

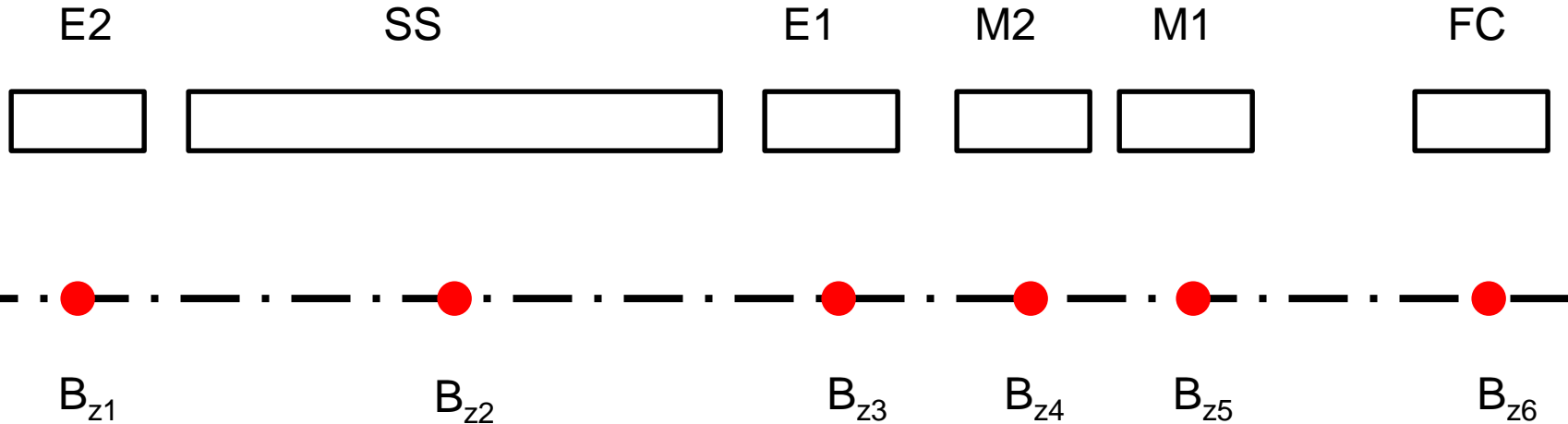
MICE PRY

Correction Solenoid Current

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- Solenoids run more efficiently with iron yoke
 - i.e. at nominal current longitudinal field is too large
 - Small effect (\approx %)
 - Can be corrected by tweaking coil currents, but this is a lengthy process if done manually
- New approach: perturbation theory
 - Treat error field as perturbation
 - Find set of coil currents which corrects these errors

Methodology



$$\begin{pmatrix} A_{11} & A_{12} & \cdots & A_{1n} \\ A_{21} & A_{22} & \cdots & A_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ A_{n1} & A_{n2} & \cdots & A_{nn} \end{pmatrix} \cdot \begin{pmatrix} I_1 \\ I_2 \\ \vdots \\ I_n \end{pmatrix} = \begin{pmatrix} B_{z1} \\ B_{z2} \\ \vdots \\ B_{zn} \end{pmatrix}$$

Linear equation system
Solve for x (=I)

$$\mathbf{A} \cdot \mathbf{x} = \mathbf{b}$$

MICE Step IV 240 MeV Flip



	r_i	r_o	dz	z_1	J
E2	0.258	0.324	0.1106	-6.0063	1.5244E+008
SS	0.258	0.2793	1.3143	-5.8582	1.3518E+008
E1	0.258	0.3176	0.1106	-4.5063	1.2737E+008
M2	0.258	0.2878	0.1995	-4.1508	1.5100E+008
M1	0.258	0.3027	0.2012	-3.7116	1.4200E+008
FC	0.263	0.347	0.21	-3.06	1.3700E+008

SI Units

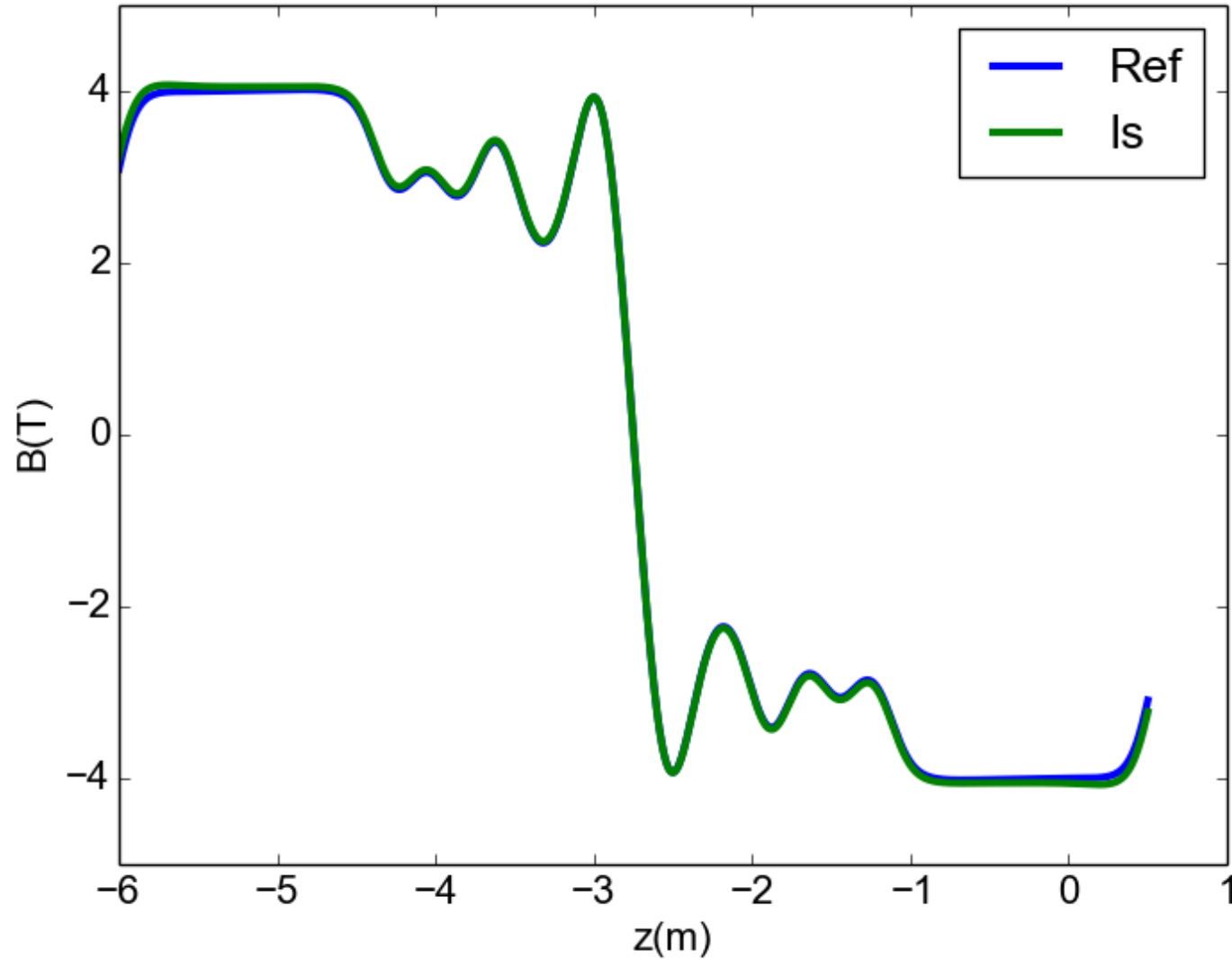
MICE Step IV 240 MeV Solenoid



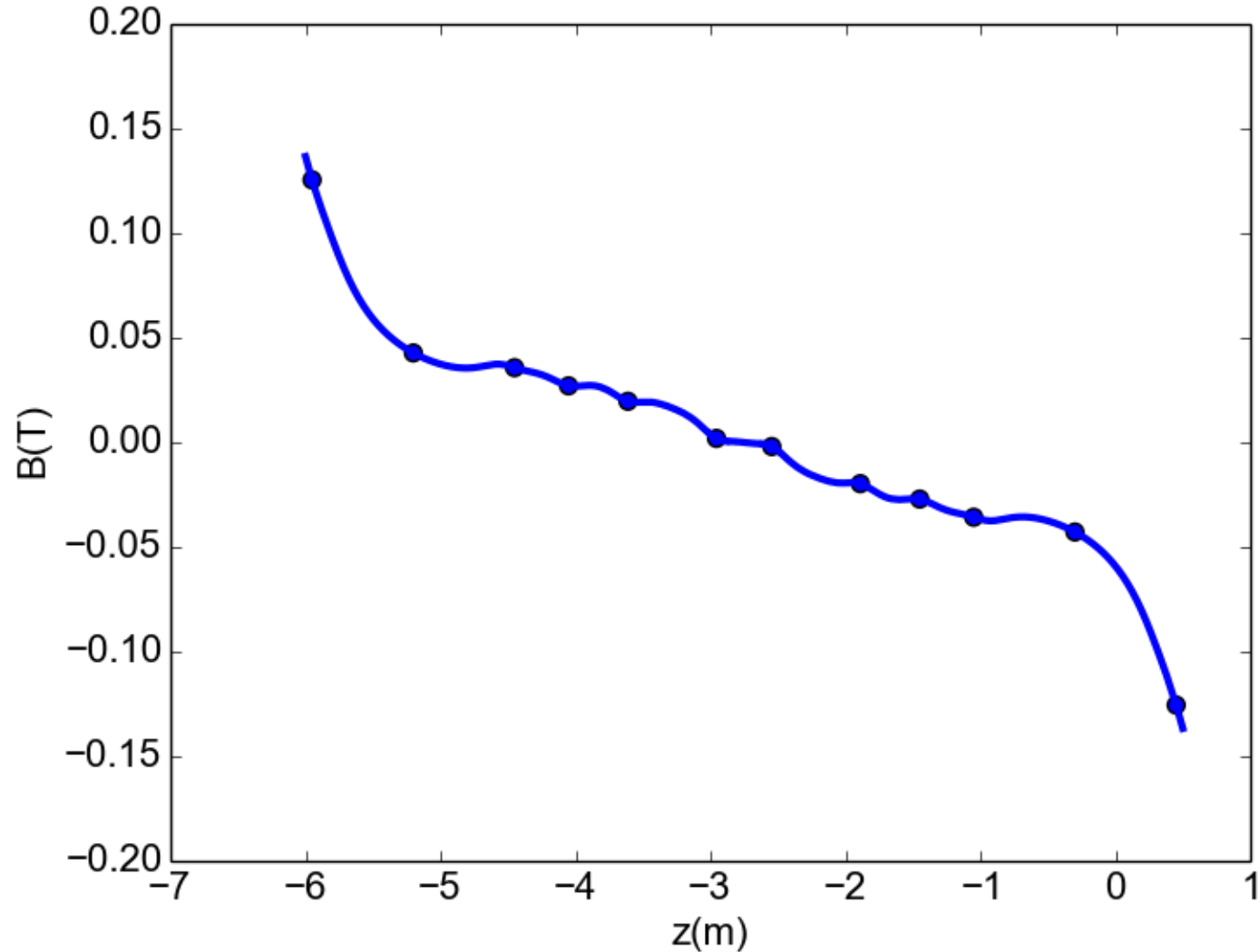
	ri	ro	dz	z1	J
E2	0.258	0.324	0.1106	-6.0063	1.3518E+008
SS	0.258	0.2793	1.3143	-5.8582	1.5244E+008
E1	0.258	0.3176	0.1106	-4.5063	1.2737E+008
M2	0.258	0.2878	0.1995	-4.1508	1.3339E+008
M1	0.258	0.3027	0.2012	-3.7116	1.4285E+008
FC	0.263	0.347	0.21	-3.06	7.1000E+007

SI Units

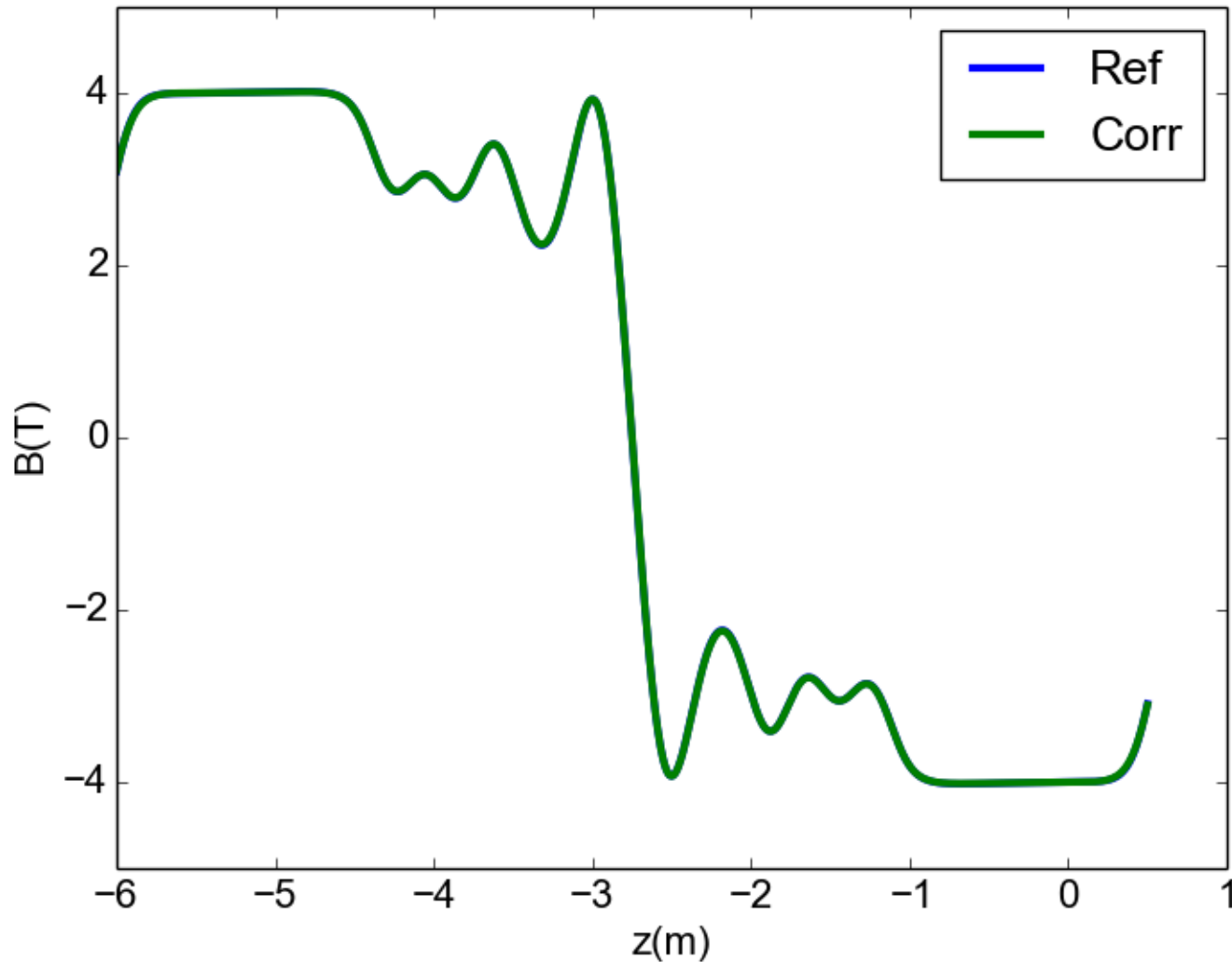
240 MeV Flip



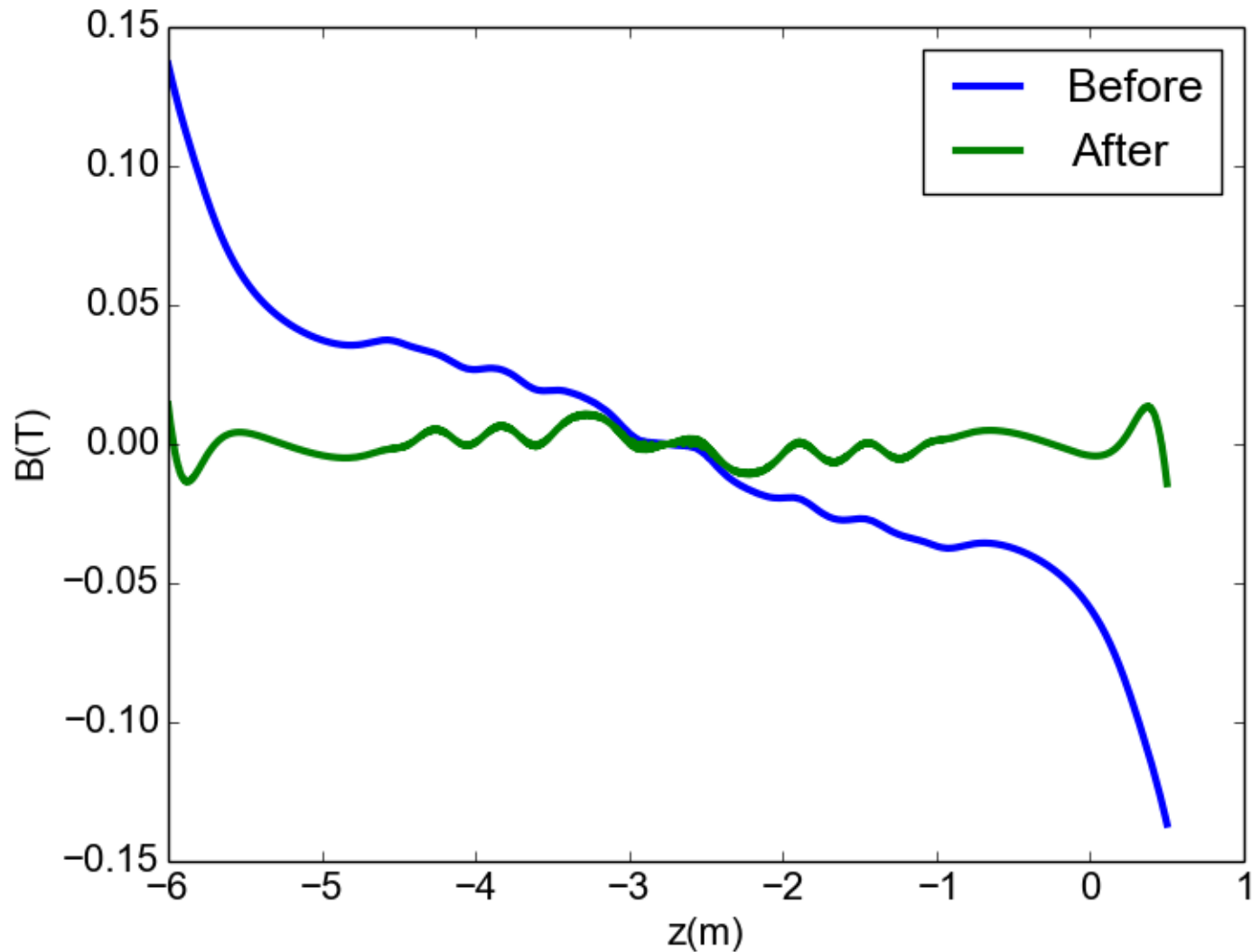
240 MeV Flip – Field Error



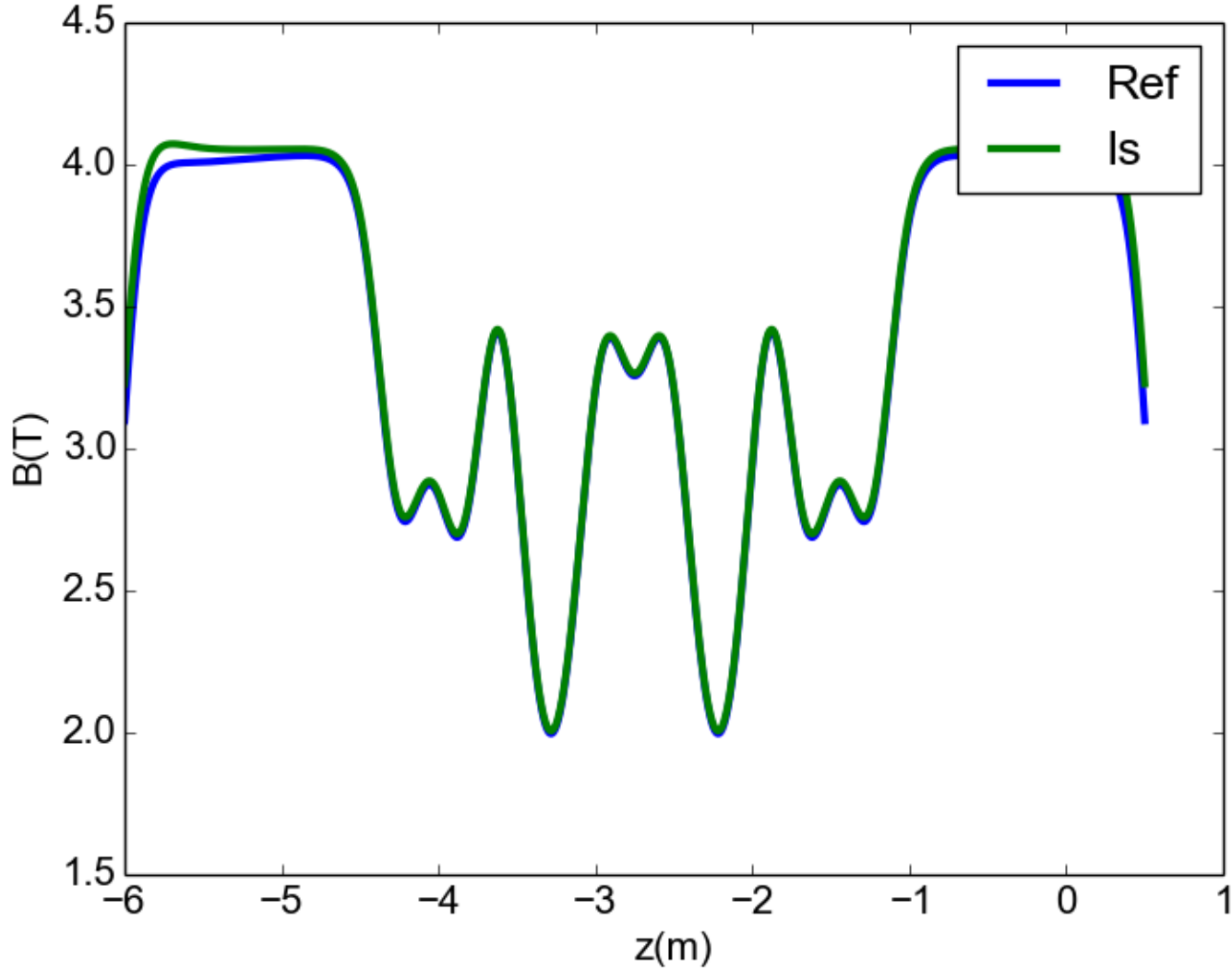
240 MeV Flip - Corrected



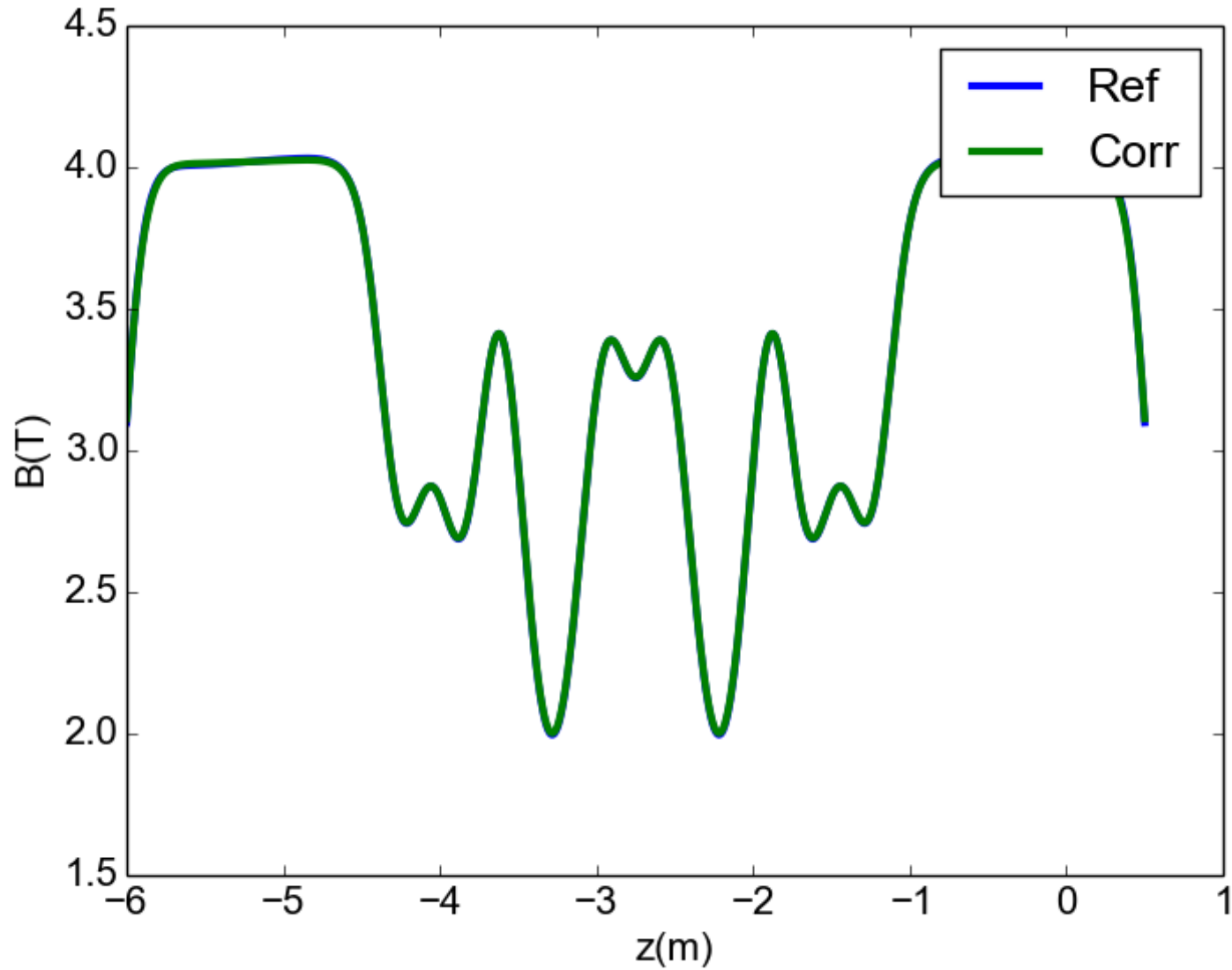
240 MeV Flip – Error Field



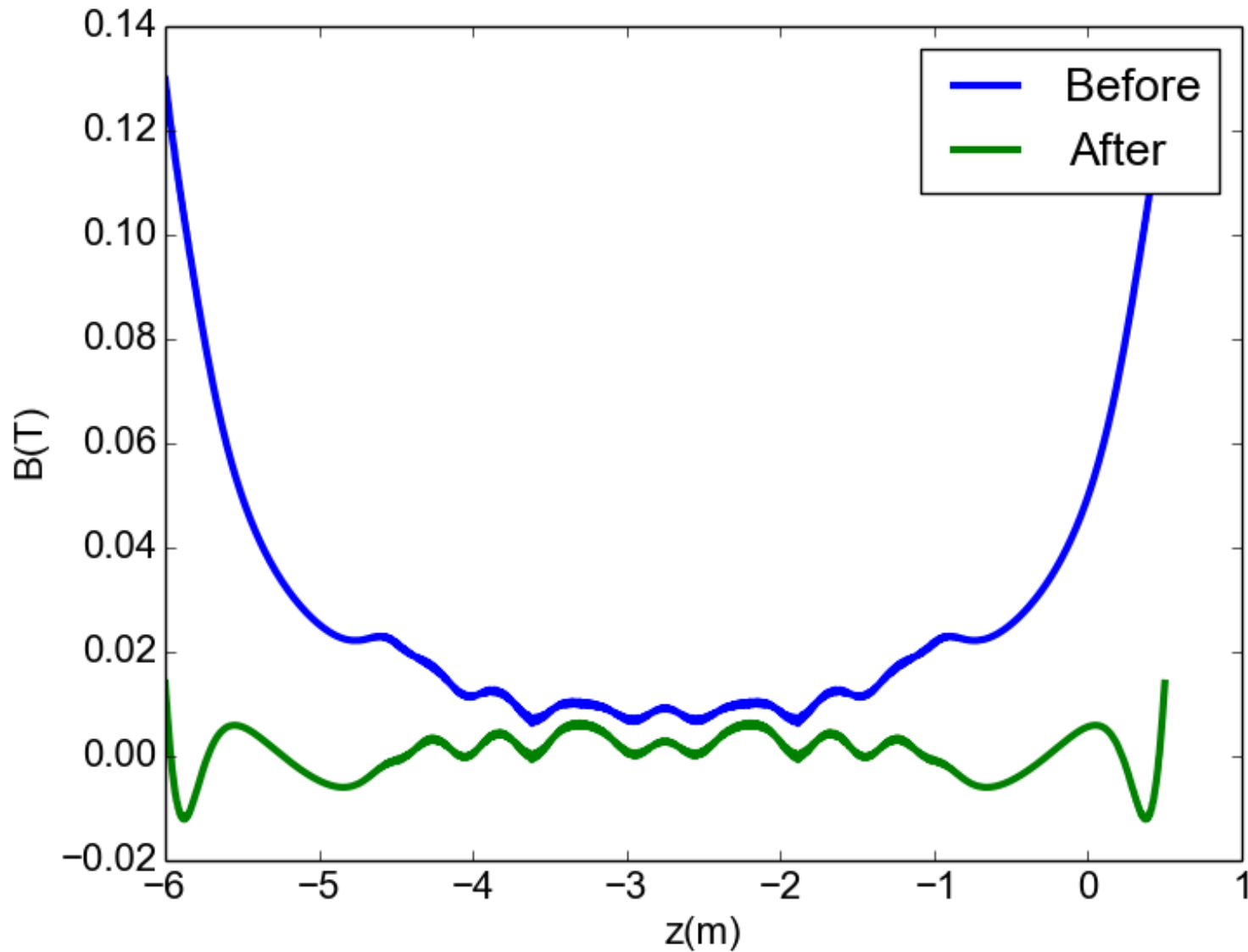
240 MeV Sol



240 MeV Sol - Corrected



240 MeV Sol – Error Field



MICE Step IV 240 MeV Flip



Corrected

	ri	ro	dz	z1	J
E2	0.258	0.324	0.1106	-6.0063	1.4428E+008
SS	0.258	0.2793	1.3143	-5.8582	1.3388E+008
E1	0.258	0.3176	0.1106	-4.5063	1.2610E+008
M2	0.258	0.2878	0.1995	-4.1508	1.4958E+008
M1	0.258	0.3027	0.2012	-3.7116	1.4119E+008
FC	0.263	0.347	0.21	-3.06	1.3697E+008

SI Units

MICE Step IV 240 MeV Solenoid



Corrected

	ri	ro	dz	z1	J
E2	0.258	0.324	0.1106	-6.0063	1.2818E+008
SS	0.258	0.2793	1.3143	-5.8582	1.5139E+008
E1	0.258	0.3176	0.1106	-4.5063	1.2673E+008
M2	0.258	0.2878	0.1995	-4.1508	1.3284E+008
M1	0.258	0.3027	0.2012	-3.7116	1.4263E+008
FC	0.263	0.347	0.21	-3.06	7.0867E+007

SI Units

Correction Factors



	Flip	Sol
E2	9.4646E-001	9.4819E-001
SS	9.9042E-001	9.9313E-001
E1	9.9000E-001	9.9499E-001
M2	9.9060E-001	9.9592E-001
M1	9.9430E-001	9.9842E-001
FC	9.9976E-001	9.9813E-001