Micemag - Software for Making Field Maps of the Spectrometer Solenoids

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Getting the code

Clone/download the code from github

`https://github.com/JoeLanglands/MICE-MagneticFieldMapping`

It comes with data and fit parameters saved as pickles so that fields can be made without re-doing any fits. It also comes with the 'raw' data from the field mapping that occurred in March.

The code requirements are:

- numpy
- scipy
- iminiut
- matplotlib

All readily available using pip.

Navigating the code

At the top level directory there is a README.md, which I shall keep updated. It (should) give a decent description of how to do stuff. There is also a setup.py file for setuptools but this DOES NOT work right now.

Then there are three directories:

- bin/ – contains convenience scripts
- micemag/ – the package itself
- tests/ – contains no tests yet :(

Navigating the code

The micemag/ directory contains various subpackages and code that performs all the fitting and field map building routines. The core functionality is contained in the core.py file. There is also utils.py which contains the paths to the data along with other utilities.
The micemag/data directory contains the data (surprise!) in subdirectories:

- SSU/ – raw data for SSU
- SSD/ – raw data for SSD
- FBpickles/ – pickles with FB coeffs
- MAUS/ – Directory for outputted MAUS fields
- geoFitFields/ – Geometrical fit fields
- residFields/ – Residual fields for FB fitting

Using the code out of the box

The bin/ directory contains useful scripts to easily do stuff like make a MAUS field map!

The main script (and only one for now) is `make_g4bl_grid.py`. This has a simple command line interface and makes a field map in the g4bl3dGrid format, like the 7469 COMSOL map, with currents specified in command line arguments.

An example

```
$./make_g4bl_grid.py SSU -M1 198.0 -M2 167 -CC 205.7
```

Field Output

As mentioned the field is output as a text file (with the file extension .table) very similar to the 7469 COMSOL field map.

The default grid extends from 0 – 18 cm in 1 cm steps in the x and y directions and 0 - 5 m in the z direction. This means it only covers a quarter of the field area so the Solenoid symmetry tag should be used in MAUS.

There is also the question of aligning the outputted field maps to the field in real life... I know where the z position of the centre of the coils are in the coordinates of the output field.

Before the New Year...

- Ability to output full field (not FB only)
- Ability to perform new fits (if you really want to)
- Freshly fitted field maps from me that are a good fit