Magnetic field gradients

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1 $\mathbf{B}_0 = 0.891$ G

1.1 Left cell

We extract the gradients of the data taken on August 28^{th}, 2009. This data set has 150 position points per cell. The gradients for the left cell are (in units of 10^{-6} G/cm)

$$\begin{pmatrix} \partial B_x/\partial x & \partial B_x/\partial y & \partial B_x/\partial z \\ \partial B_y/\partial x & \partial B_y/\partial y & \partial B_y/\partial z \\ \partial B_z/\partial x & \partial B_z/\partial y & \partial B_z/\partial z \end{pmatrix} = \begin{pmatrix} 2.11 & -40.4 & 0.28 \\ 72.8 & -4.29 & -53.5 \\ 8.1 & -3.74 & -1.10 \end{pmatrix}, \tag{1}$$

with uncertainties (in units of 10^{-6} G/cm) of

$$\begin{pmatrix} \sigma_{xx} & \sigma_{xy} & \sigma_{xz} \\ \sigma_{yx} & \sigma_{yy} & \sigma_{yz} \\ \sigma_{zx} & \sigma_{zy} & \sigma_{zz} \end{pmatrix} = \begin{pmatrix} 7.11 & 0.67 & 0.20 \\ 21.2 & 3.91 & 0.41 \\ 15.1 & 1.81 & 0.17 \end{pmatrix}, \tag{2}$$

where σ_{ij} represents the uncertainty of $\partial B_i/\partial w_j$ where $w_j = [x, y, z]$.

1.2 Right cell

For the right cell we have

$$\begin{pmatrix} \partial B_x/\partial x & \partial B_x/\partial y & \partial B_x/\partial z \\ \partial B_y/\partial x & \partial B_y/\partial y & \partial B_y/\partial z \\ \partial B_z/\partial x & \partial B_z/\partial y & \partial B_z/\partial z \end{pmatrix} = \begin{pmatrix} -4.77 & -48.4 & -12.0 \\ 65.4 & -5.65 & -59.1 \\ -30.0 & -67.9 & 9.83 \end{pmatrix}. \tag{3}$$

with uncertainties:

$$\begin{pmatrix} \sigma_{xx} & \sigma_{xy} & \sigma_{xz} \\ \sigma_{yx} & \sigma_{yy} & \sigma_{yz} \\ \sigma_{zx} & \sigma_{zy} & \sigma_{zz} \end{pmatrix} = \begin{pmatrix} 10.1 & 0.72 & 0.19 \\ 11.8 & 3.70 & 0.24 \\ 12.2 & 0.65 & 0.12 \end{pmatrix}, \tag{4}$$