Field Mapping DarkLight Dipoles

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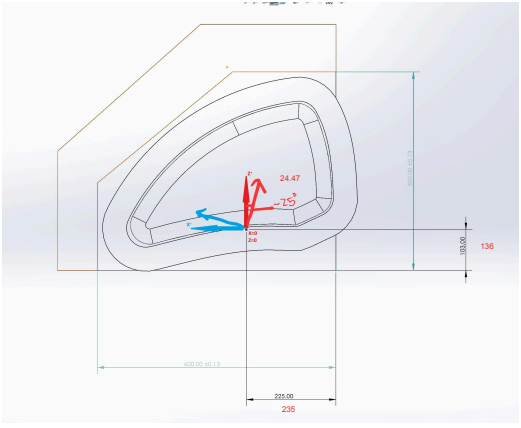
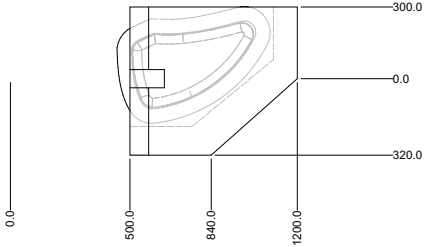
Comparing Field Map and Field Calculation

- Xiaqing has calculated the field map of the DarkLight dipoles in ANSYS-MAXWELL
- Shaquille at TRIUMF has performed a field map of the dipoles
- There have been some apparent disagreements and coordinate system questions
- It is my understanding a new map is going to be performed/has been performed this week
- Let us summarize and move forward...

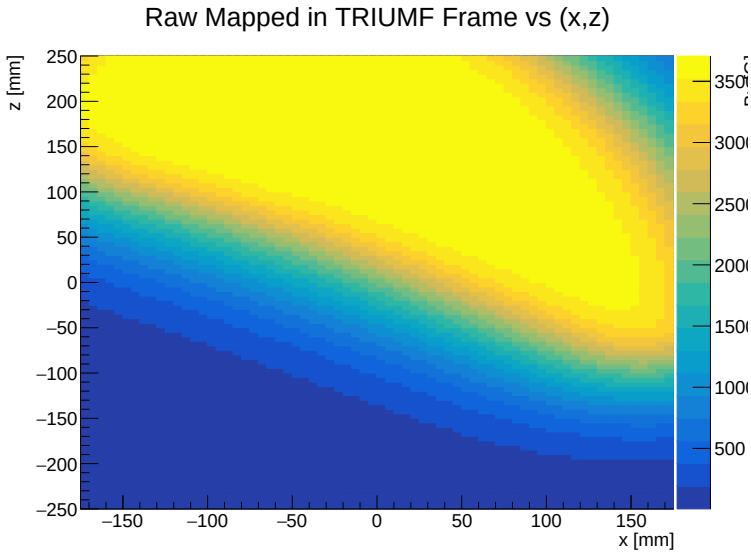
Coordinate Systems





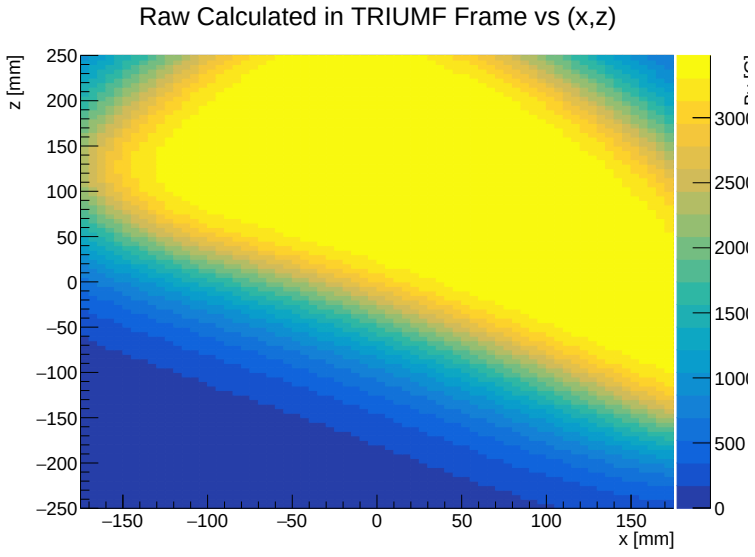
Left diagram is from TRIUMF describing coordinate system. Right is drawing from SolidWorks (I believe). Note that rotation is shown as 24.47.° In the code Doug has a slightly different rotation of 25.4705°, unclear where this number comes from–could be a verbal description at some point. Story does not meaningfully change if either angle is used.

Field Map



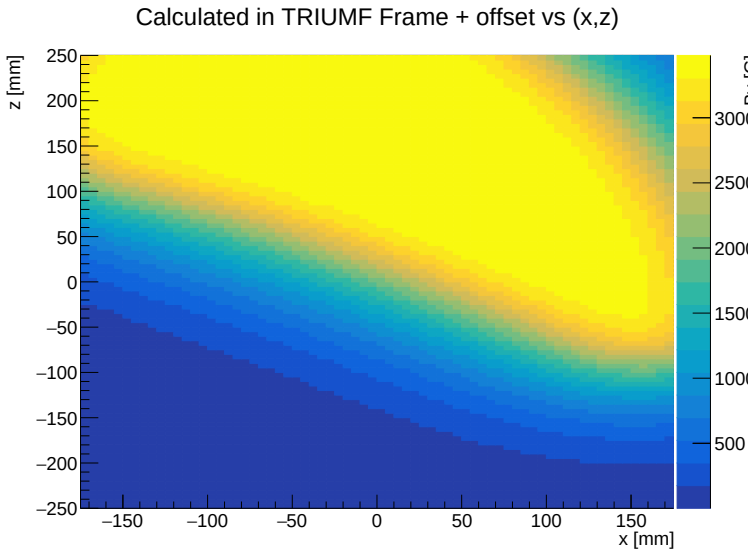
This is the mapped field by Shaquille.

Calculated Map



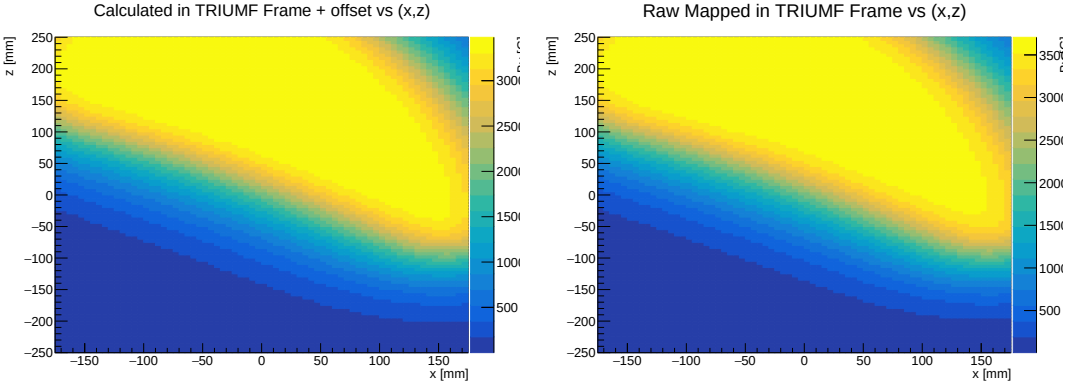
Based on the description of the TRIUMF coordinate system, this is the transformation from Xiaqing's calculation into the TRIUMF system.

Calculated and Shifted Map



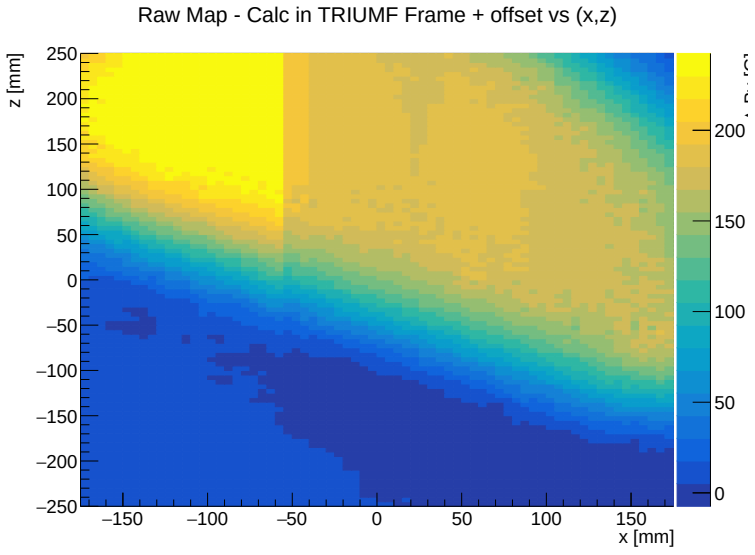
Via bi-ocular assessment, this is Xiaqing's calculation shifted to roughly overlay with the nominal dipole position in the TRIUMF system. 70 mm shift vertically, 45 mm shift

Calculated and Shifted Map and Field Map



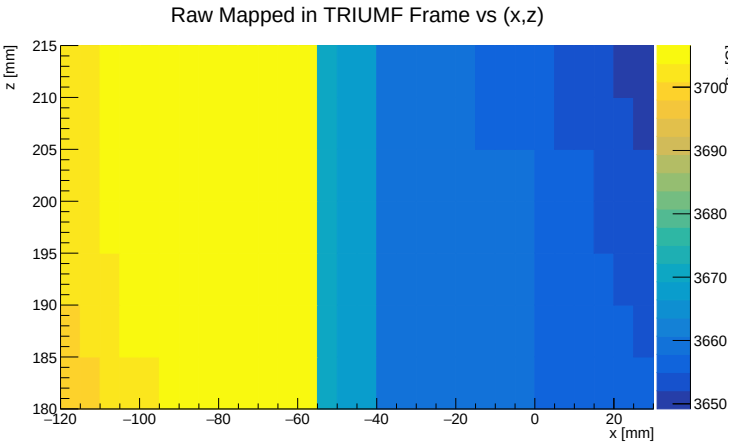
Here is the calculated and shifted map next to the raw mapped file. There is a slight difference in the shape of the field at the right side of the image. The mapped tip is slightly smaller. Maximum mapped field: 3706 G, maximum calculated field: 3478 G. Mapping may have been done at 200 A?

Difference Between Fields



This is the difference between the measured field and calculated field. Note the obvious step. This comes from the measured field.

Issue in the Field Map



This is a zoomed in version of the field mapped by Shaquille. Note the field drops by 30 G in one 5 mm step. Assume a readout problem in the probe?