DIPFIT and NFT dipole modeling

1. **Dipfit**
   
   a. **Co-register electrodes with model**
   
   b. **Demonstration**

2. **NFT**

   a. **Co-register to subject MRI**

   b. **Warp MNI to subject electrode locations**
Finding dipole locations
Co-register to model

Head model (click to select)
- Spherical Four-Shell (EEG)
- Boundary Element Model (MNI)
- CTF MEG
- Custom model files

Head model file
- lab/plugins/dipfit2.2/standard_BEM/standard_vol.mat

Output coordinates
- lab/plugins/dipfit2.2/standard_BEM/standard_vol.mat

MRI file
- lab/plugins/dipfit2.2/standard_BEM/standard_mri.mat

Model template channel locations file
- lab/plugins/dipfit2.2/standard_BEM/standard_templateiloc.mat

Co-register chan. locs. with head model
- lab/plugins/dipfit2.2/standard_BEM/elec/standard_1005.elec

Channels to omit from dipole fitting
- lab/plugins/dipfit2.2/standard_BEM/elec/standard_1005.elec

Note: For EEG, check that the channel locations are on the surface of the head model.
(To do this: ‘Set head radius’ to about 85 in the channel editor.)

Cancel   Help   Ok
Co-register to model, cont'd
Perform translation of electrode positions

- \( \pi/2 \)

Dipole modeling
Perform translation of electrode positions

Requires a shift toward back of the head
AND
an expansion along the X-axis

shift backward
Perform translation of electrode positions

- Shift left
- Resize
Confirm electrode transformation

Head model (click to select)
- Spherical Four-Shell (EEG)
- Boundary Element Model (MNI)
- CTF MEG
- Custom model files

Head model file
- Output coordinates
- MRI file
- Model template channel locations file
- Co-register chan. locs. with head model
- Channels to omit from dipole fitting

Note: For EEG, check that the channel locations are on the surface of the head model
(To do this: 'Set head radius' to about 85 in the channel editor).
Alternatively, warp to standard montage

Check to see that electrodes are correctly matched

stats toolbox required for warping
Check coregistration with model
>> EEG.dipfit

ans =

    hdmfile: [1x76 char]
    mrifile: [1x71 char]
    chanfile: [1x83 char]
    chansel: [1x33 double]
    coordformat: 'spherical'
    model: [1x33 struct]
    current: 32
    vol: [1x1 struct]

    coord_transform: [0 0 -1.570796 100 76 90.87264 1 1 1]

From head model transformations
Autofit equivalent dipoles
Plot dipoles
Scroll through dipoles
Fine fit options in DIPFIT

- Locate dipoles using DIPFIT 2.x
  - Laplacian
  - FMRIB Tools
  - Grand average datasets
  - Locate dipoles using LORETA
  - PCA plugin
- Fine fit (iterative)
- Head model and settings
- Coarse fit (grid scan)
- Autofit (coarse fit, fine fit & plot)
- Plot component dipoles
Fine fit menu

Component to fit: 6
Plot map
Residual variance = 3.21%

Dipole  fit   position       moment
#1   ✓   28.222 -2.401 37.331    2.380 475942.653 3819304.288
#2   ✓   0.000 0.000 0.000    0.000 0.000 0.000

Symmetry constrain for dipole ...
Fit dipole(s)' position & moment
Or fit only dipole(s)' moment
Plot dipole(s)
Cancel
Help
Ok
Bilateral dipole modeling

Manual dipole fit -- pop_dipfit_nonlinear()
EEG.dipfit structure

>> EEG.dipfit.model
ans =

1x33 struct array with fields:
   posxyz
   momxyz
   rv
   active
   select

>> EEG.dipfit.model(1)
ans =
   posxyz: [1x3 double]
   momxyz: [1x3 double]
   rv: 0.0288
   active: 1
   select: 1

[14.9791  -86.0094   47.9448]