Field Map Correction for the GE Scanners at UCSD CFMRI
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Overview
This document describes the procedure for field map correction of EPI images acquired with the product EPI sequence (e.g. EPI DICOM files). A 2dflash sequence is used to acquire the field maps and various tools (FSL, AFNI, etc) are used for post-processing. This approach mirrors the field map correction method that is being developed for use by the fBIRN consortium.

Acquiring the Field Maps
The protocols for field map acquisition are under site/head/fBIRN_fmap. The directions below assume that you are using the 8ch head coil for EPI acquisition. If you are using the split head coil (single channel) then you should use that coil for the field maps.

Step by step instructions:
1. Enable research mode.
2. Perform a localizer scan.
3. Load the protocols *fm_TE1_NFS* and *fm_TE2_NFS*
4. View edit *fm_TE1_NFS*. Note the system will indicate that you are switching to the body coil. Accept this (unless you are using the split head coil). The body coil will be used for the field map acquisition, while EPIs will typically use the 8-channel head coil.
5. Prescribe the slices that you will be using for the functional run. Verify that auto-shim **is** checked. Save the series for *fm_TE1_NFS*.
6. View edit *fm_TE2_NFS*. Copy the graphical prescription from *fm_TE1_NFS* (use original loc option). Verify that auto-shim is **not** checked. *Save* the series.
7. At this point, the easiest way to proceed is to check the *auto-scan* button. This will then automatically run the two series of the field map. **Warning: if you prescribe additional series while auto-scan is enabled, it will automatically run these as well!**
8. Once the field map is acquired, **disable** auto-scan.
9. **NOTE:** It is good practice to visually inspect the field map images for motion or operator errors (e.g. different prescription for TE1 and TE2). The TE1 and TE2 images are acquired as magnitude, phase, real, and imaginary for each slice. In particular, if there is a significant motion or physical between the TE1 and TE2 images (most easily seen in the magnitude images), the field map computations will not work. **Warning: if the TE1 and TE2 prescriptions are not identical, the correction algorithm will not work!**
10. Prescribe your EPI run. Typically, this will use the 8 channel head coil. Copy the graphical prescription from *fm_TE1_NFS*. (NOTE: in order to copy the prescription, the FOV, slice thickness, slice spacing, and matrix size must match that of the TE1 and TE2 images. Also make sure to use the *original loc* option). It is also recommended that you **disable** auto-shim, but it probably doesn't make a huge difference. **Warning: if the field map and EPI prescriptions are not identical, the correction algorithm will not work.**