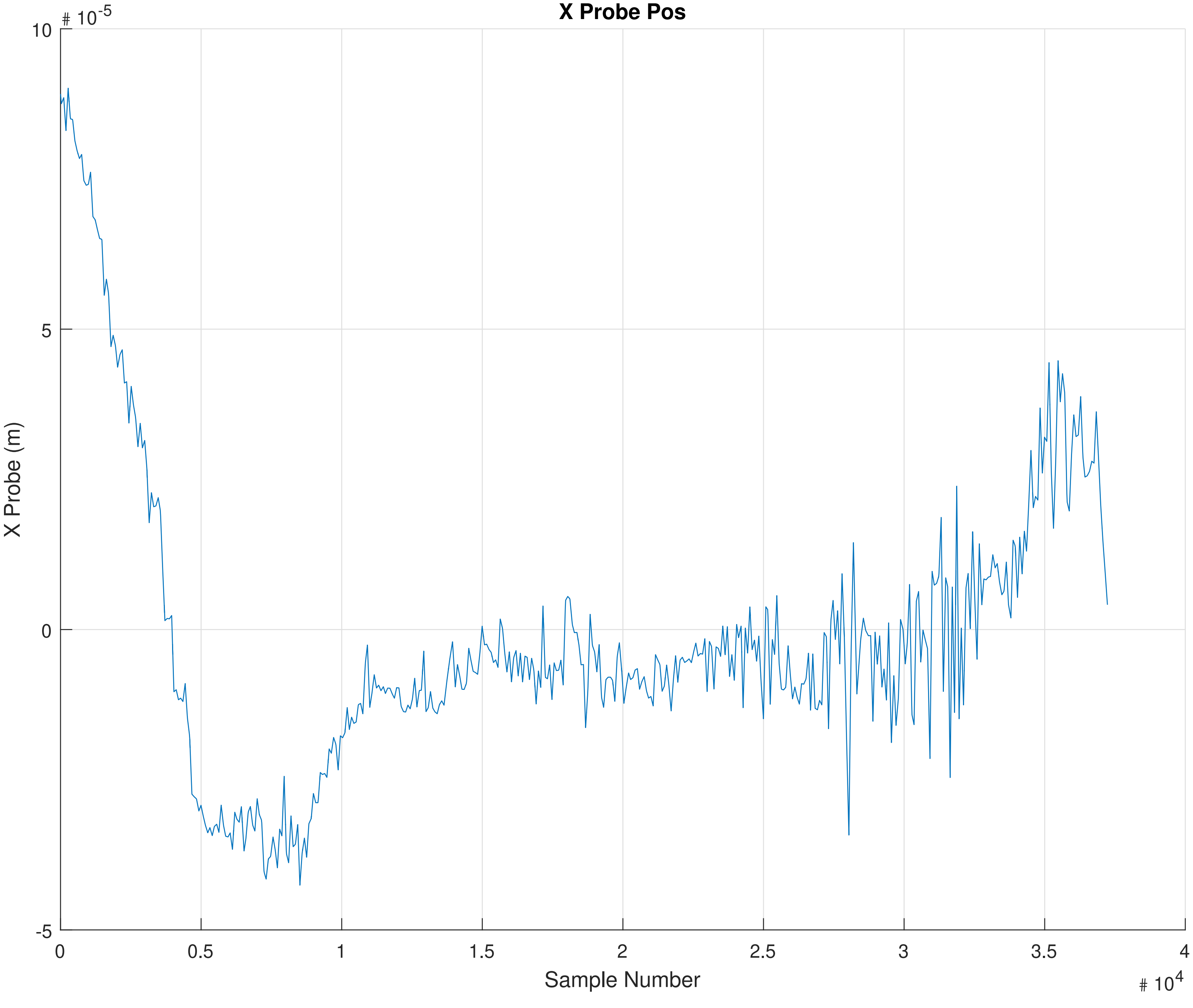
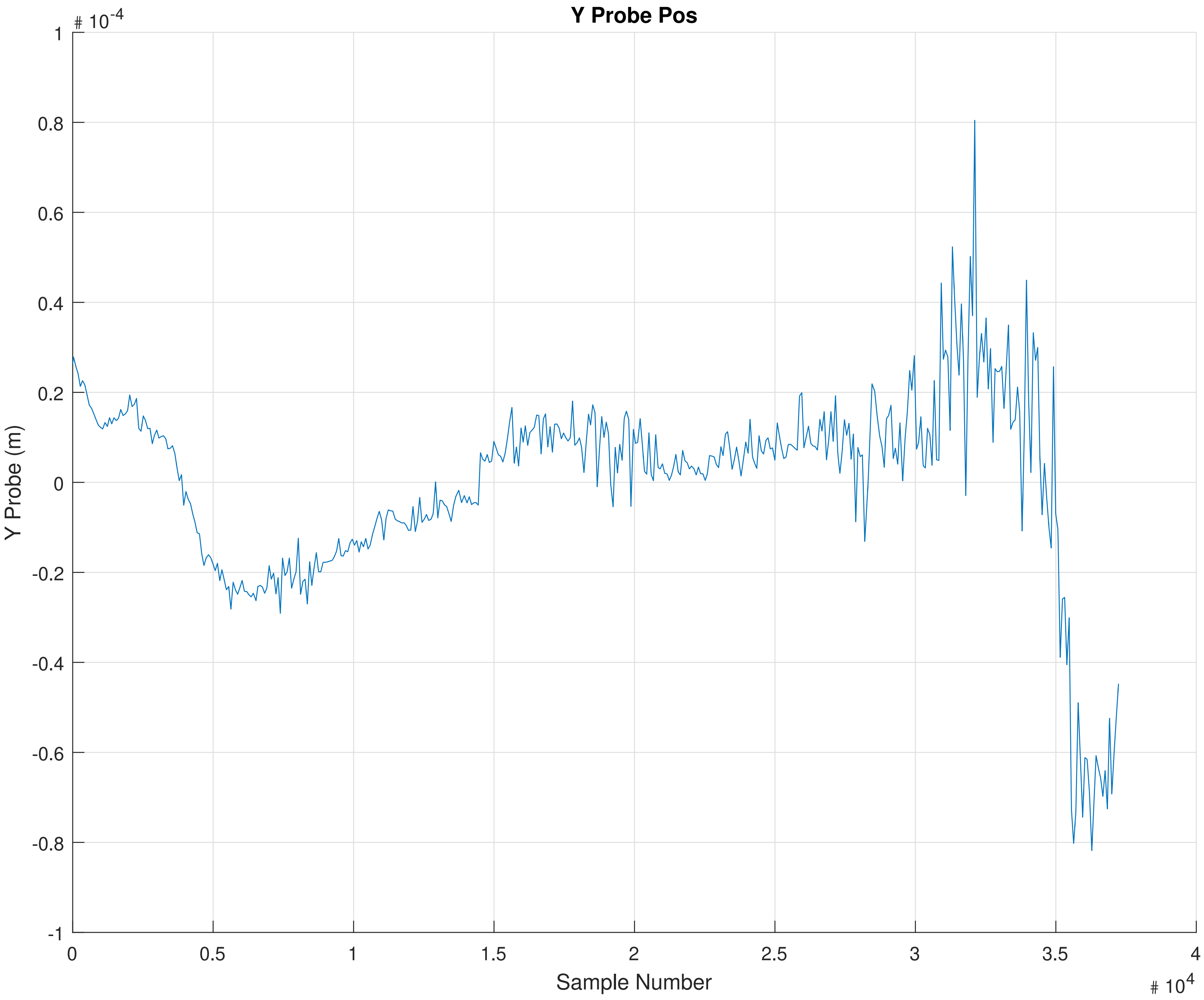
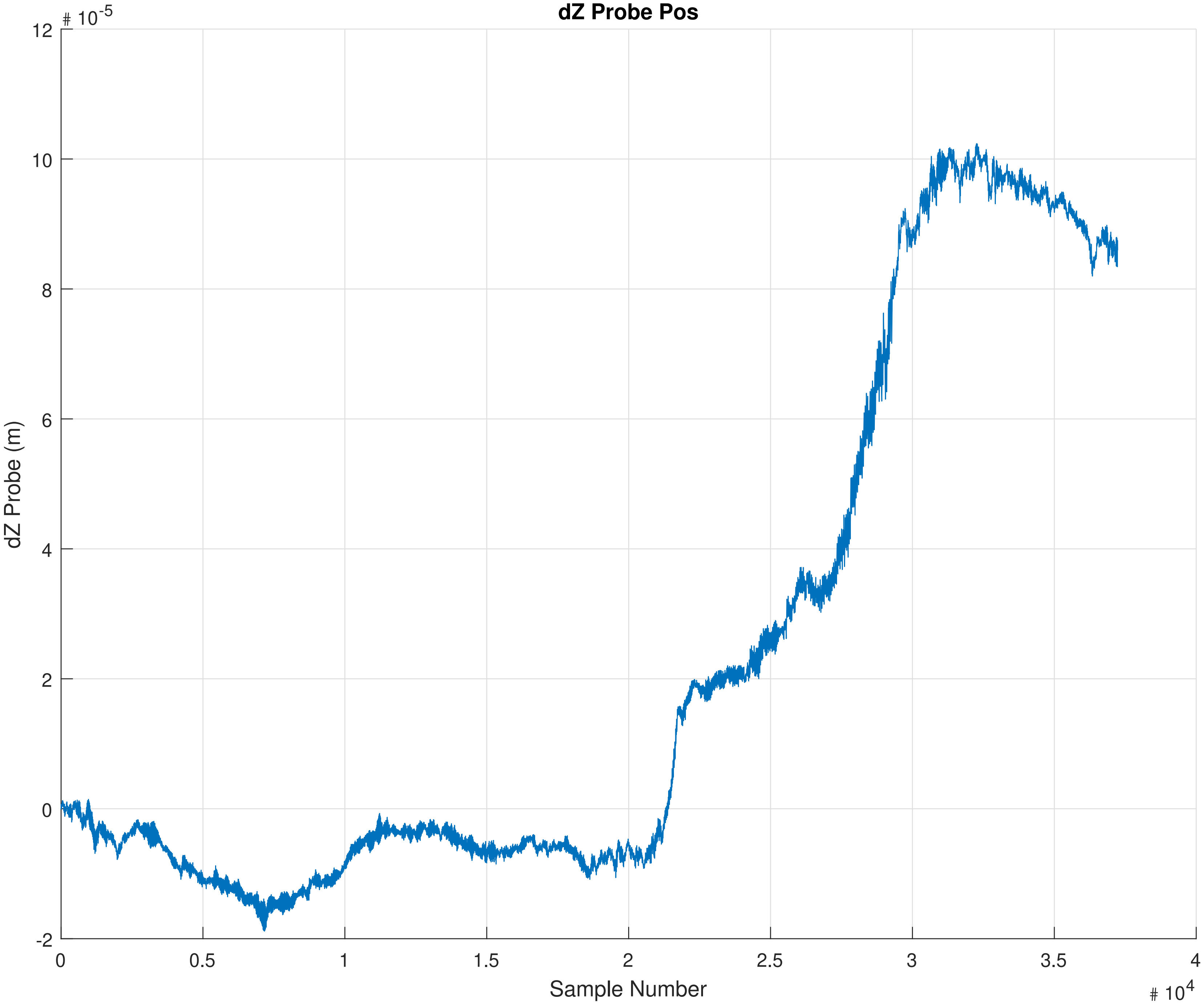
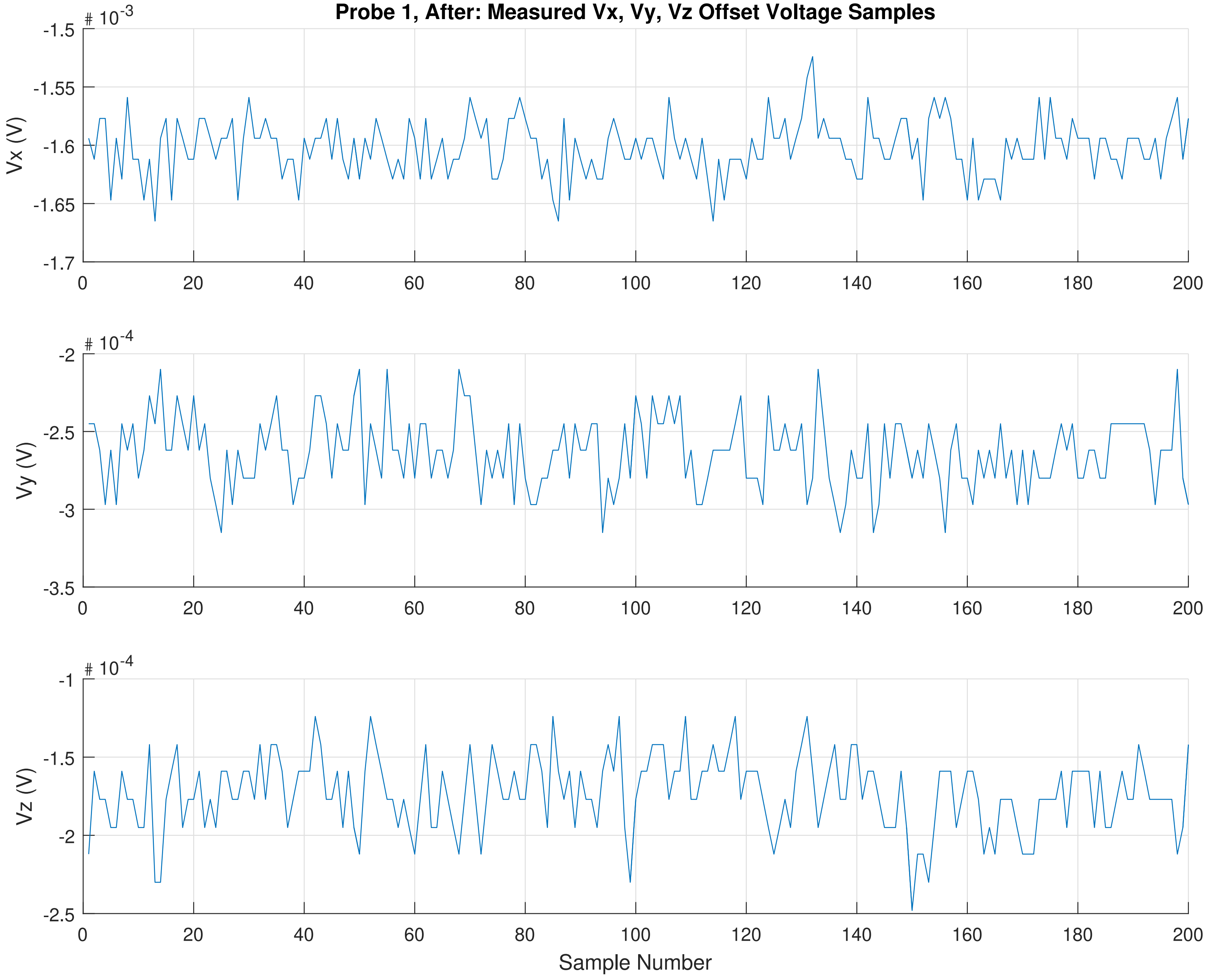


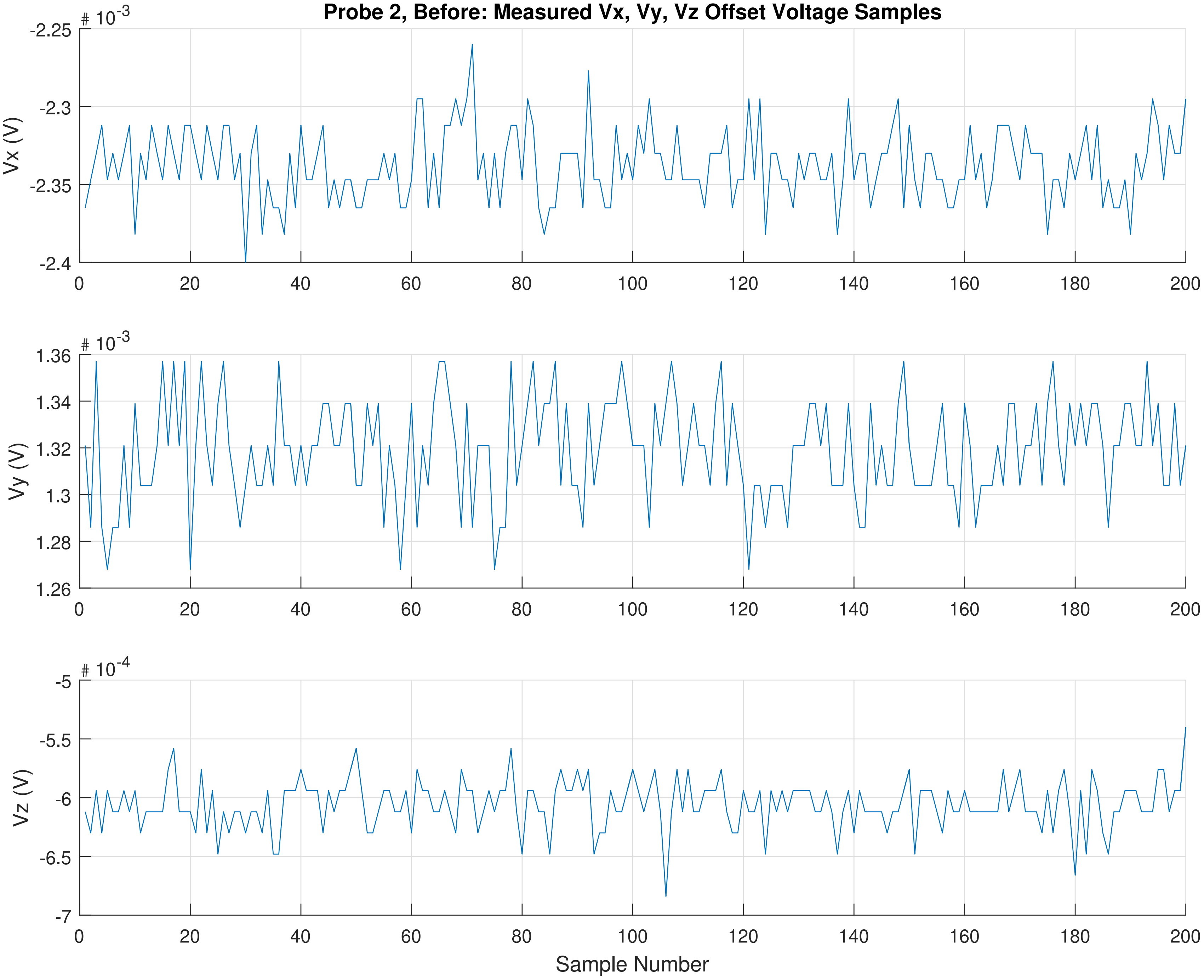
X Probe Pos
10-5
10
5
0
-5
X Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sample Number
10^4

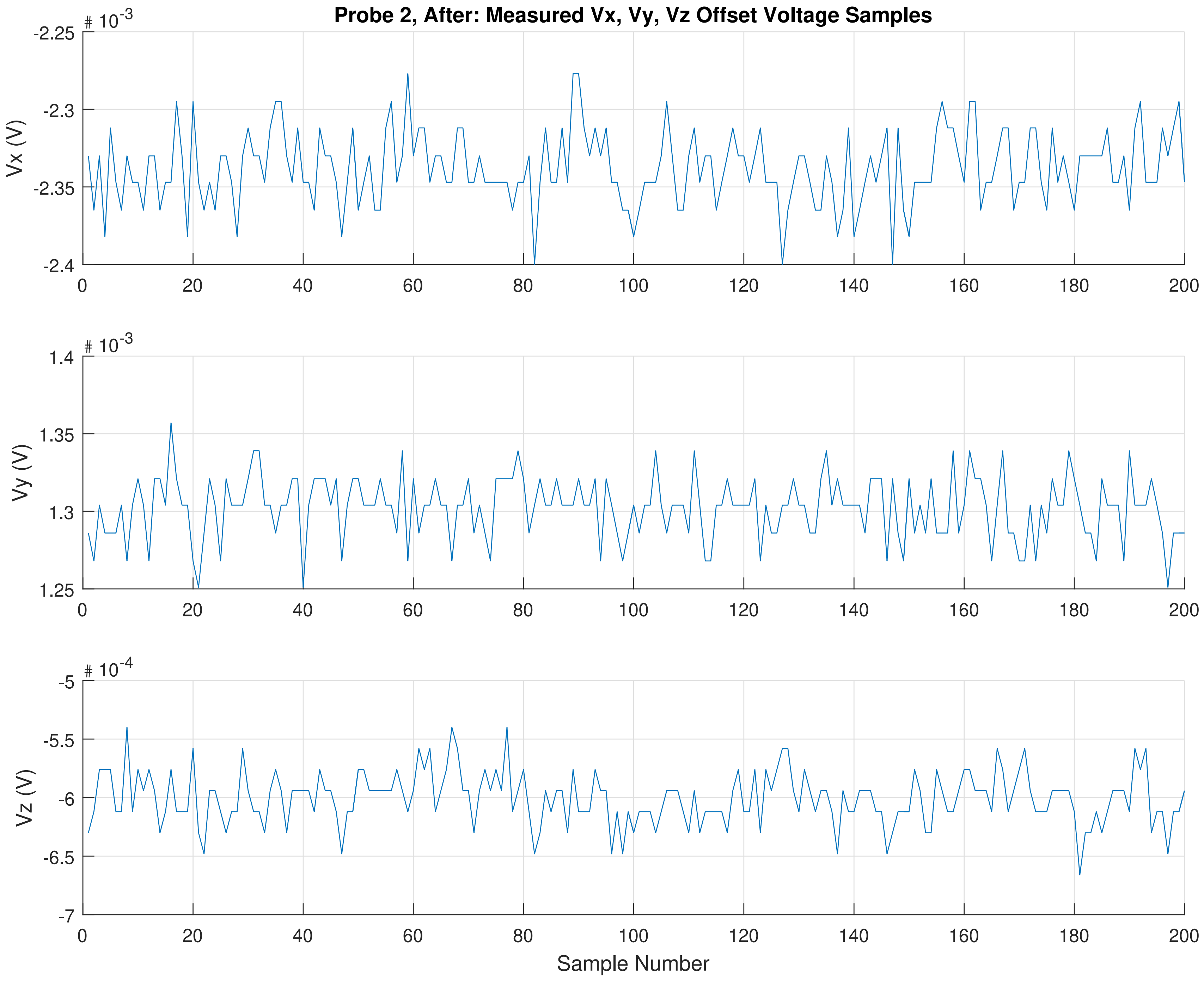

Y Probe Pos
10^-4
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Y Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sample Number
10^4

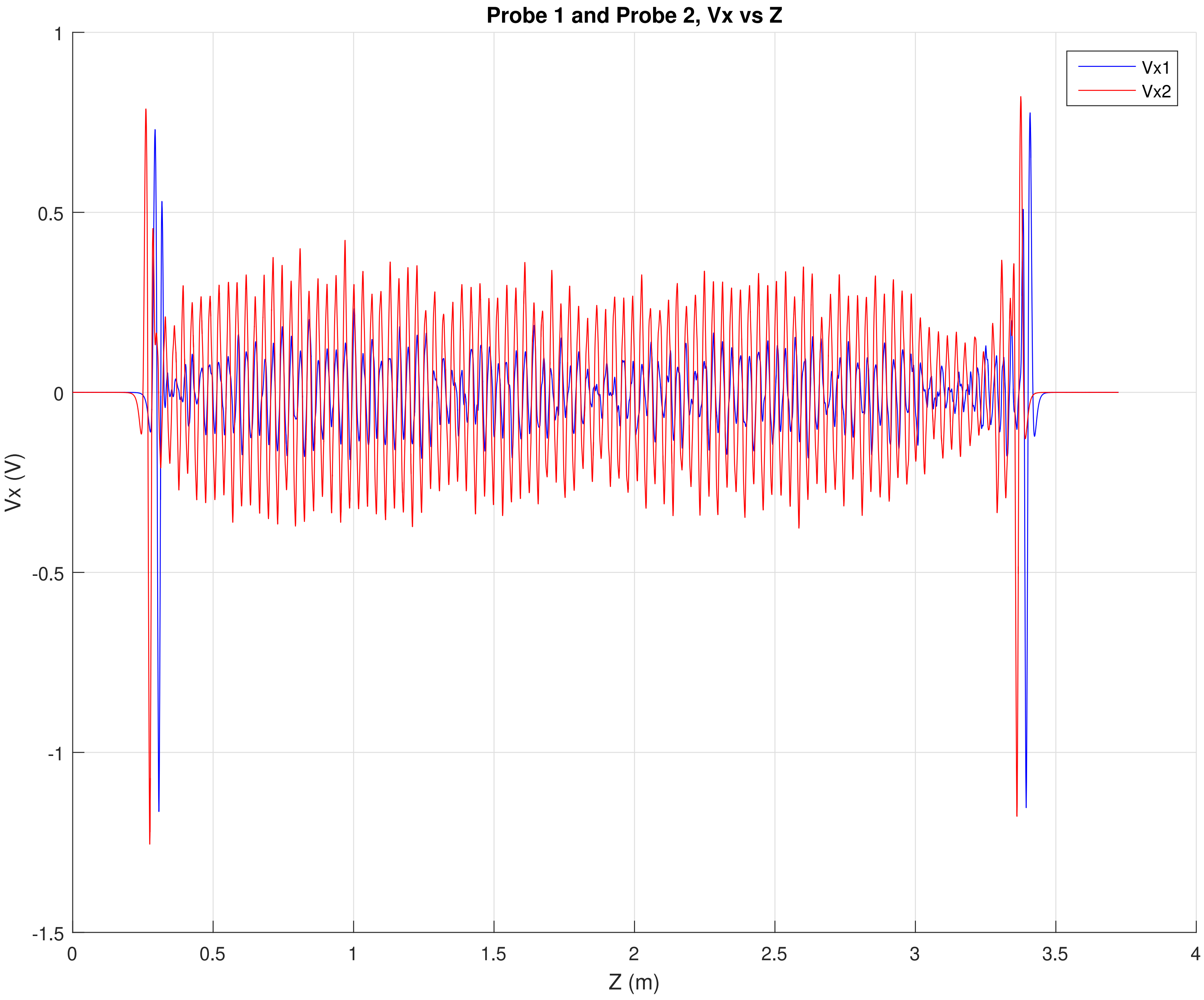

dZ Probe Pos
10^-5
12
10
8
6
4
2
0
-2
dZ Probe (m)
0
0.5
1
1.5
2
2.5
3
3.5
4
Sample Number
10^4


Probe 1, Before: Measured Vx, Vy, Vz Offset Voltage Samples
10-3
-1.5
-1.55
-1.6
-1.65
-1.7
Vx (V)
0
20
40
60
80
100
120
140
160
180
200
10-4
-1.5
-2
-2.5
-3
-3.5
Vy (V)
0
20
40
60
80
100
120
140
160
180
200
10-4
-1.5
-2
-2.5
-3
Vz (V)
0
20
40
60
80
100
120
140
160
180
200
Sample Number

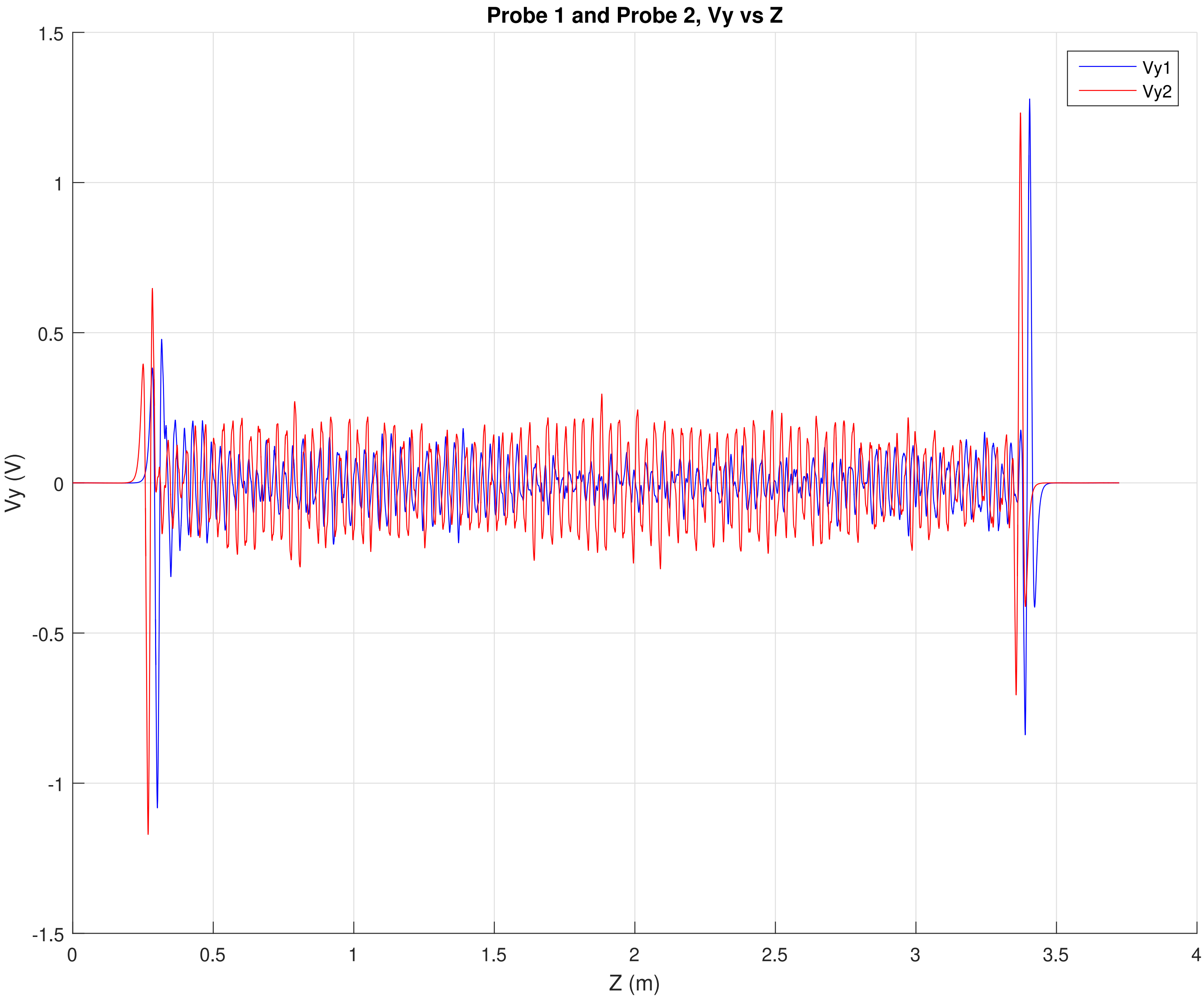

Probe 1, After: Measured Vx, Vy, Vz Offset Voltage Samples


Probe 2, Before: Measured Vx, Vy, Vz Offset Voltage Samples
10-3
Vx (V)
-2.25
-2.3
-2.35
-2.4
0
20
40
60
80
100
120
140
160
180
200
10-3
Vy (V)
1.36
1.34
1.32
1.3
1.28
1.26
0
20
40
60
80
100
120
140
160
180
200
10-4
Vz (V)
-5
-5.5
-6
-6.5
-7
0
20
40
60
80
100
120
140
160
180
200
Sample Number

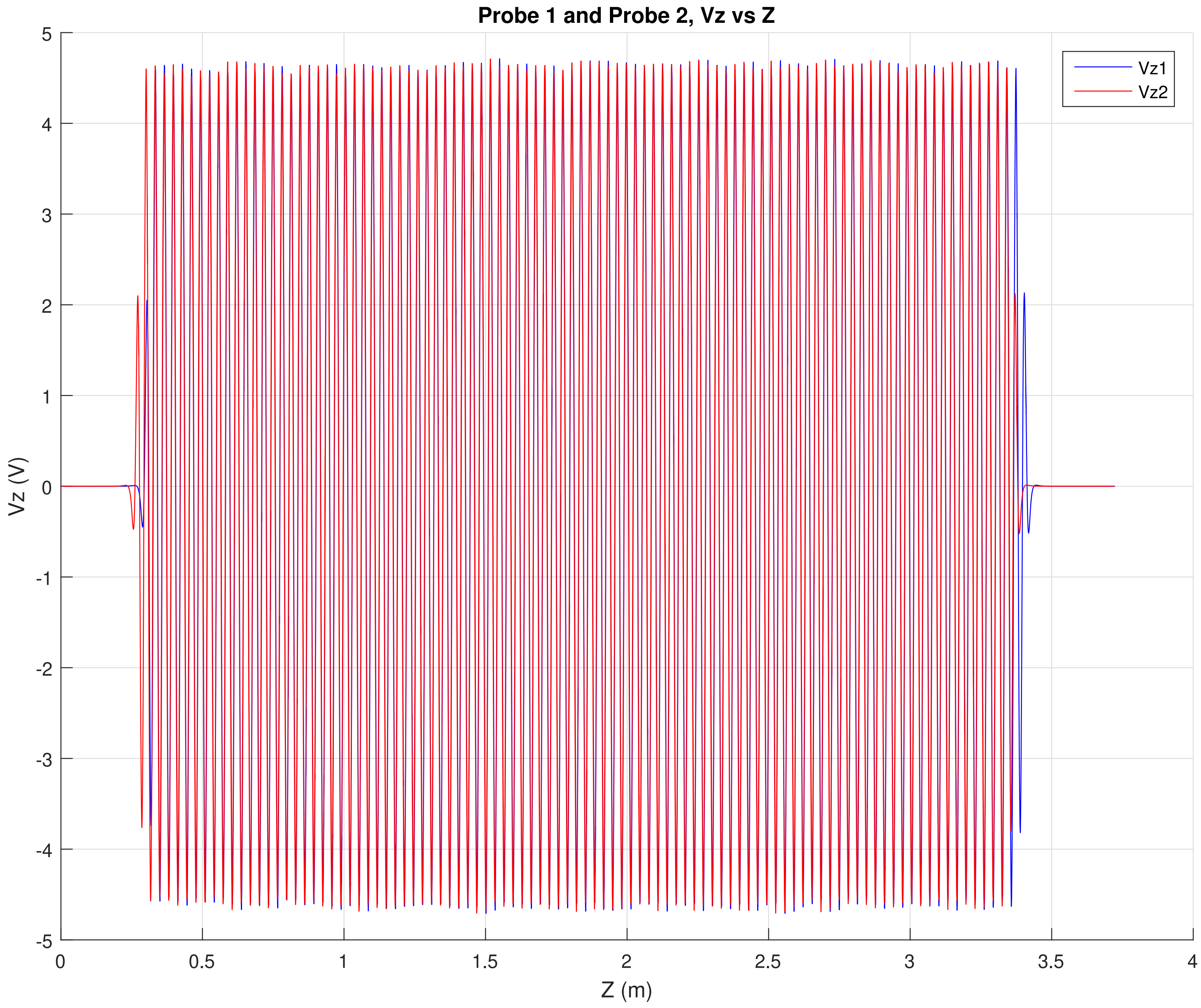

Probe 2, After: Measured Vx, Vy, Vz Offset Voltage Samples
10^{-3}
-2.25
-2.3
-2.35
-2.4
Vx (V)
0
20
40
60
80
100
120
140
160
180
200
10^{-3}
1.4
1.35
1.3
1.25
Vy (V)
0
20
40
60
80
100
120
140
160
180
200
10^{-4}
-5
-5.5
-6
-6.5
-7
Vz (V)
0
20
40
60
80
100
120
140
160
180
200
Sample Number

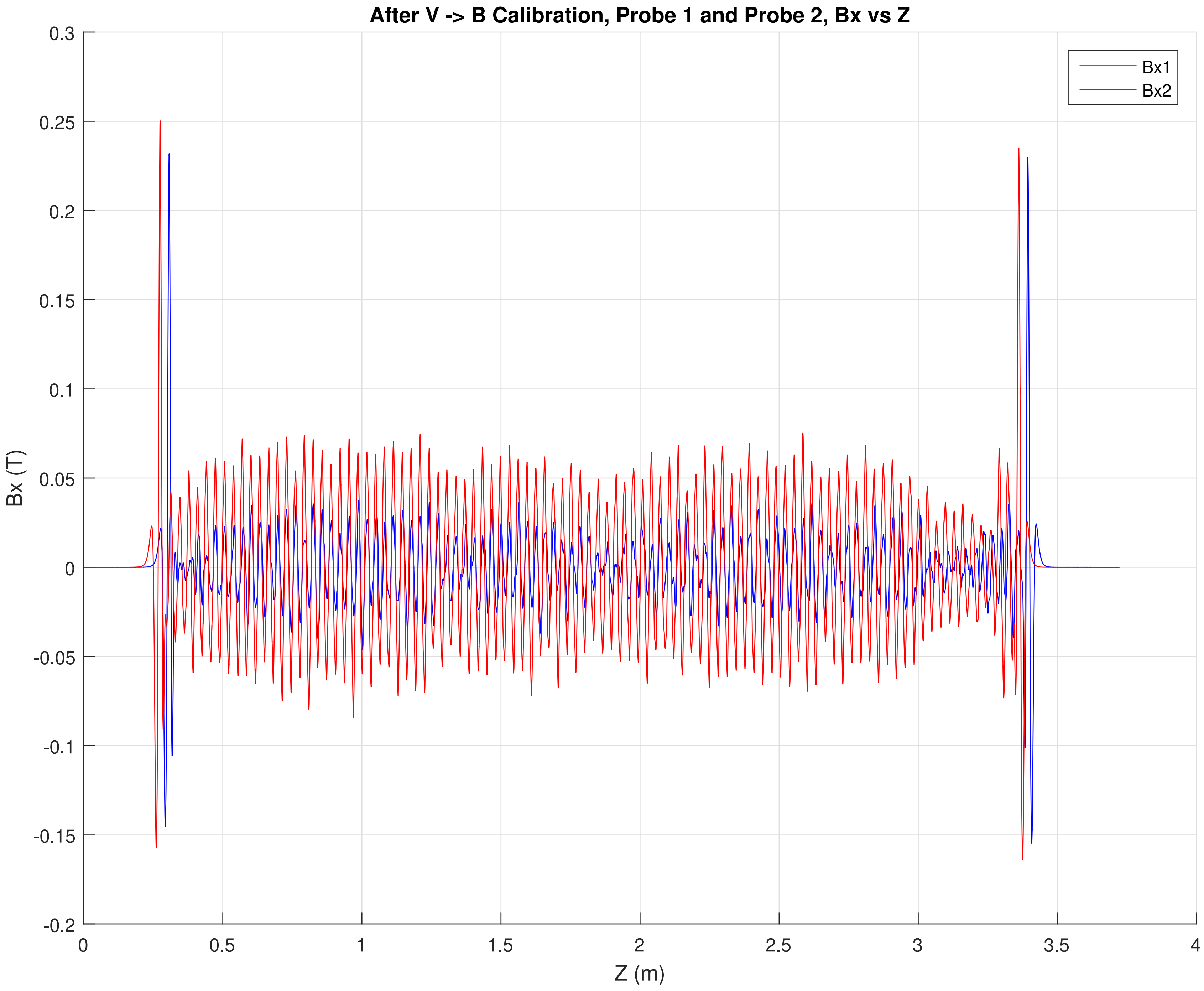


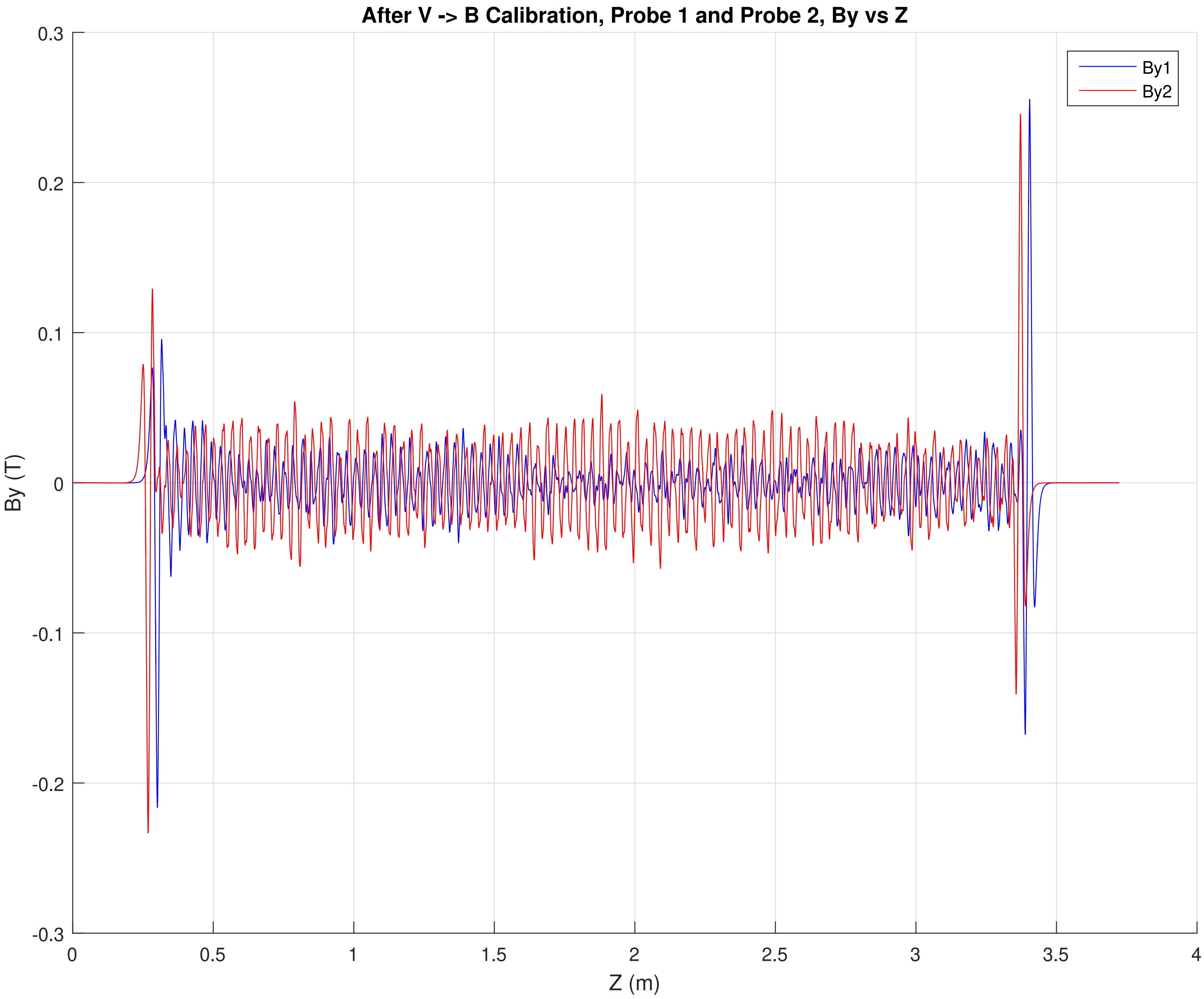
Probe 1 and Probe 2, Vx vs Z
Vx1
Vx2
Vx (V)
Z (m)
1
0.5
0
-0.5
-1
-1.5
0
0.5
1
1.5
2
2.5
3
3.5
4



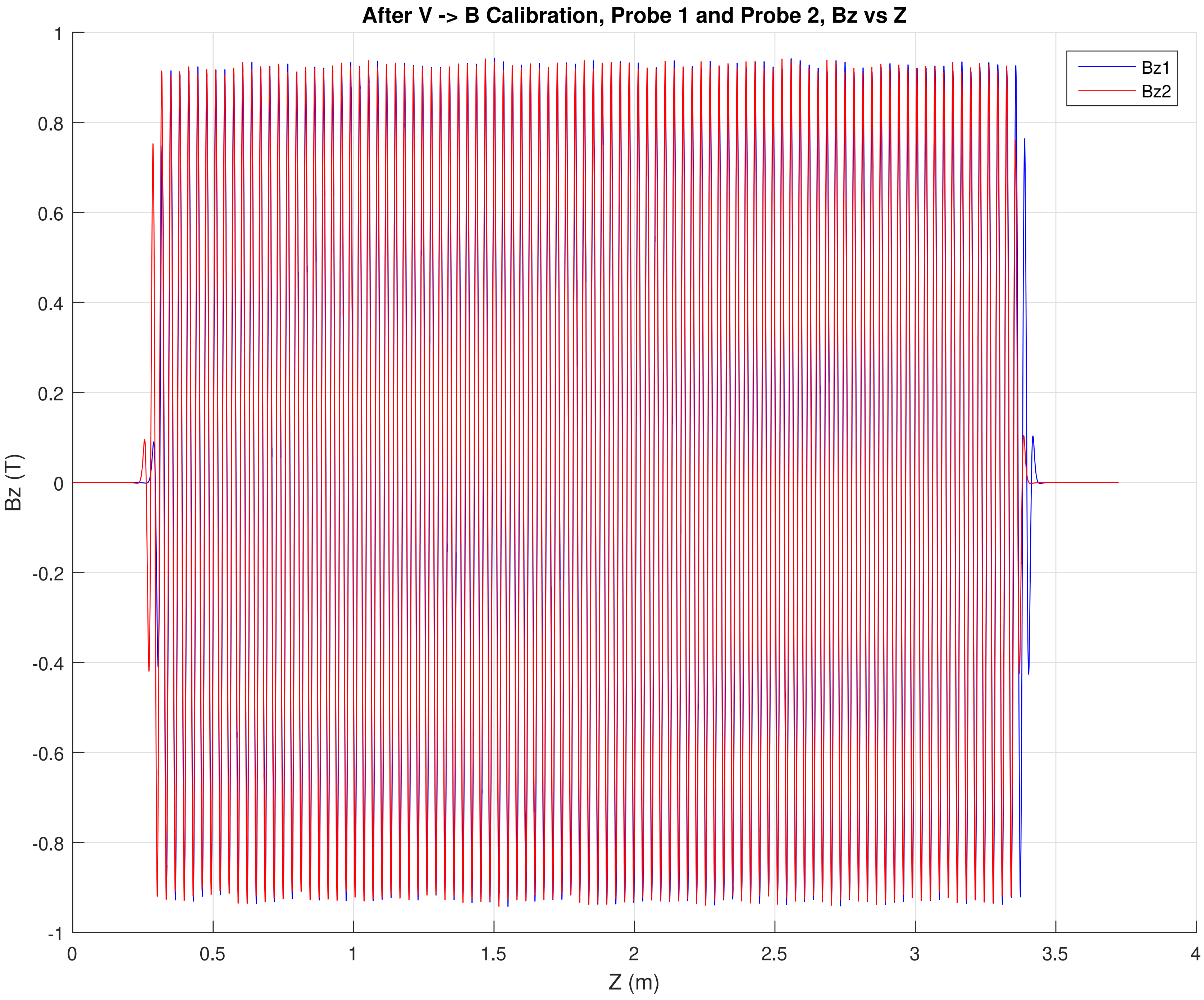
Probe 1 and Probe 2, Vy vs Z
Vy (V)
Z (m)
Vy1
Vy2
1.5
1
0.5
0
-0.5
-1
-1.5
0
0.5
1
1.5
2
2.5
3
3.5
4


Probe 1 and Probe 2, Vz vs Z
Vz1
Vz2
Vz (V)
5
4
3
2
1
0
-1
-2
-3
-4
-5
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

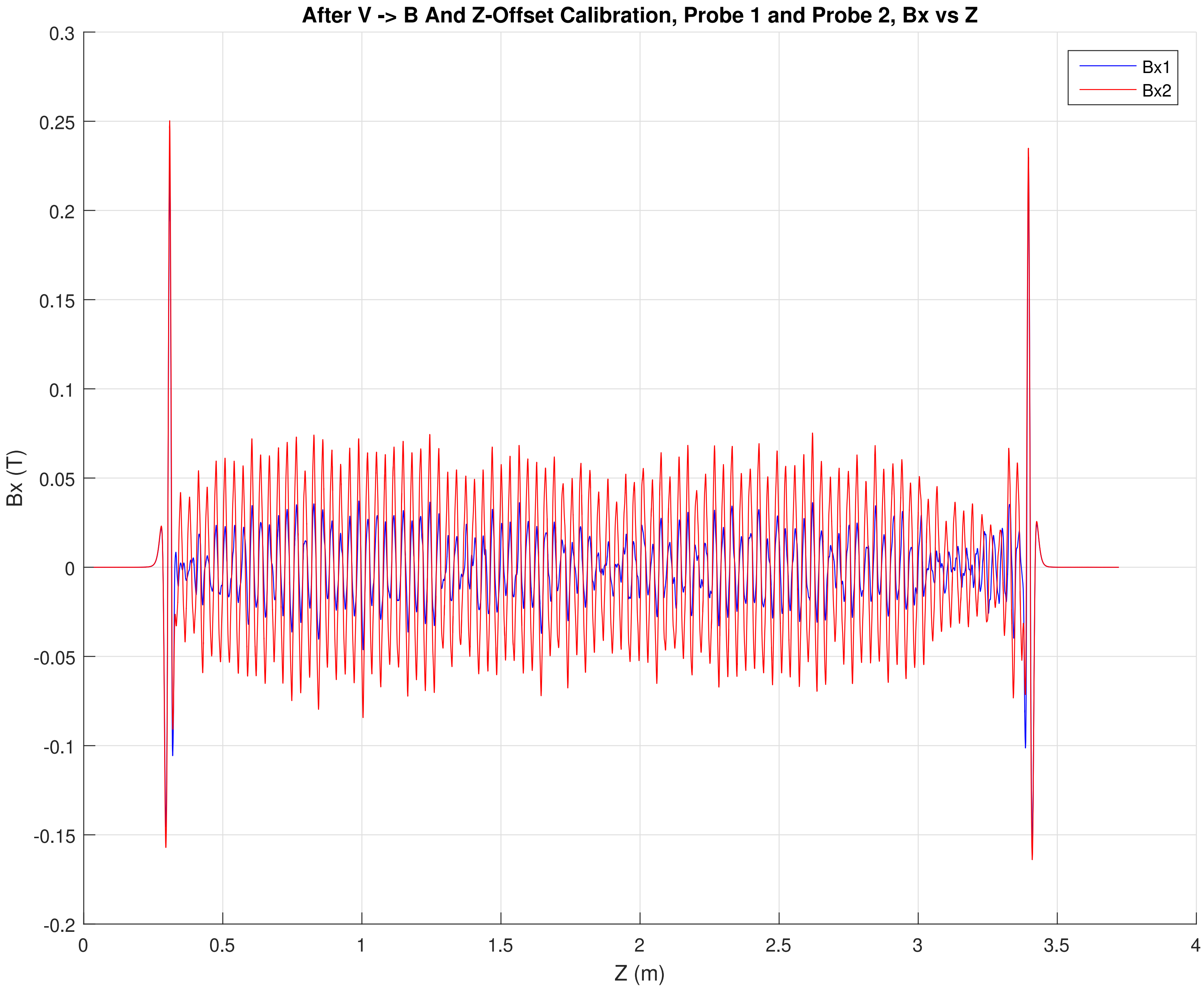

After V -> B Calibration, Probe 1 and Probe 2, Bx vs Z
Bx1
Bx2
Bx (T)
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

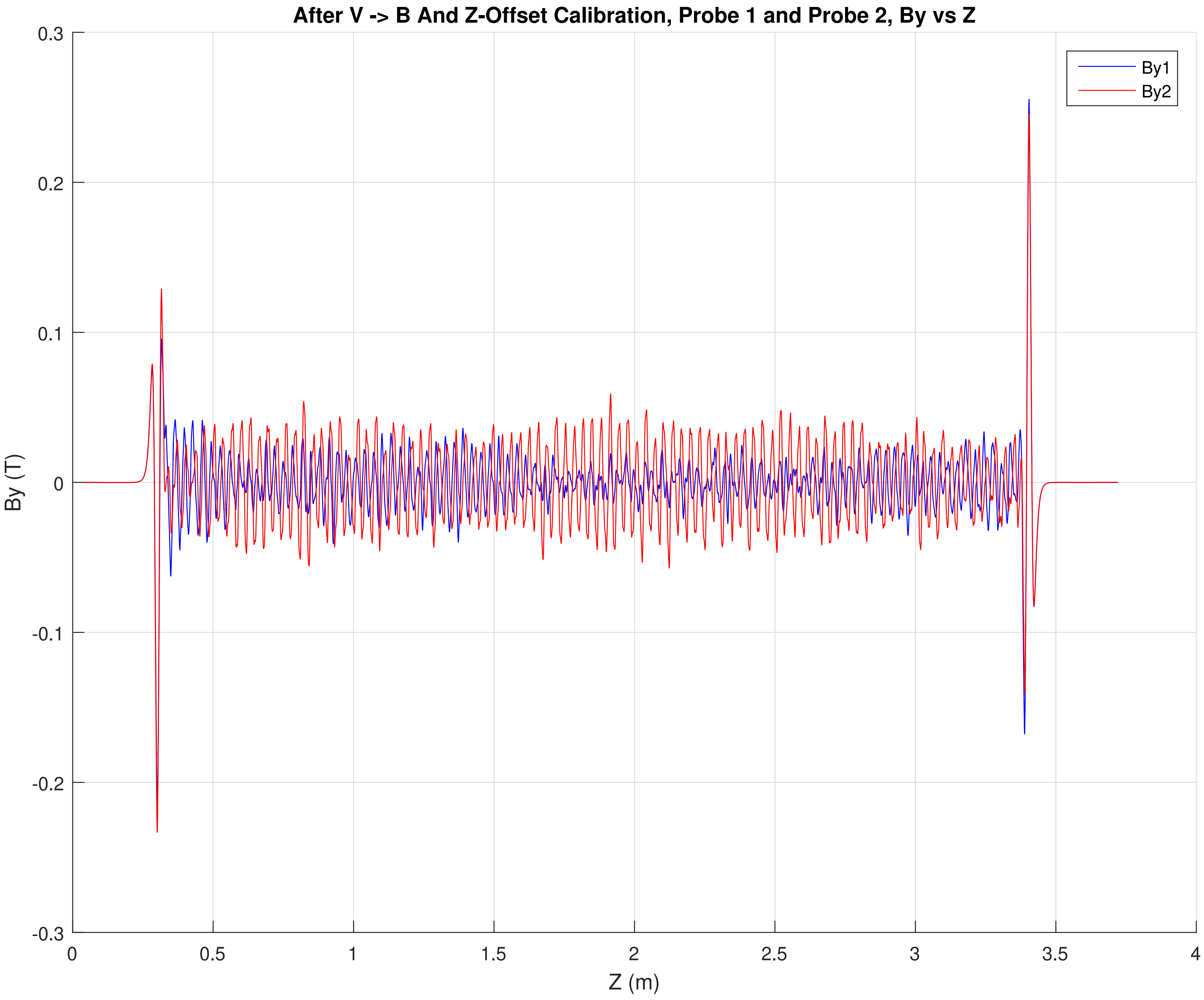


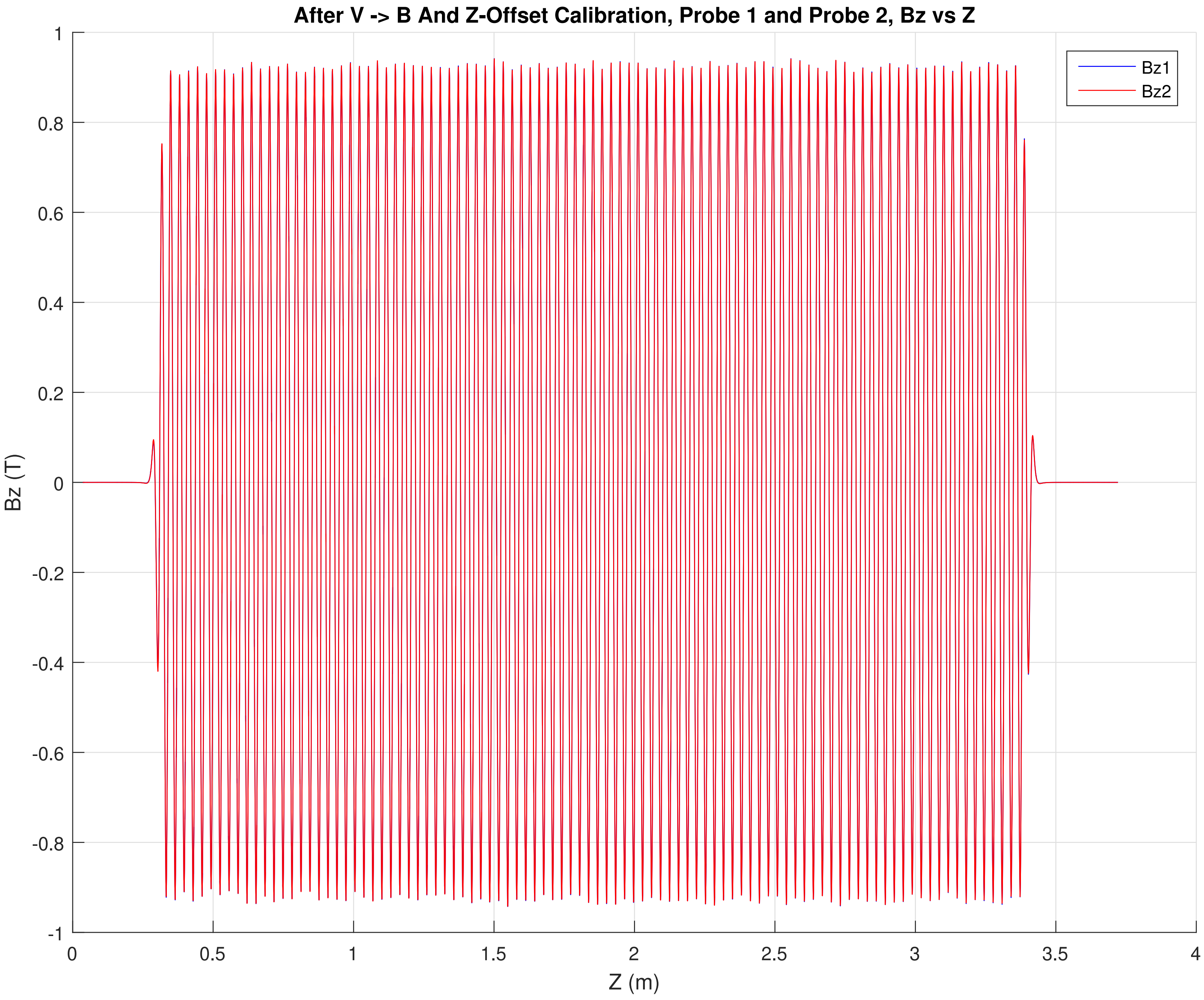
After V -> B Calibration, Probe 1 and Probe 2, By vs Z
By1
By2
By (T)
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5
4

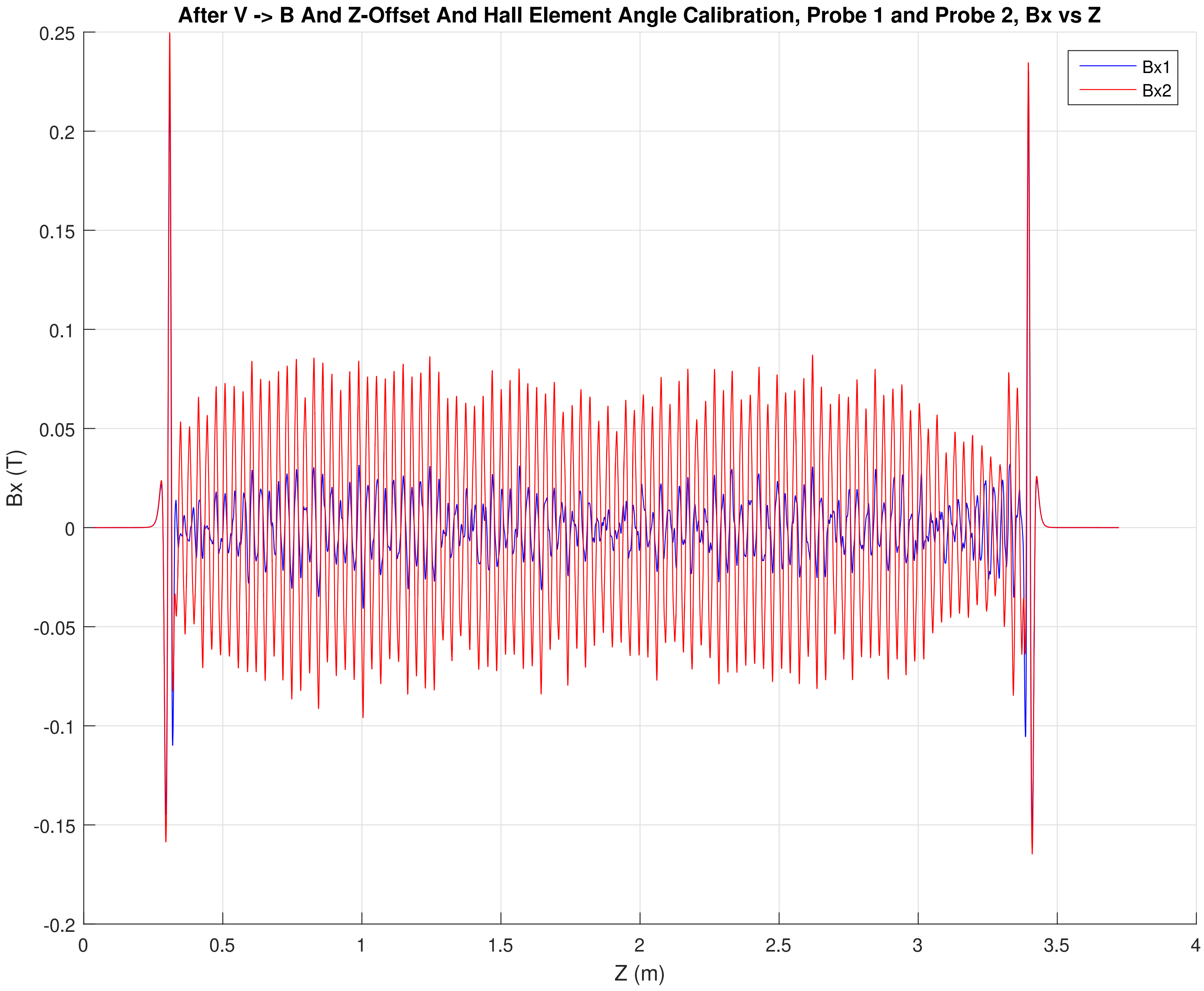


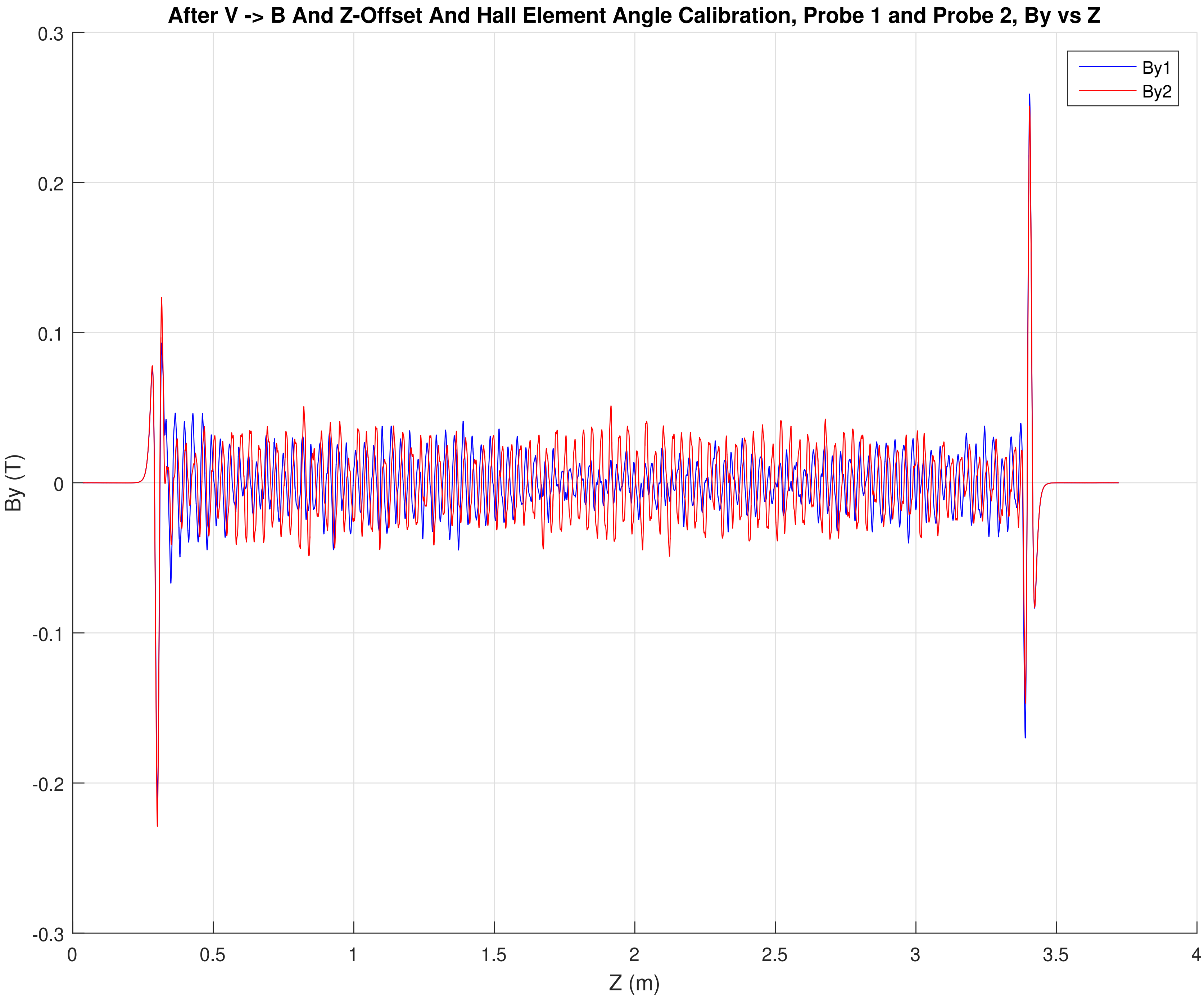
After V -> B Calibration, Probe 1 and Probe 2, Bz vs Z


After V -> B And Z-Offset Calibration, Probe 1 and Probe 2, Bx vs Z
Bx1
Bx2
Bx (T)
0.3
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5
4

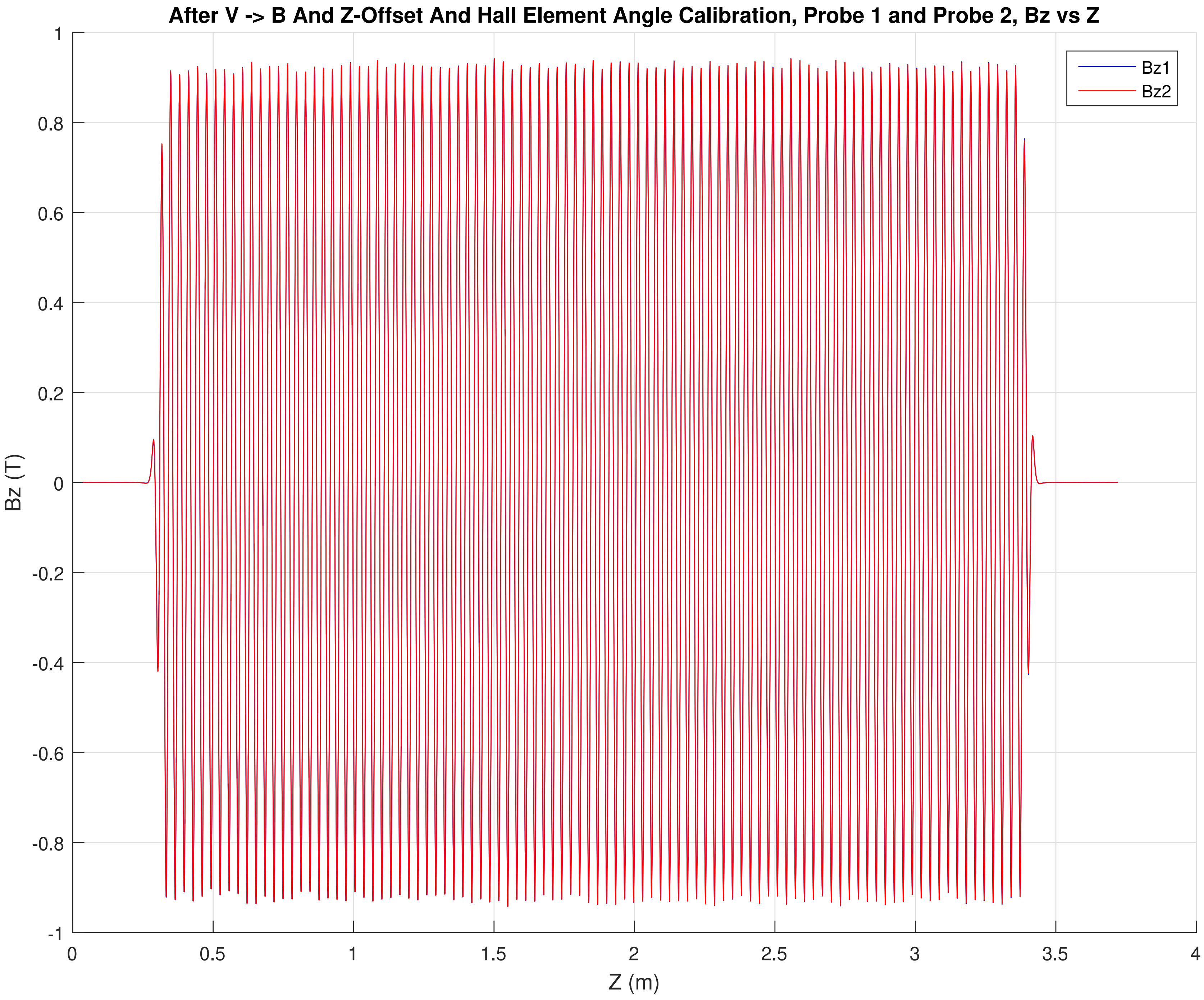

After V -> B And Z-Offset Calibration, Probe 1 and Probe 2, By vs Z
By1
By2
By (T)
Z (m)
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
0.5
1
1.5
2
2.5
3
3.5
4

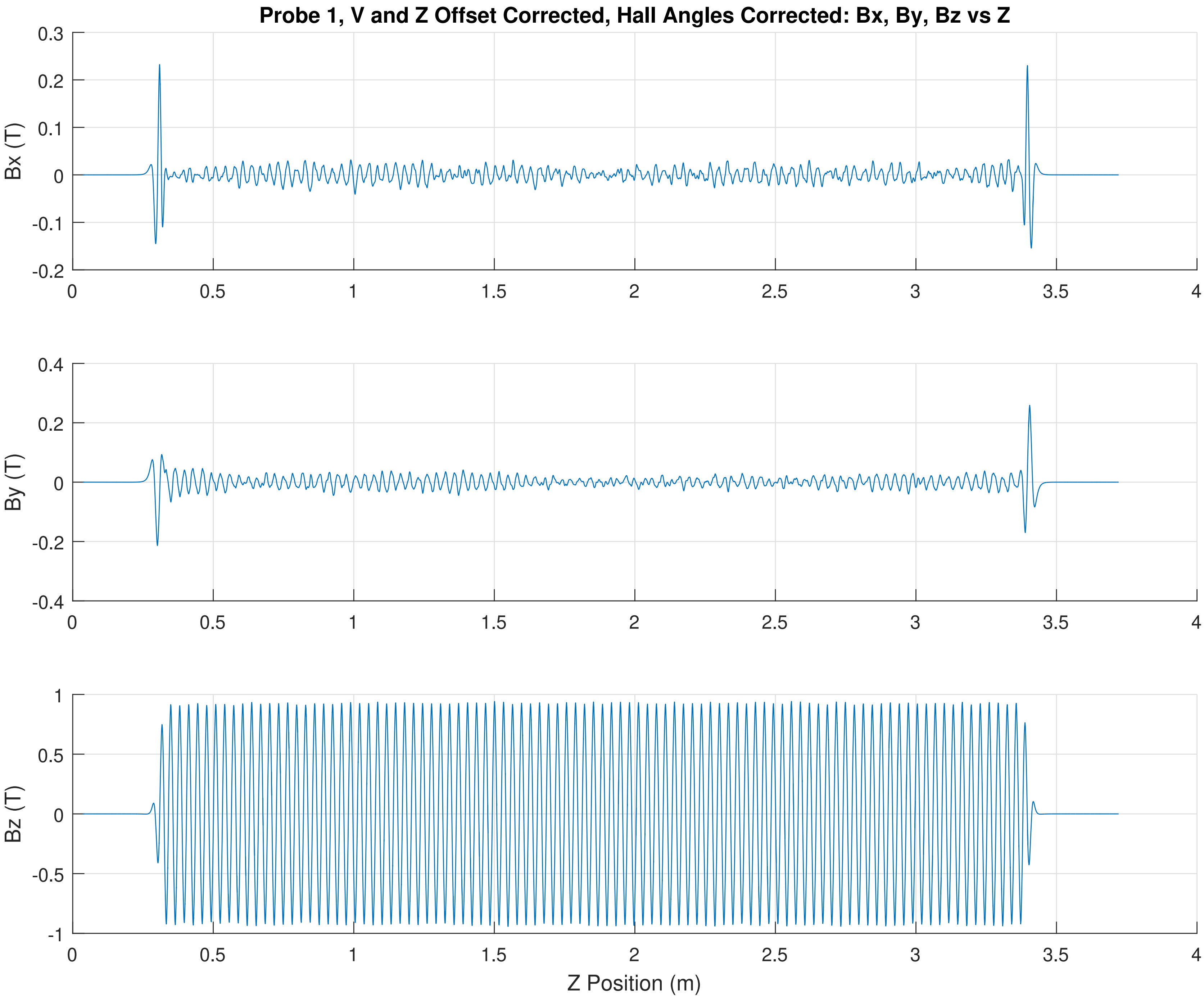

After V -> B And Z-Offset Calibration, Probe 1 and Probe 2, Bz vs Z
Bz1
Bz2
Bz (T)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

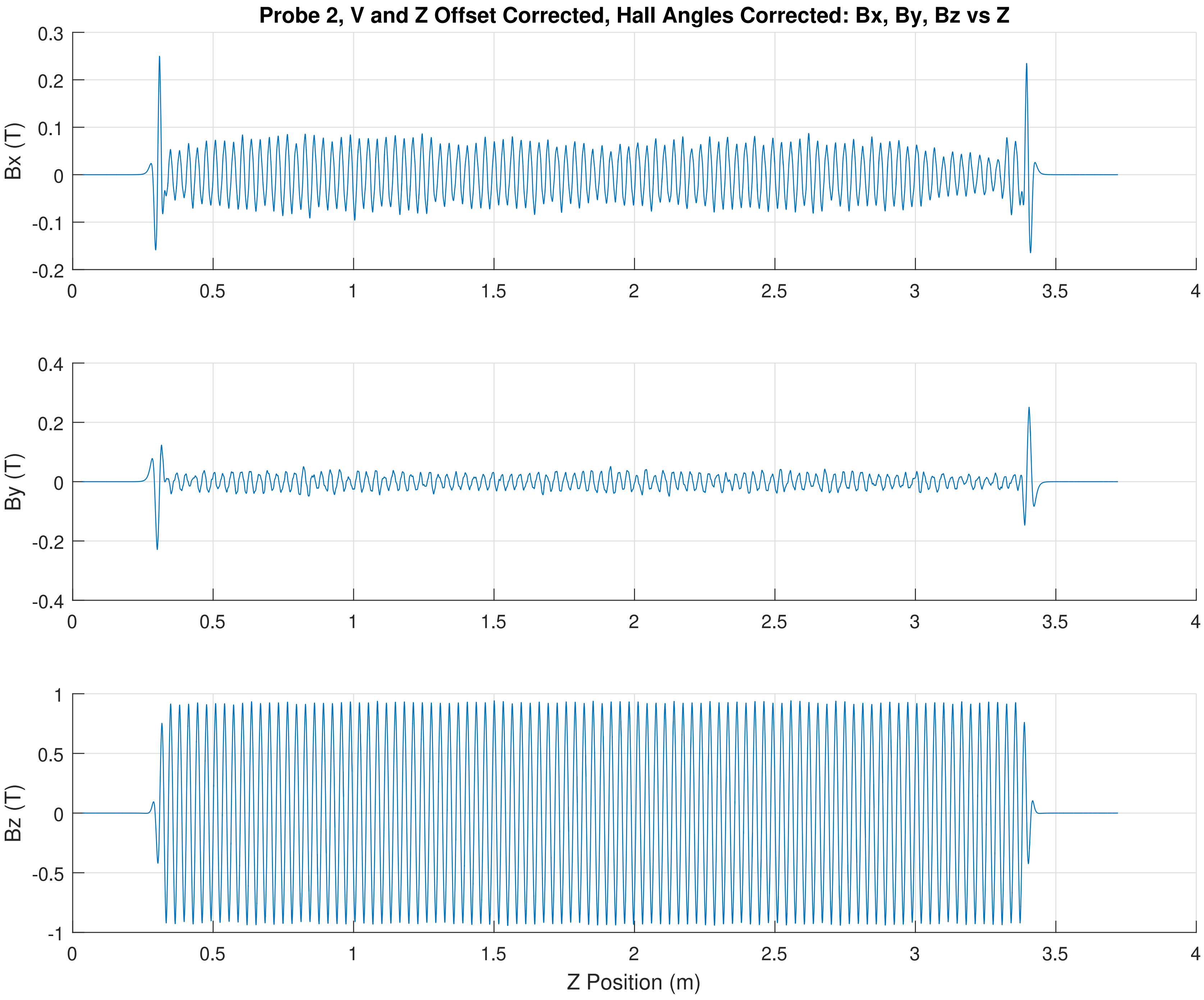

After V -> B And Z-Offset And Hall Element Angle Calibration, Probe 1 and Probe 2, Bx vs Z
Bx (T)
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5
4
Bx1
Bx2

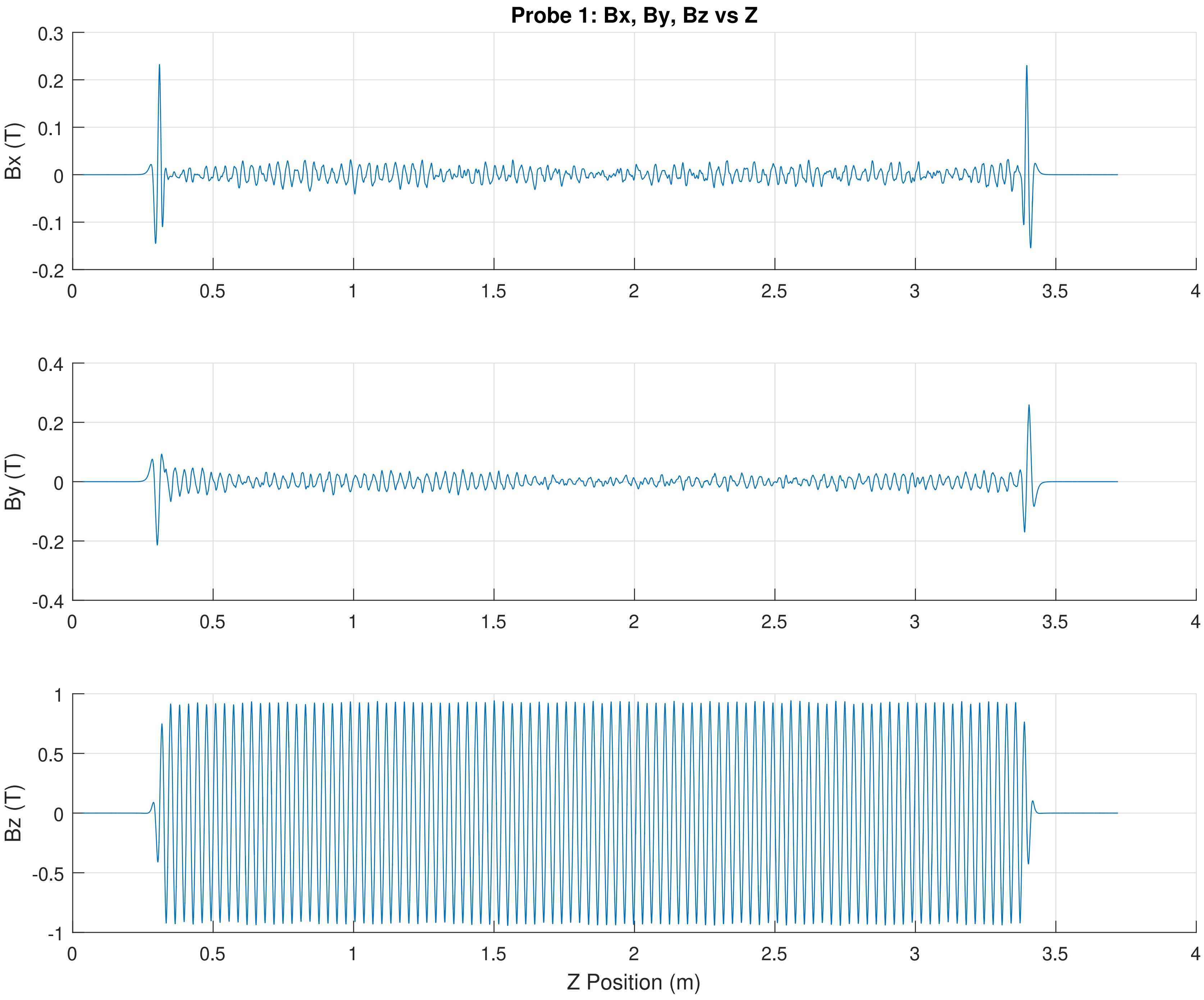


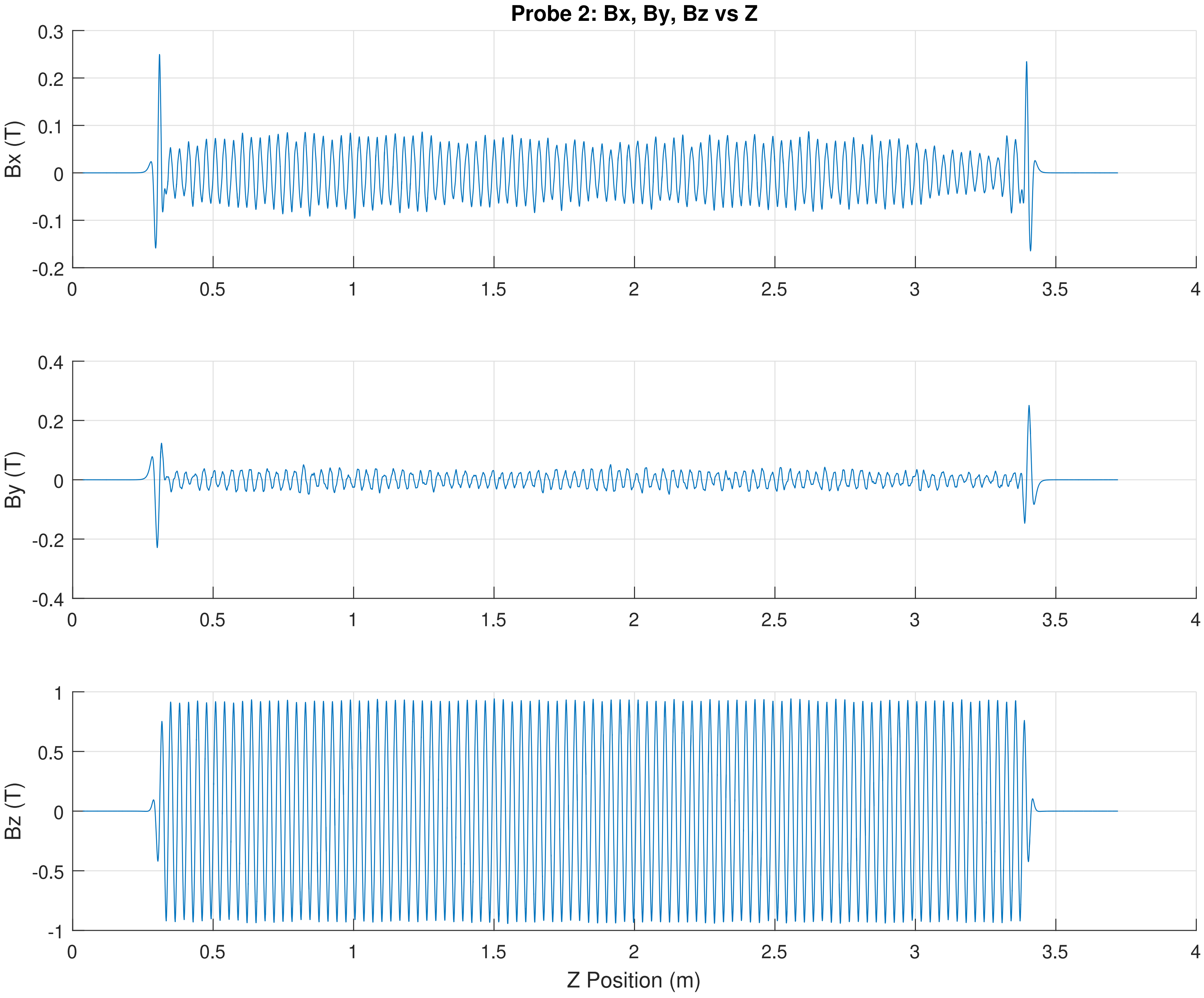
After V -> B And Z-Offset And Hall Element Angle Calibration, Probe 1 and Probe 2, By vs Z

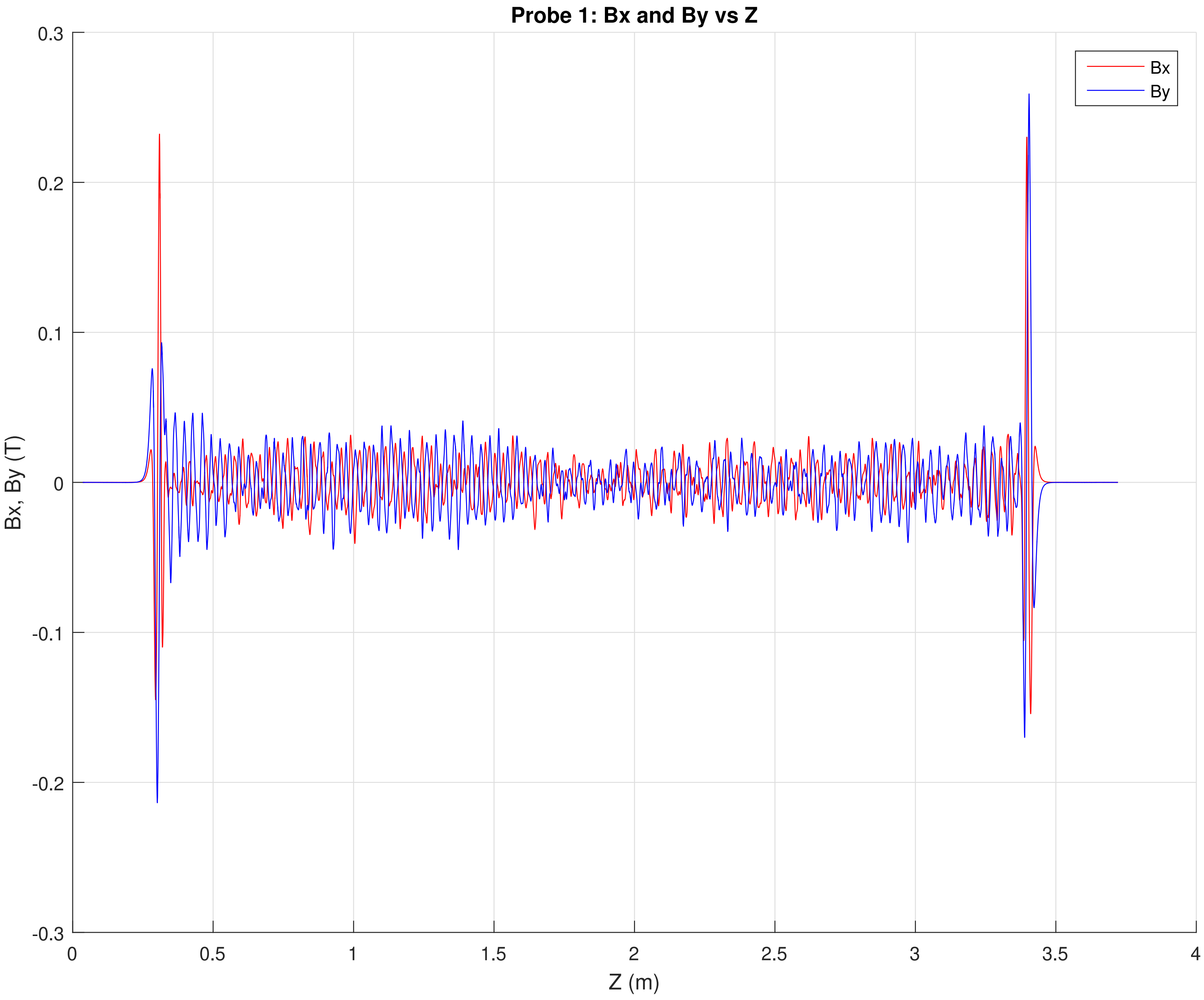

After V -> B And Z-Offset And Hall Element Angle Calibration, Probe 1 and Probe 2, Bz vs Z
Bz1
Bz2
Bz (T)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5
4


Probe 1, V and Z Offset Corrected, Hall Angles Corrected: Bx, By, Bz vs Z
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z Position (m)

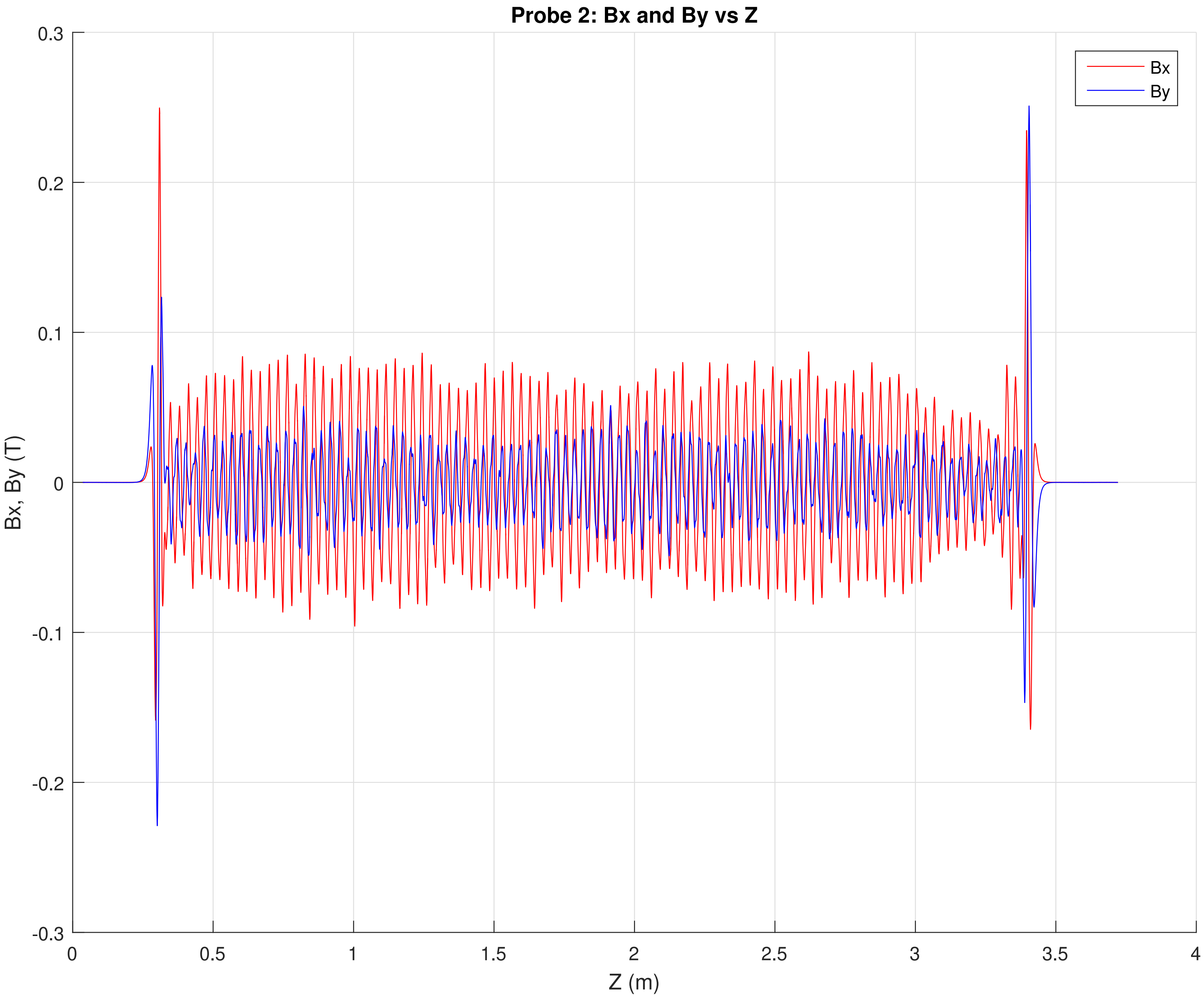

Probe 2, V and Z Offset Corrected, Hall Angles Corrected: Bx, By, Bz vs Z
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4
Bz (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z Position (m)

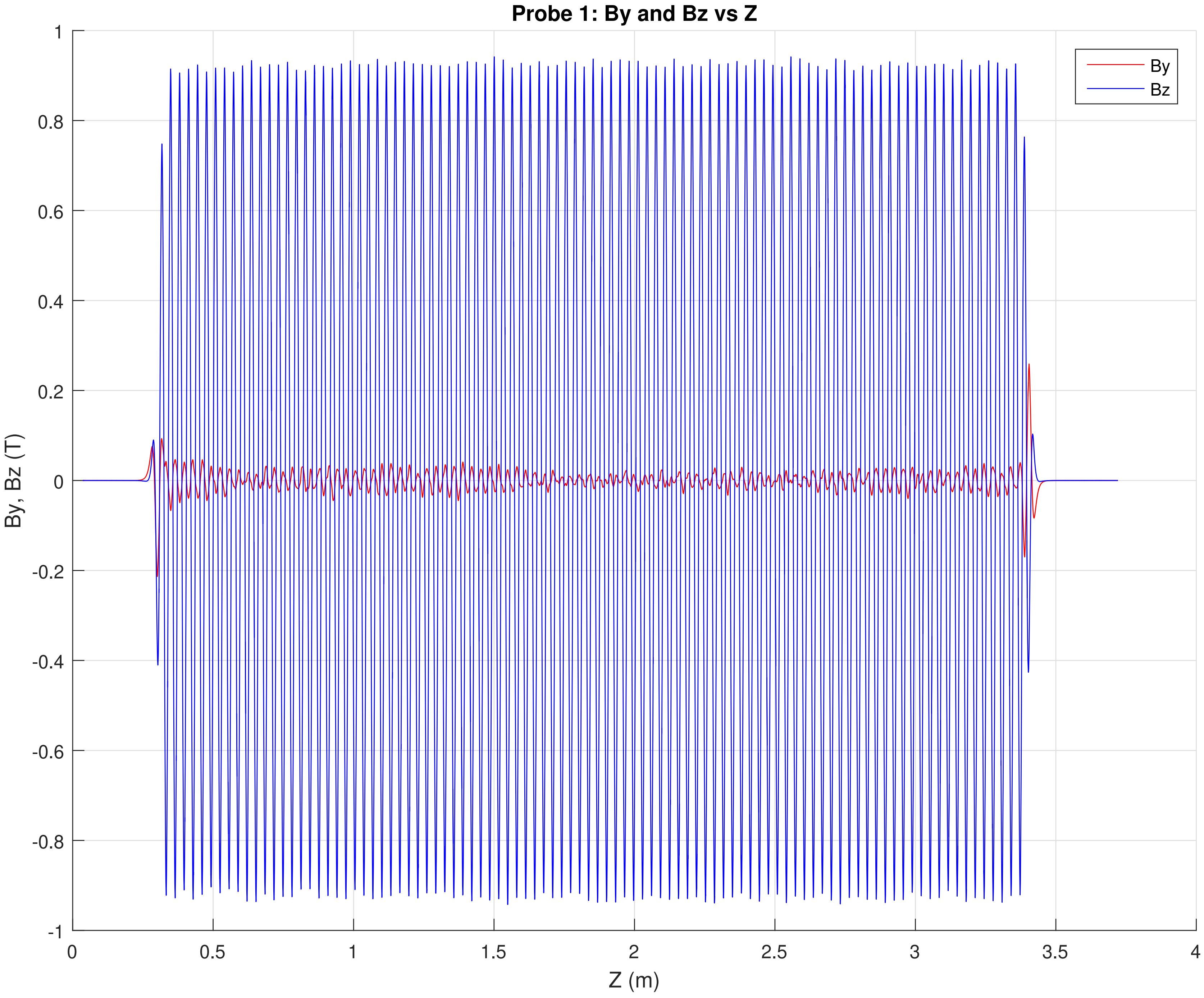

Probe 1: Bx, By, Bz vs Z
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
By (T)
0.4
0.2
0
-0.2
-0.4
Bz (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z Position (m)

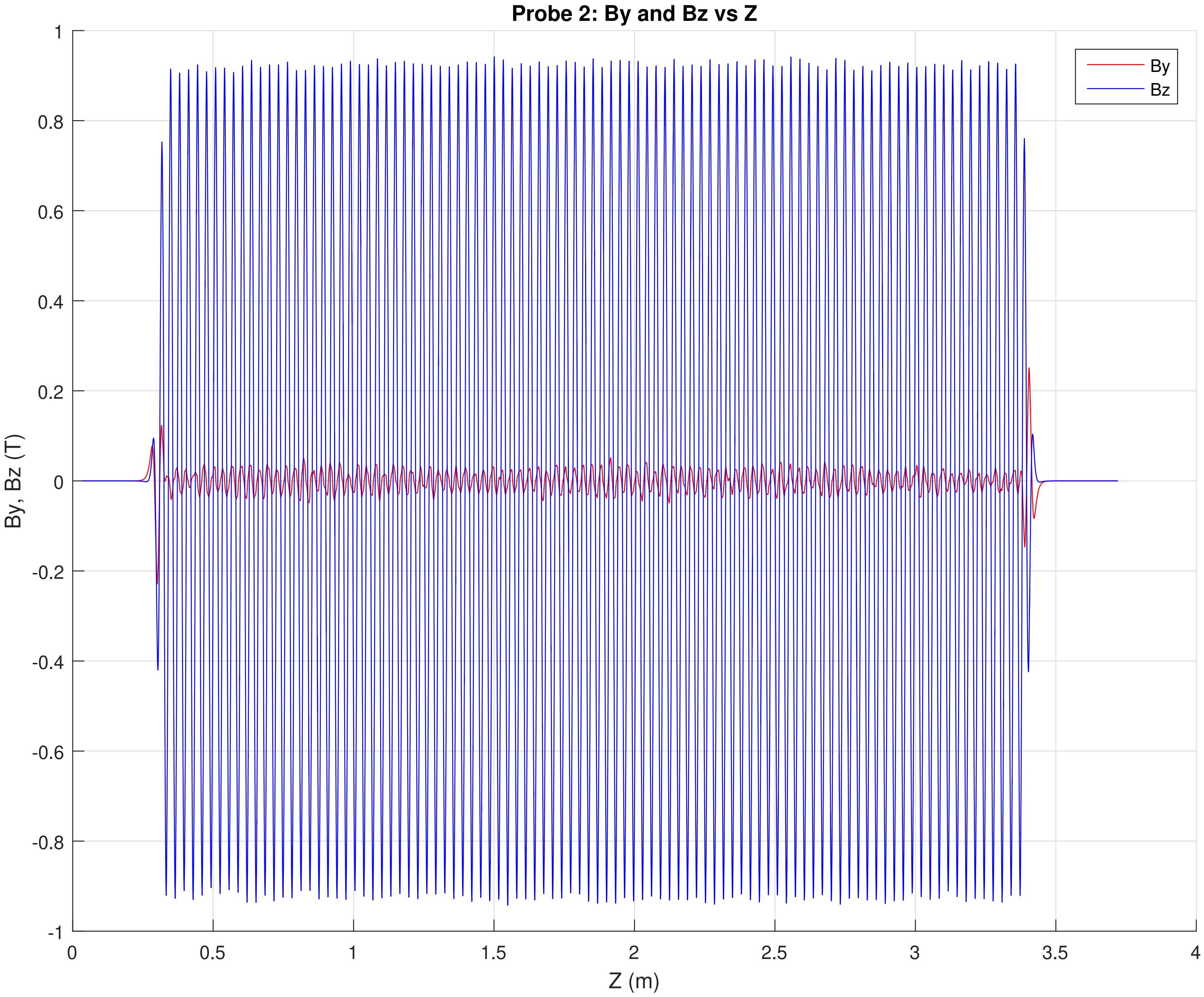

Probe 2: Bx, By, Bz vs Z
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
By (T)
0.4
0.2
0
-0.2
-0.4
Bz (T)
1
0.5
0
-0.5
-1
Z Position (m)

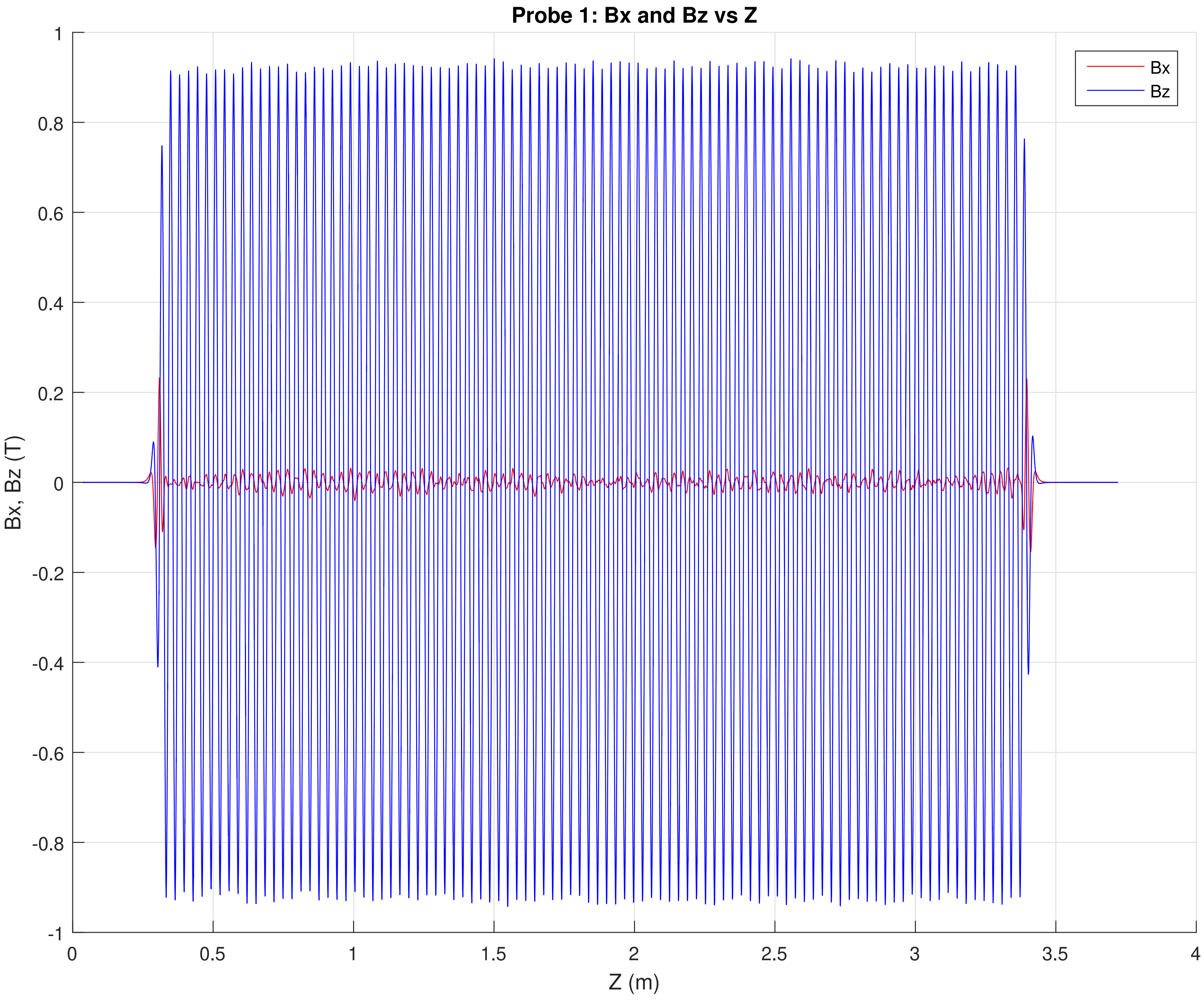


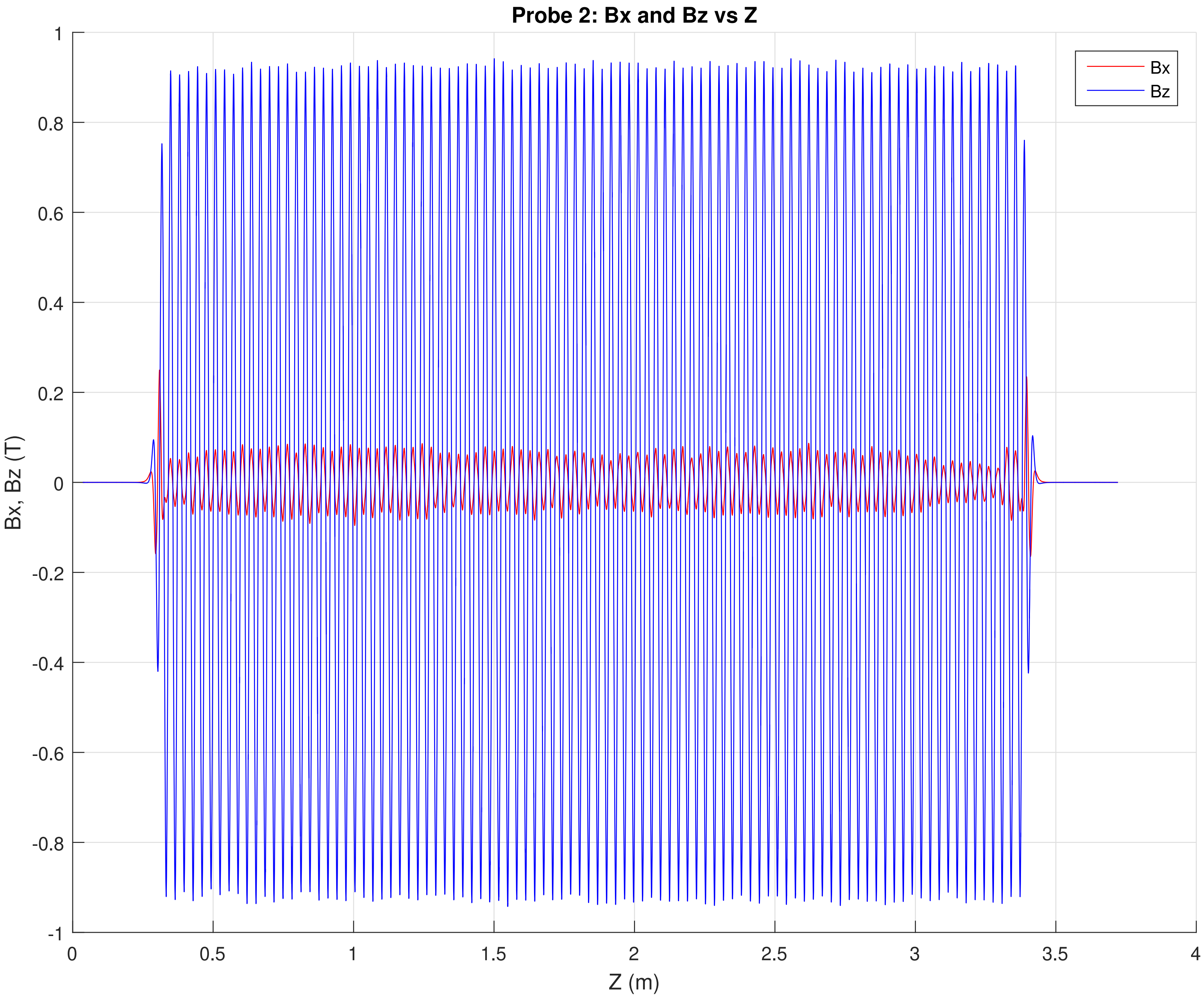
Probe 1: Bx and By vs Z
Bx
By
Bx, By (T)
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

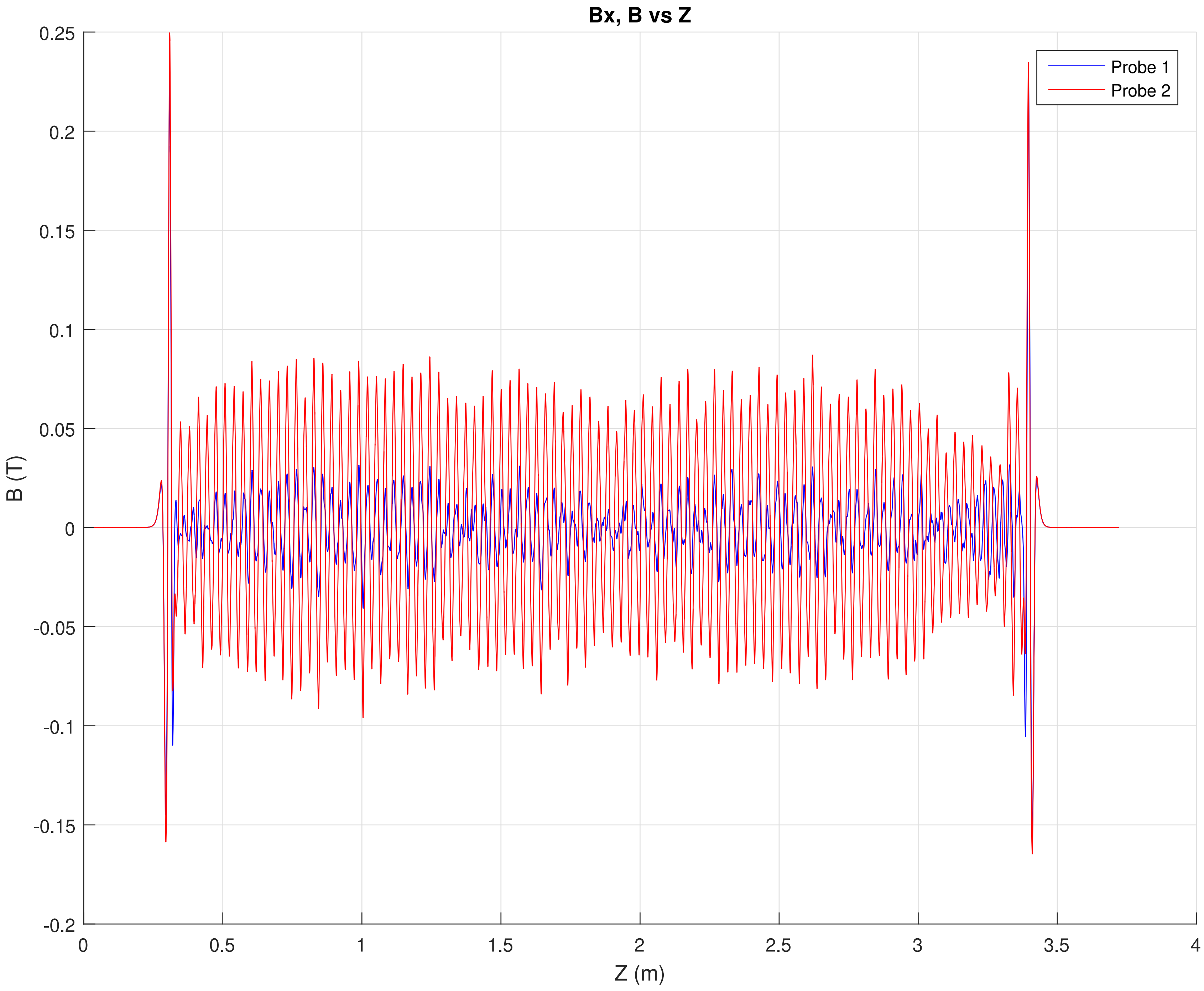

Probe 2: Bx and By vs Z
Bx
By
Bx, By (T)
Z (m)
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
0
0.5
1
1.5
2
2.5
3
3.5
4

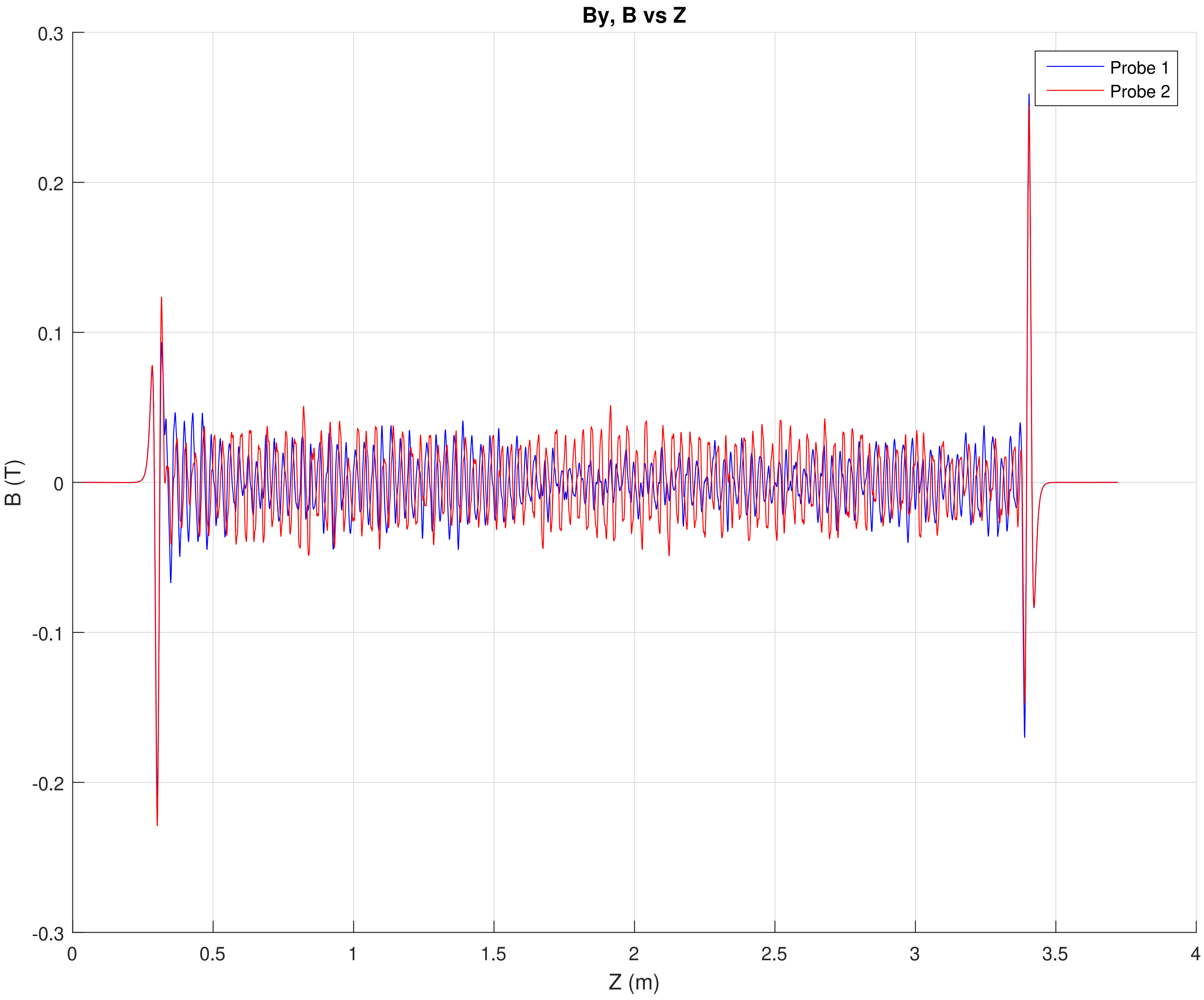

Probe 1: By and Bz vs Z
By
Bz
By, Bz (T)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

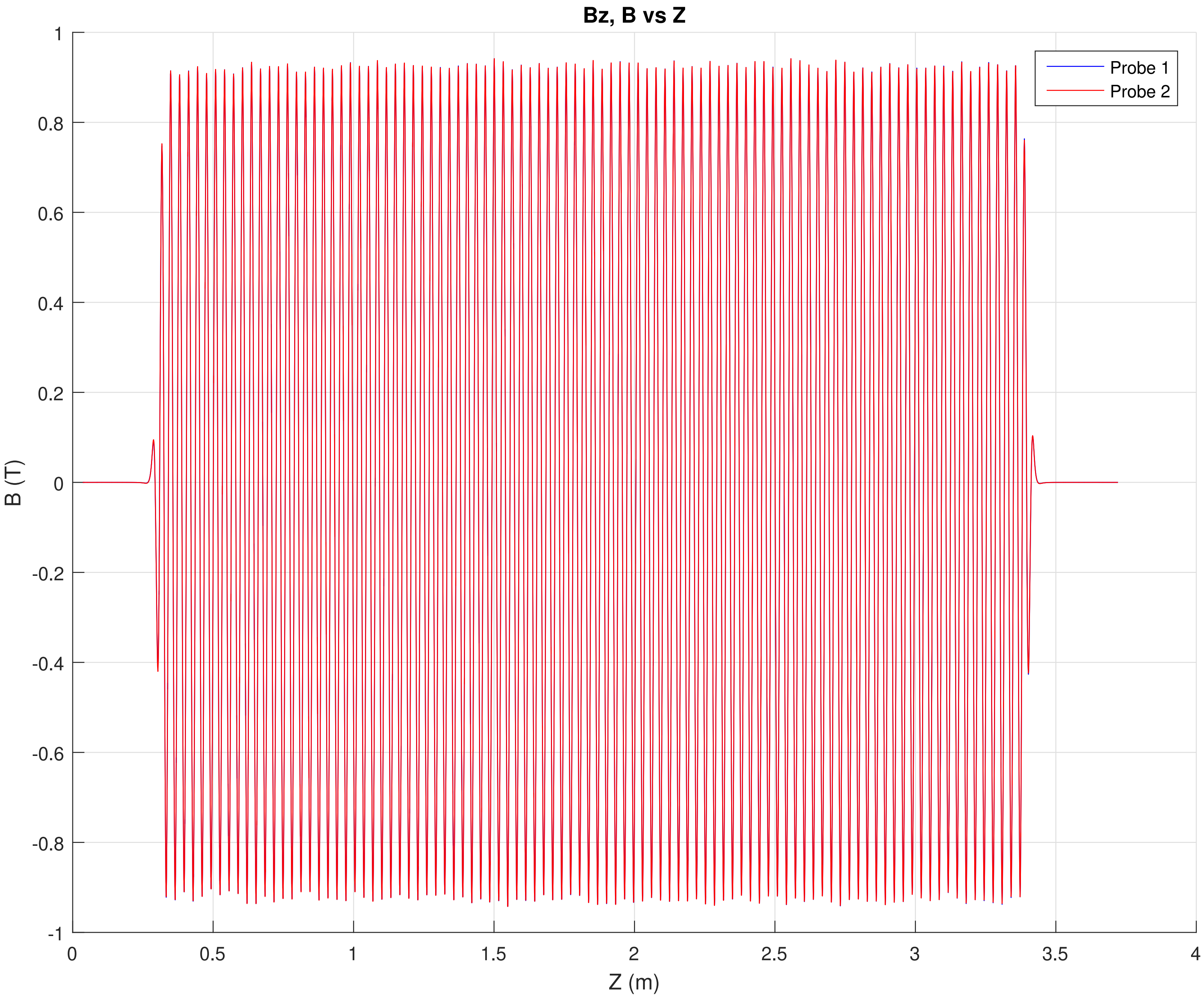

Probe 2: By and Bz vs Z
By
Bz
By, Bz (T)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)


Probe 1: Bx and Bz vs Z
Bx
Bz
Bx, Bz (T)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

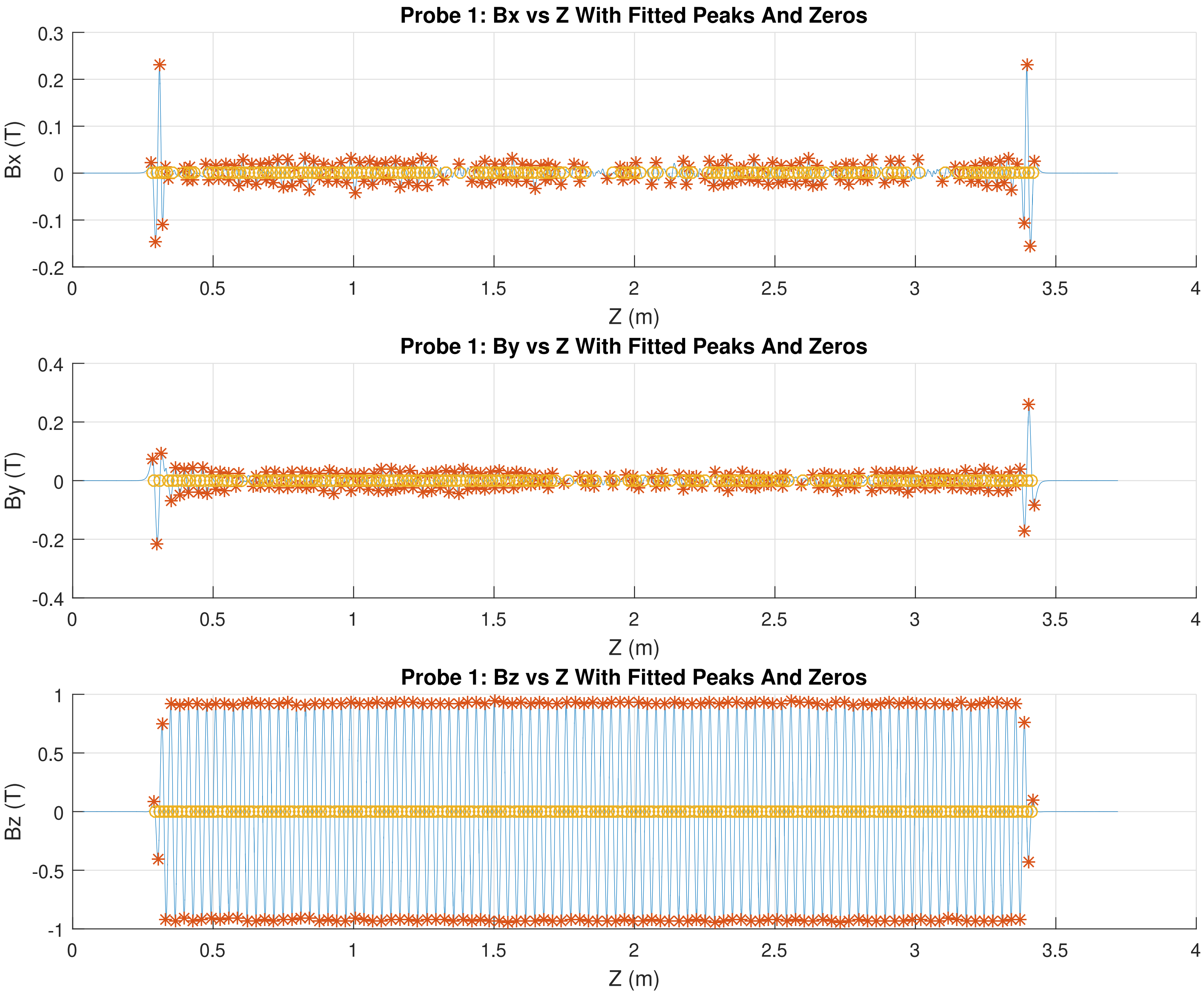

Probe 2: Bx and Bz vs Z
Bx
Bz
Bx, Bz (T)
Z (m)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
3.5
4

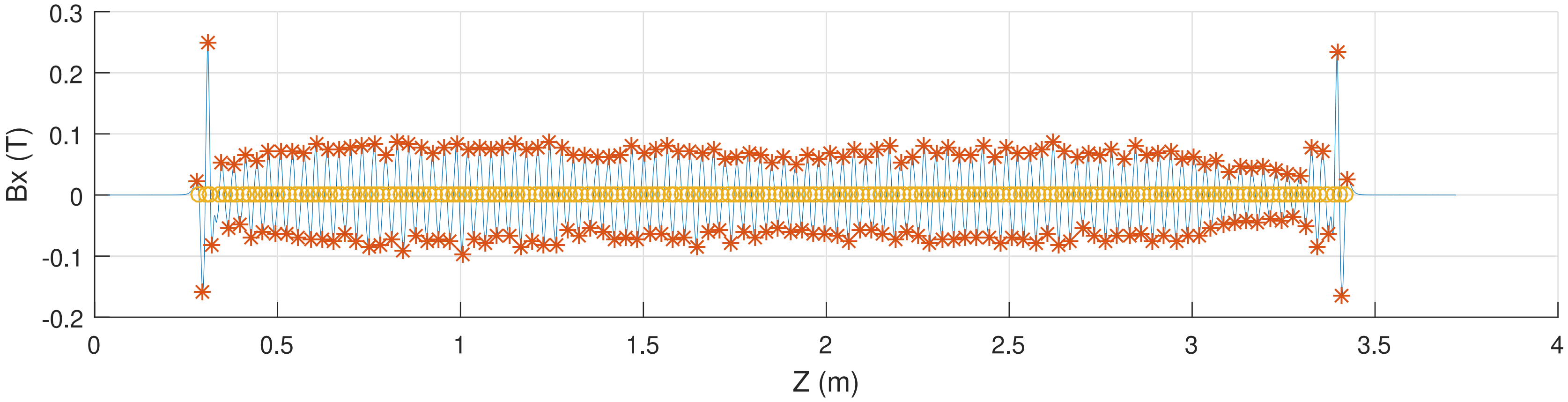

Bx, B vs Z
Probe 1
Probe 2
B (T)
0.25
0.2
0.15
0.1
0.05
0
-0.05
-0.1
-0.15
-0.2
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5
4

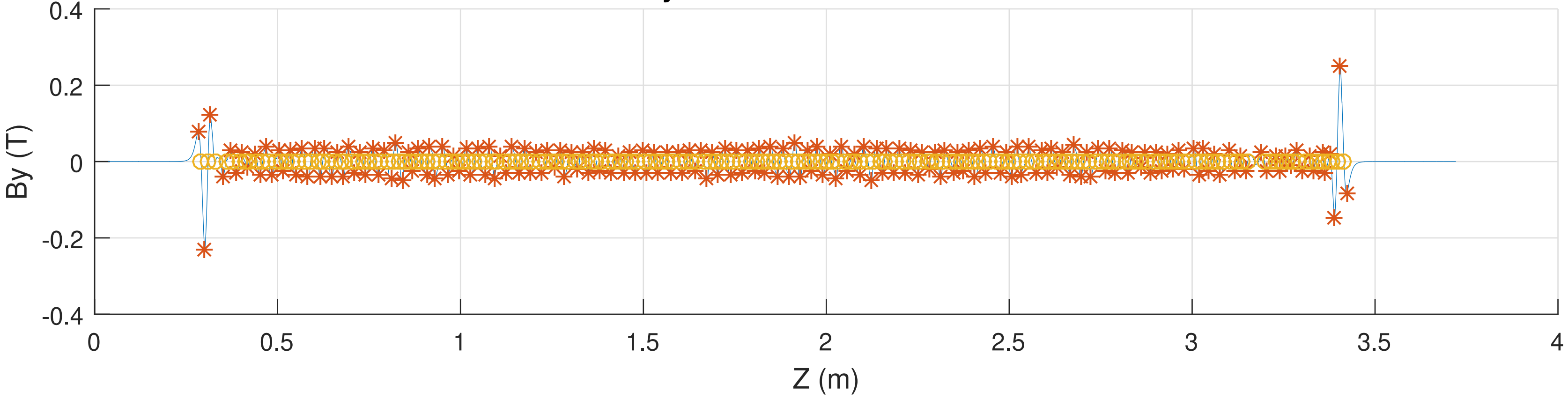

By, B vs Z
Probe 1
Probe 2
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
B (T)
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

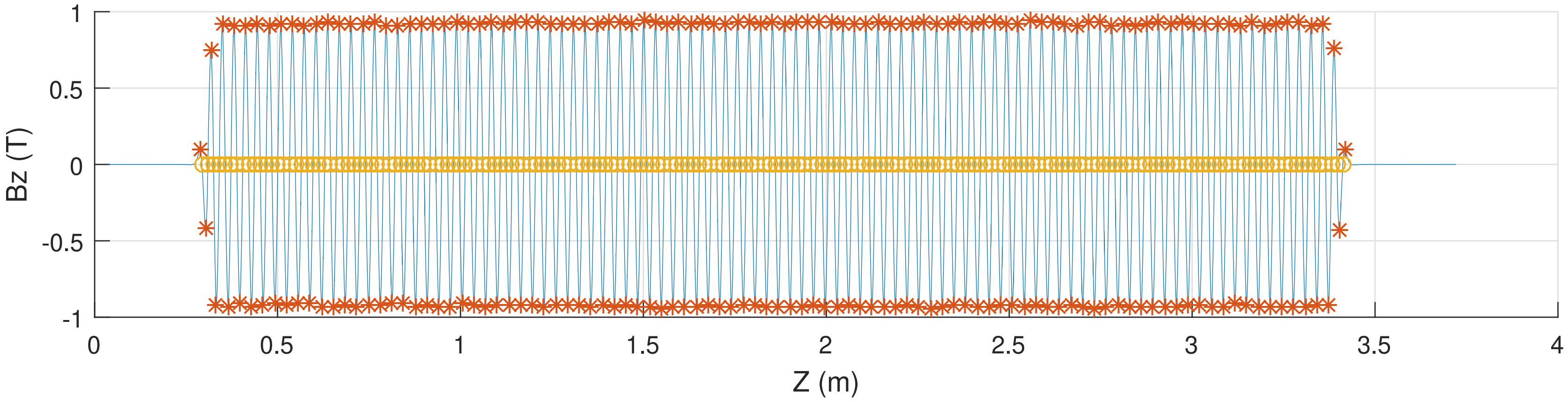


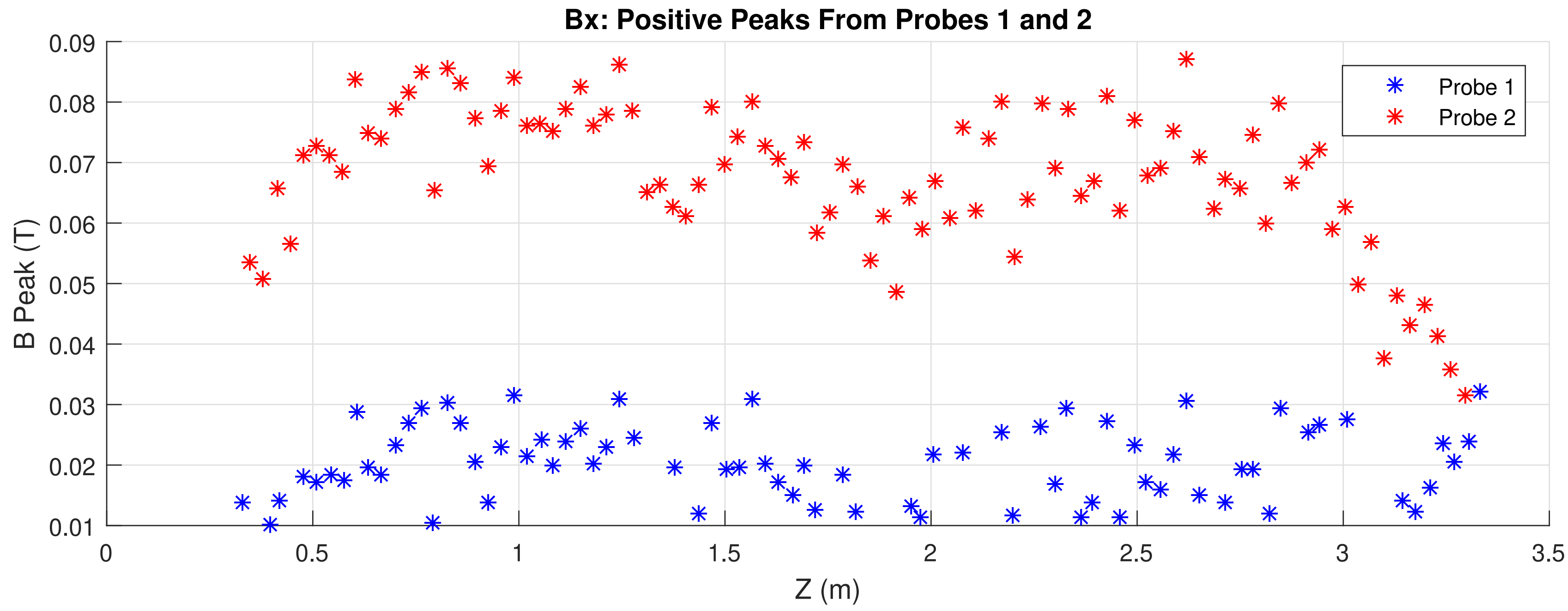
Bz, B vs Z
Probe 1
Probe 2
B (T)
Z (m)
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
0
0.5
1
1.5
2
2.5
3
3.5
4

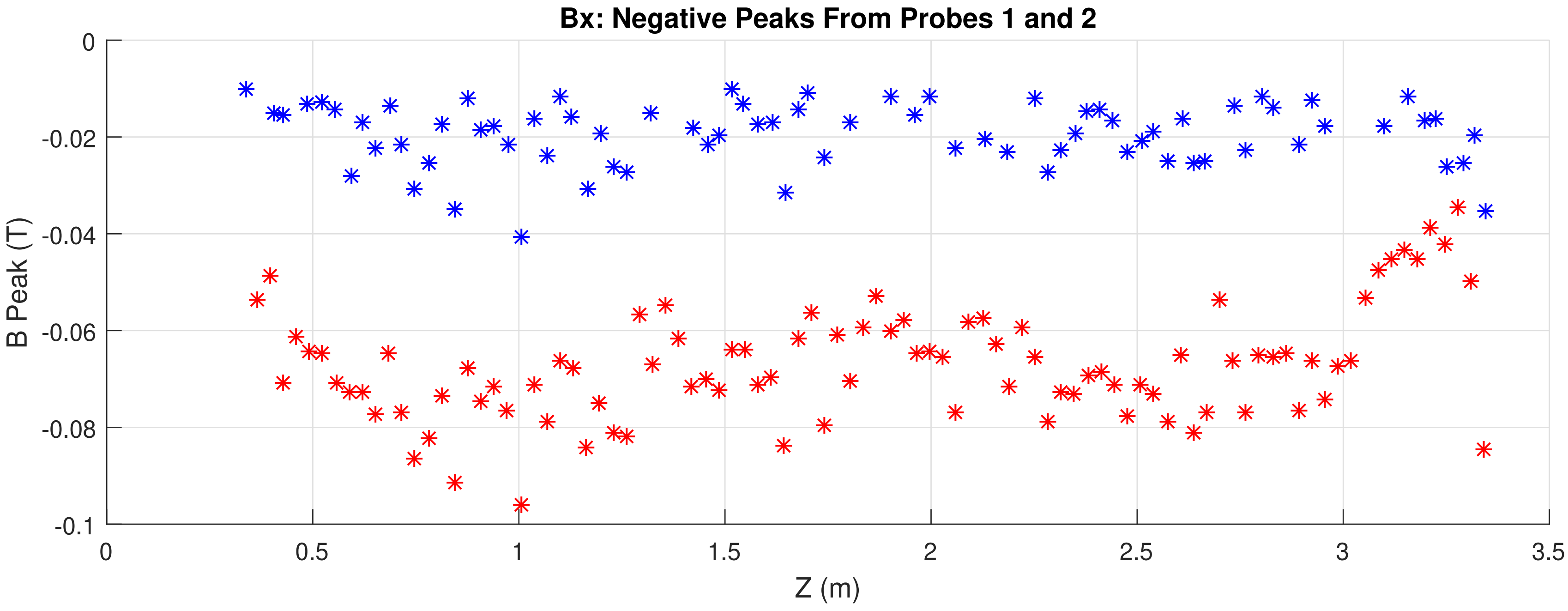

Probe 1: Bx vs Z With Fitted Peaks And Zeros
Bx (T)
0.3
0.2
0.1
0
-0.1
-0.2
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)
Probe 1: By vs Z With Fitted Peaks And Zeros
By (T)
0.4
0.2
0
-0.2
-0.4
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)
Probe 1: Bz vs Z With Fitted Peaks And Zeros
Bz (T)
1
0.5
0
-0.5
-1
0
0.5
1
1.5
2
2.5
3
3.5
4
Z (m)

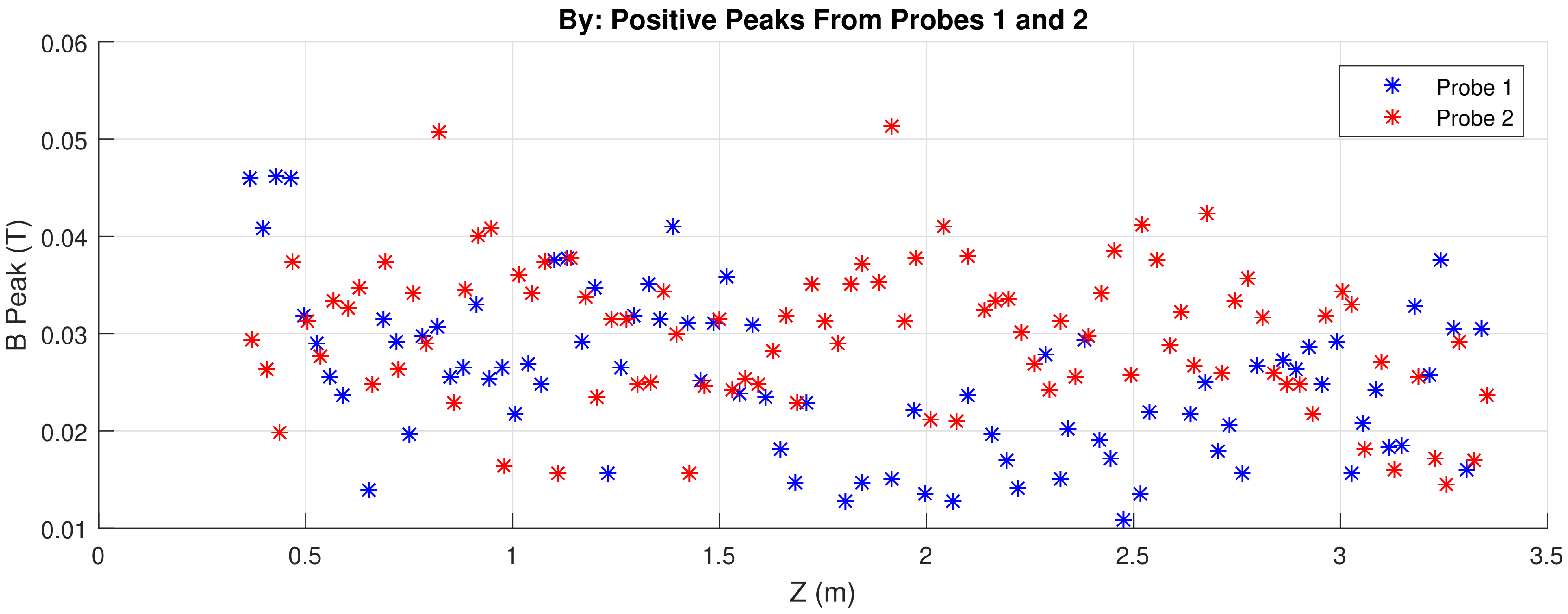

Probe 2: Bx vs Z With Fitted Peaks And Zeros


Probe 2: By vs Z With Fitted Peaks And Zeros

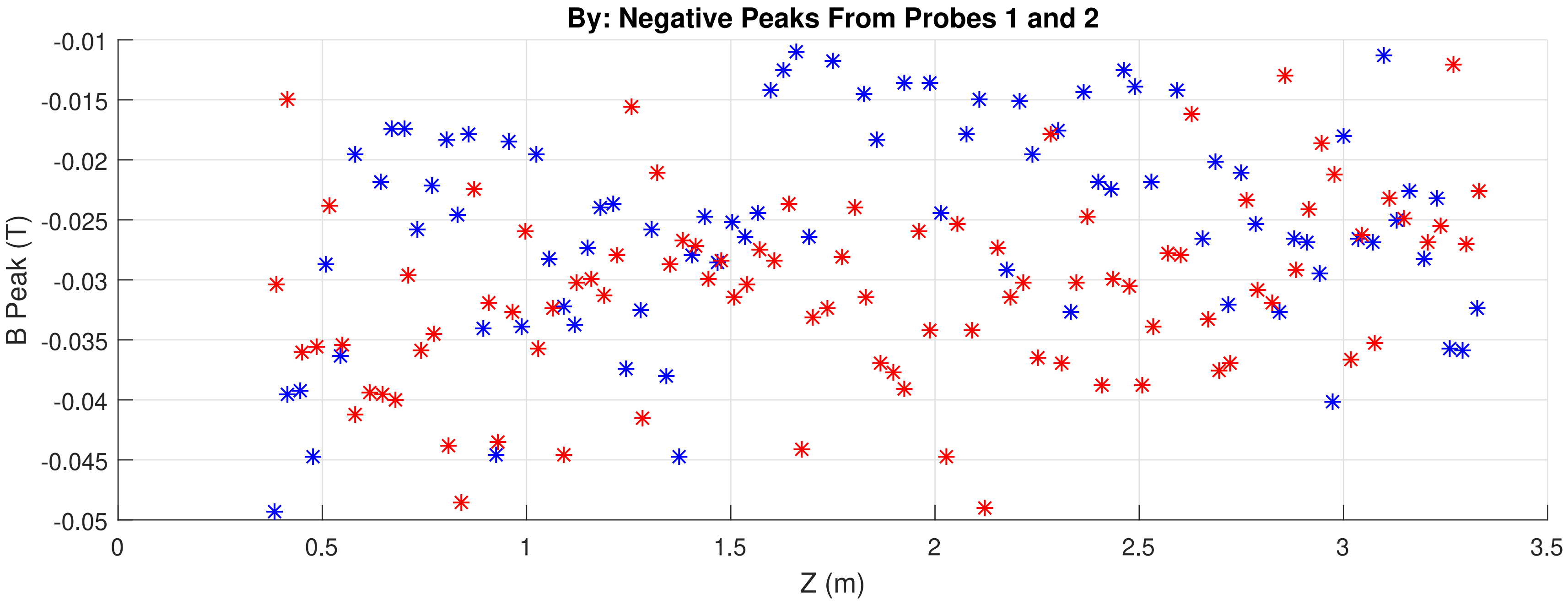

Probe 2: Bz vs Z With Fitted Peaks And Zeros


Bx: Positive Peaks From Probes 1 and 2
B Peak (T)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5
Probe 1
Probe 2

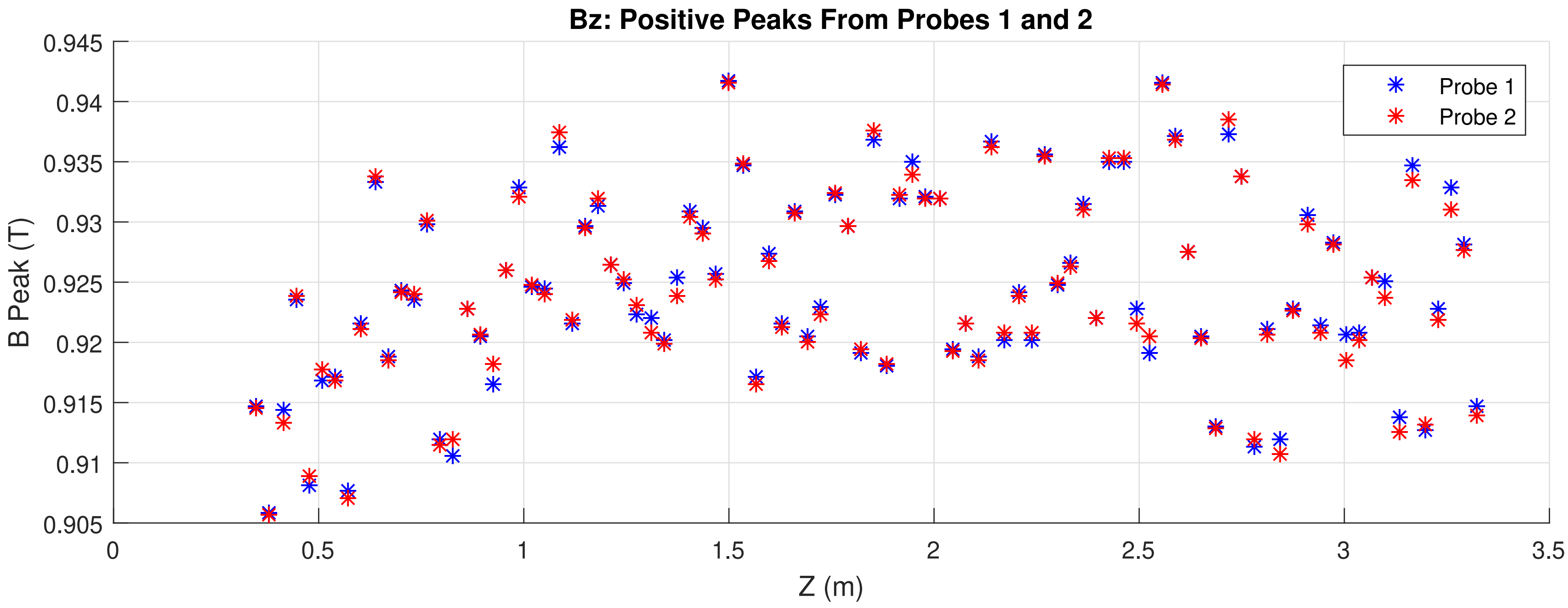

Bx: Negative Peaks From Probes 1 and 2
B Peak (T)
0
-0.02
-0.04
-0.06
-0.08
-0.1
Z (m)
0
0.5
1
1.5
2
2.5
3
3.5

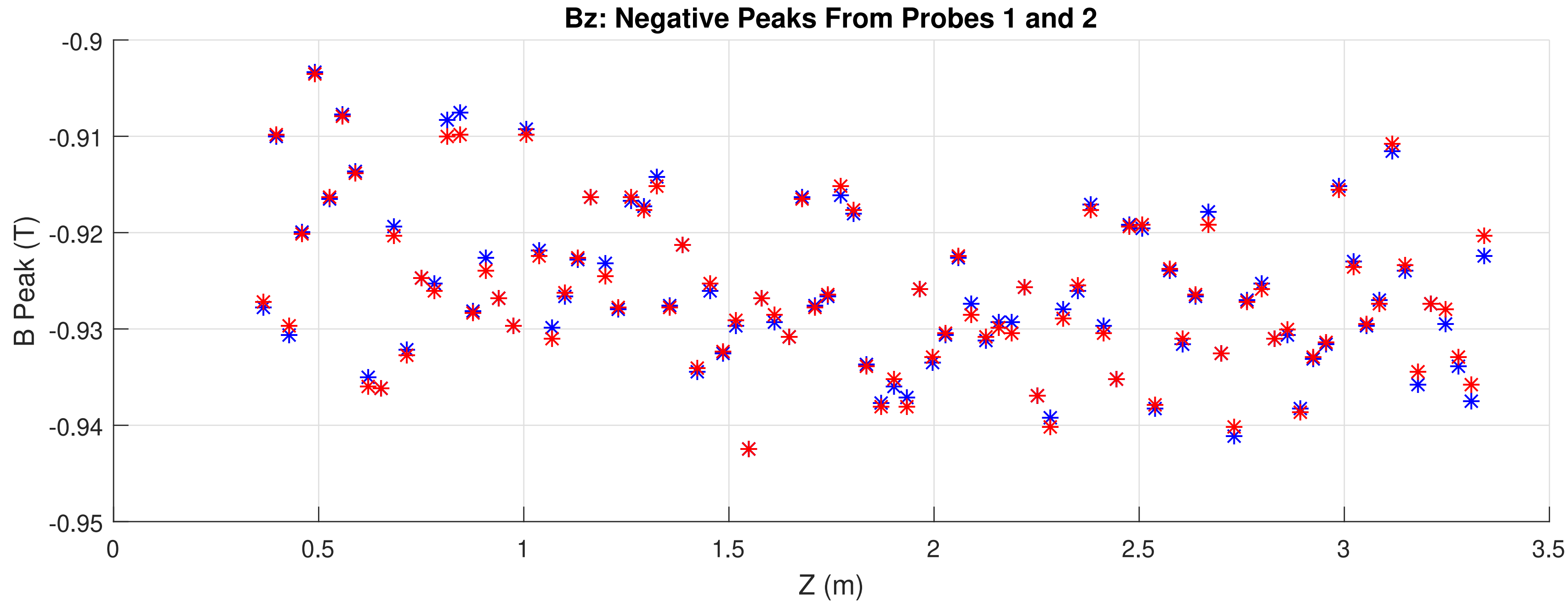


By: Positive Peaks From Probes 1 and 2



By: Negative Peaks From Probes 1 and 2


Bz: Positive Peaks From Probes 1 and 2
Probe 1
Probe 2
B Peak (T)
0.945
0.94
0.935
0.93
0.925
0.92
0.915
0.91
0.905
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)


Bz: Negative Peaks From Probes 1 and 2
B Peak (T)
-0.9
-0.91
-0.92
-0.93
-0.94
-0.95
0
0.5
1
1.5
2
2.5
3
3.5
Z (m)