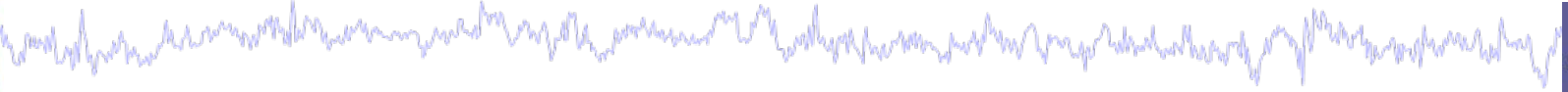


DIPFIT and model co-registration



Task 1

Co-register electrodes with model

Task 2

Autofit equivalent dipoles

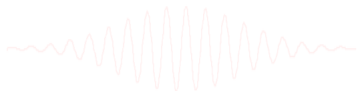
Task 3

Fine fit options

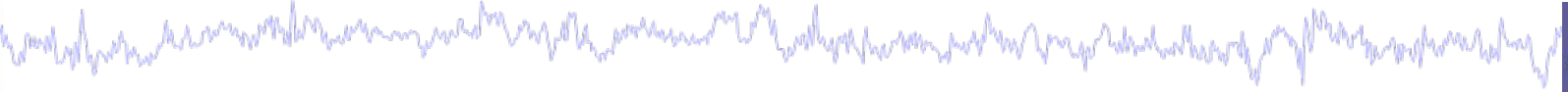
Task 4

3D *headplot()* co-registration

Exercise...



DIPFIT and model co-registration



Task 1

Co-register electrodes with model

Task 2

Autofit equivalent dipoles

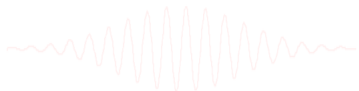
Task 3

Fine fit options

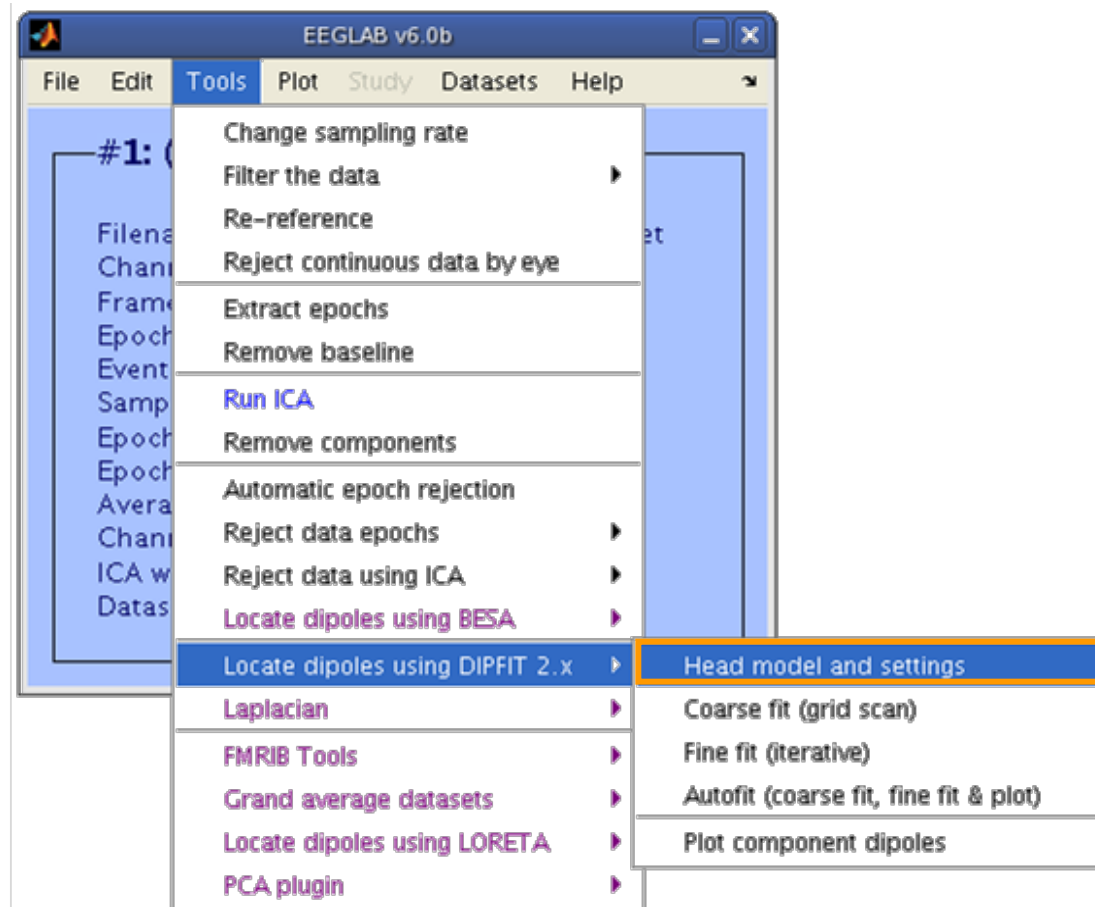
Task 4

3D *headplot()* co-registration

Exercise...



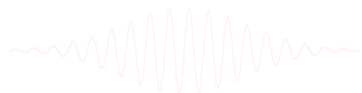
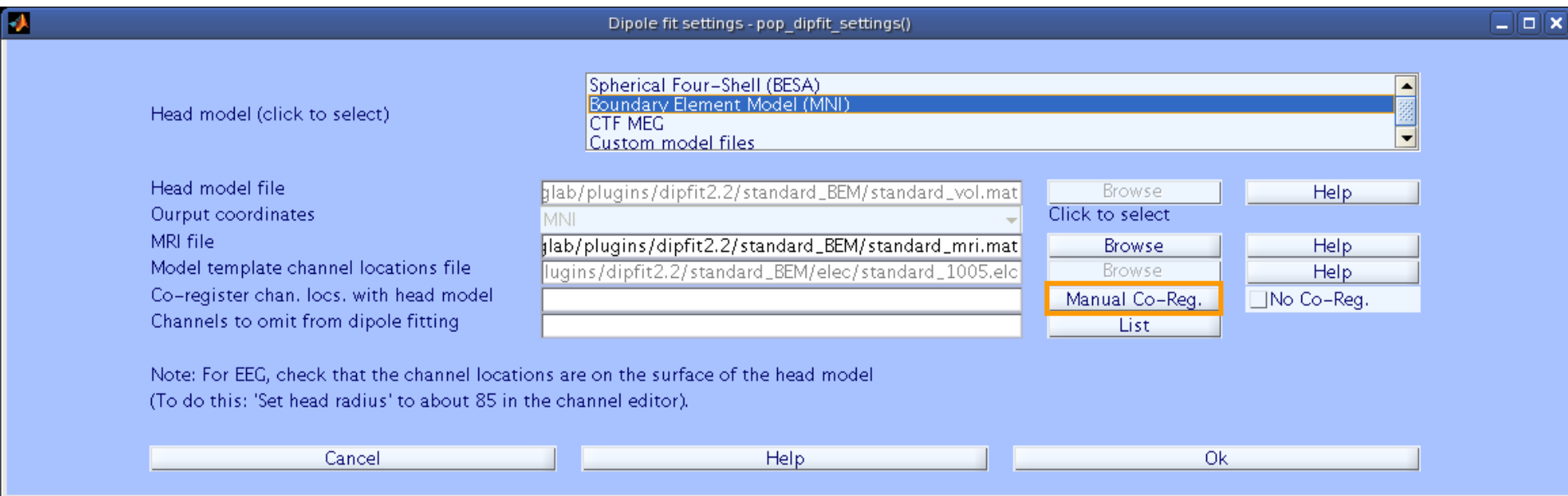
Finding dipole locations



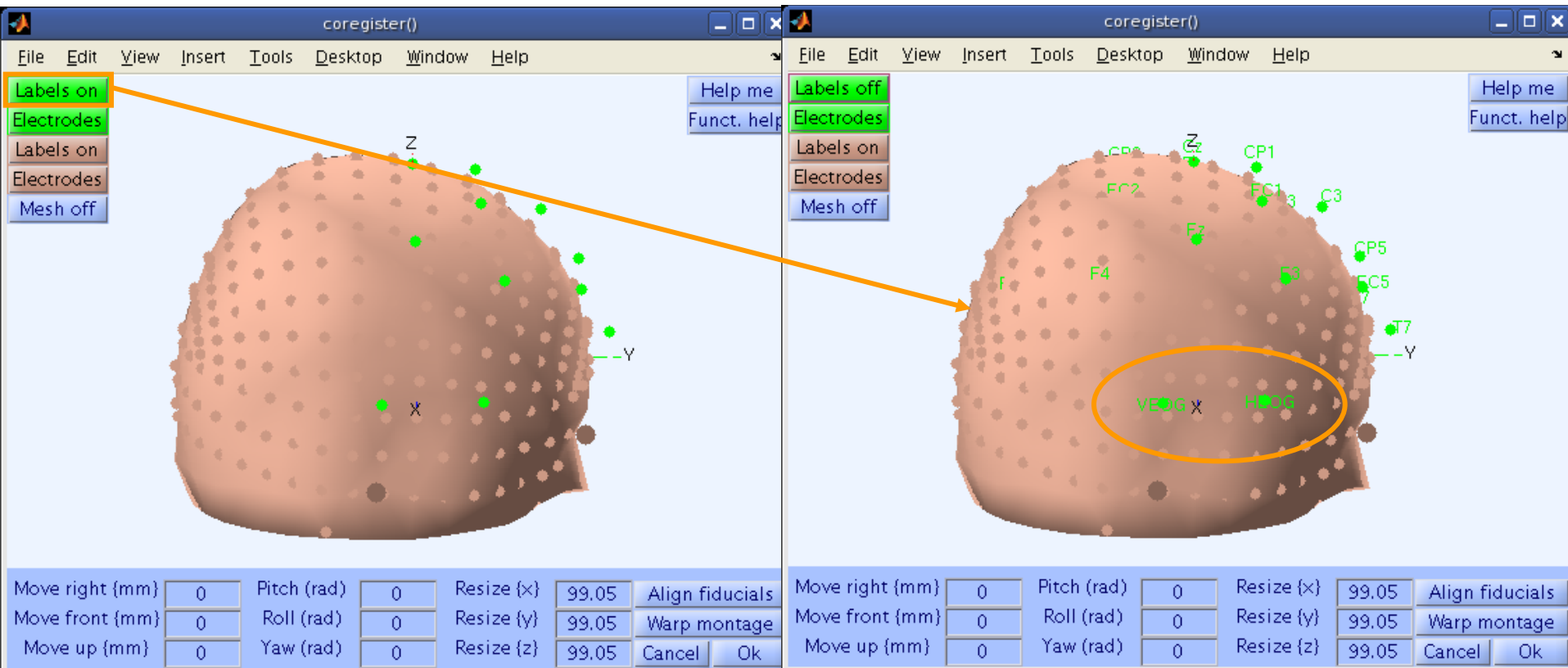
Co-register to model



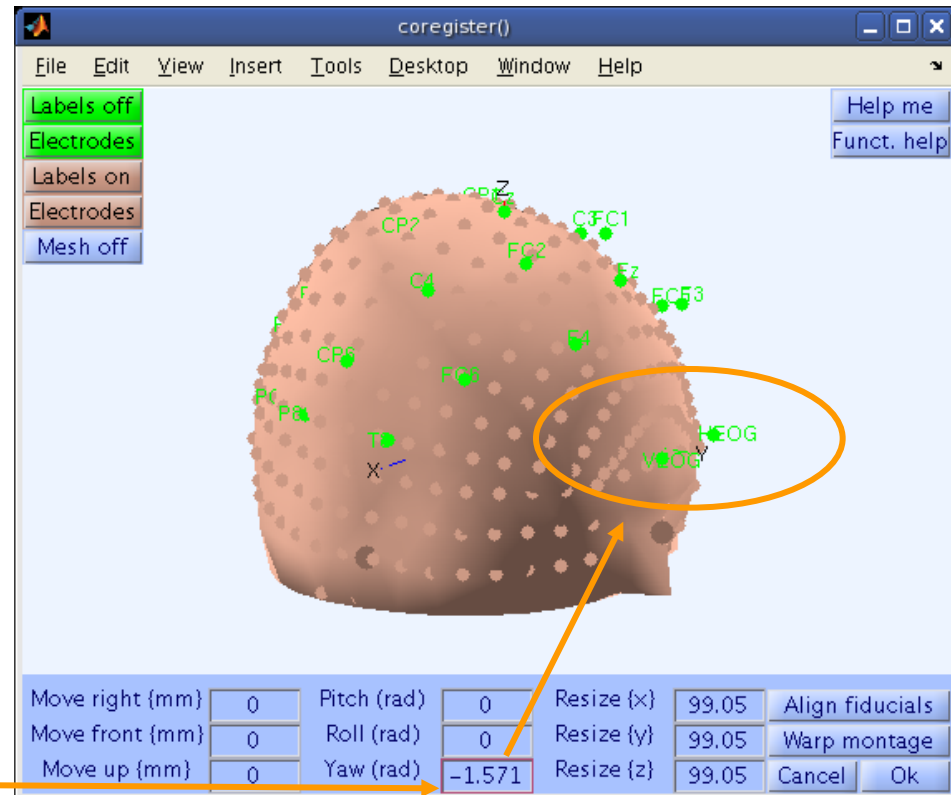
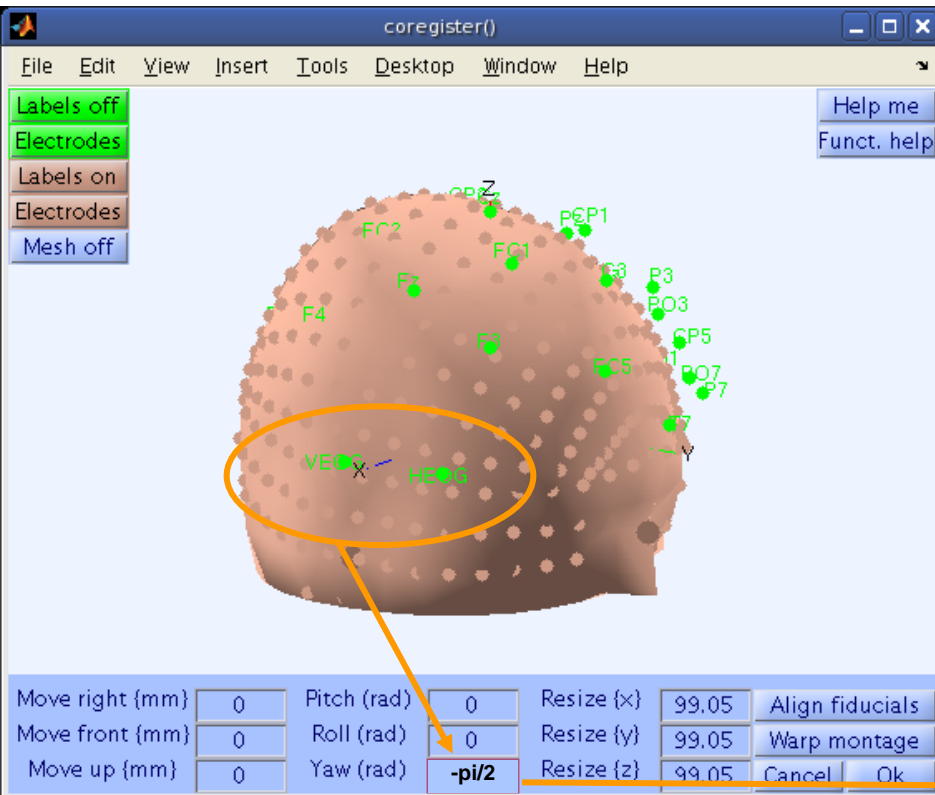
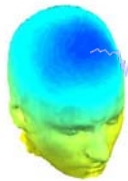
If you used a standard electrode location file, co-registration is automatic.



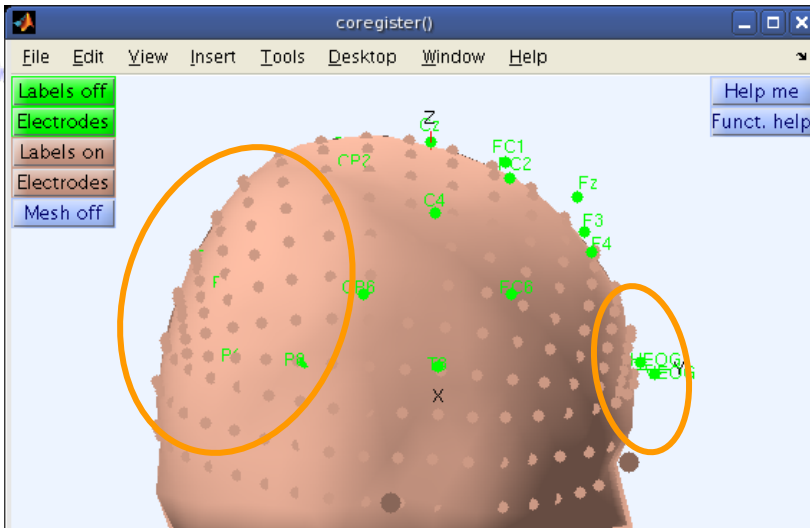
Co-register to model, cont'd



Perform translation of electrode positions



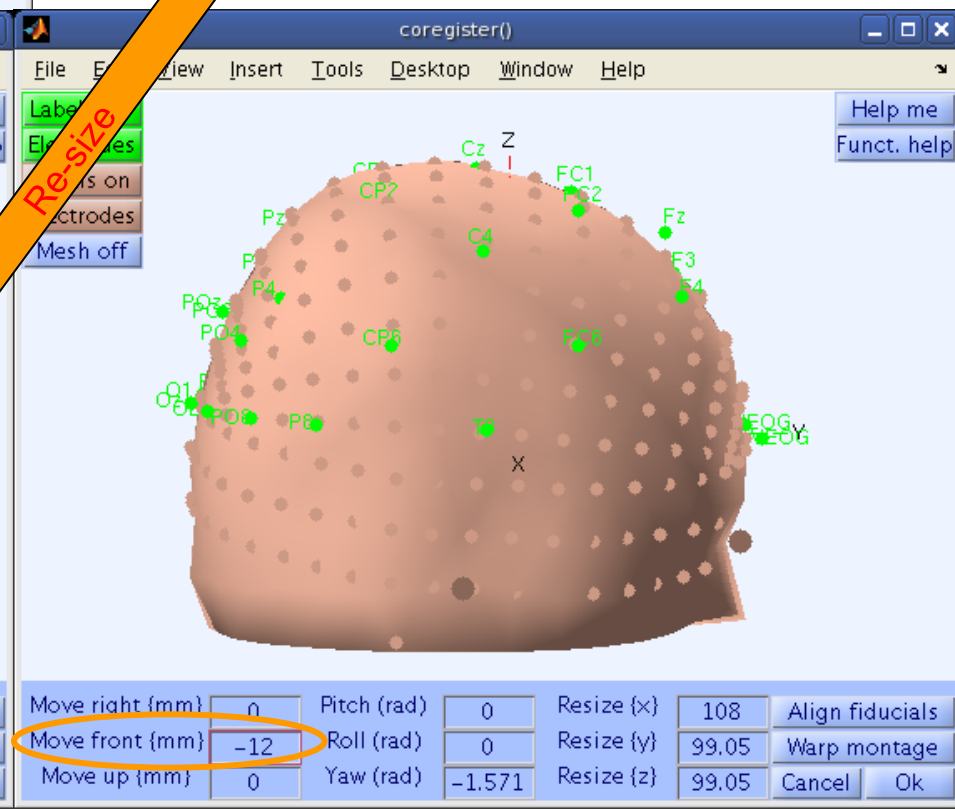
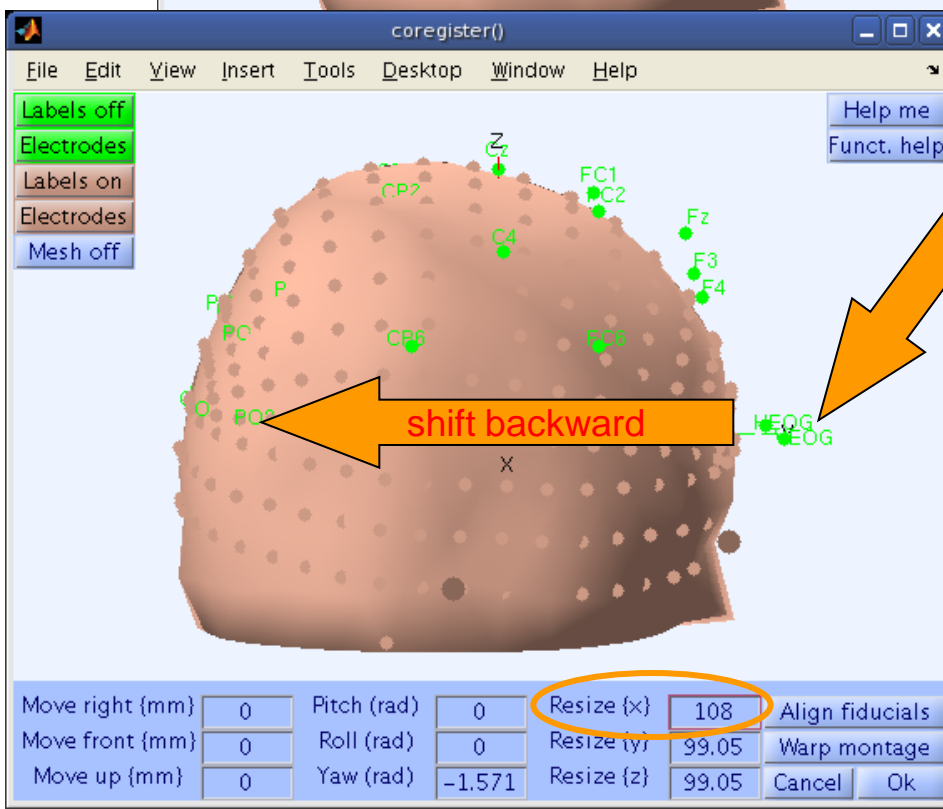
Perform translation of electrode positions



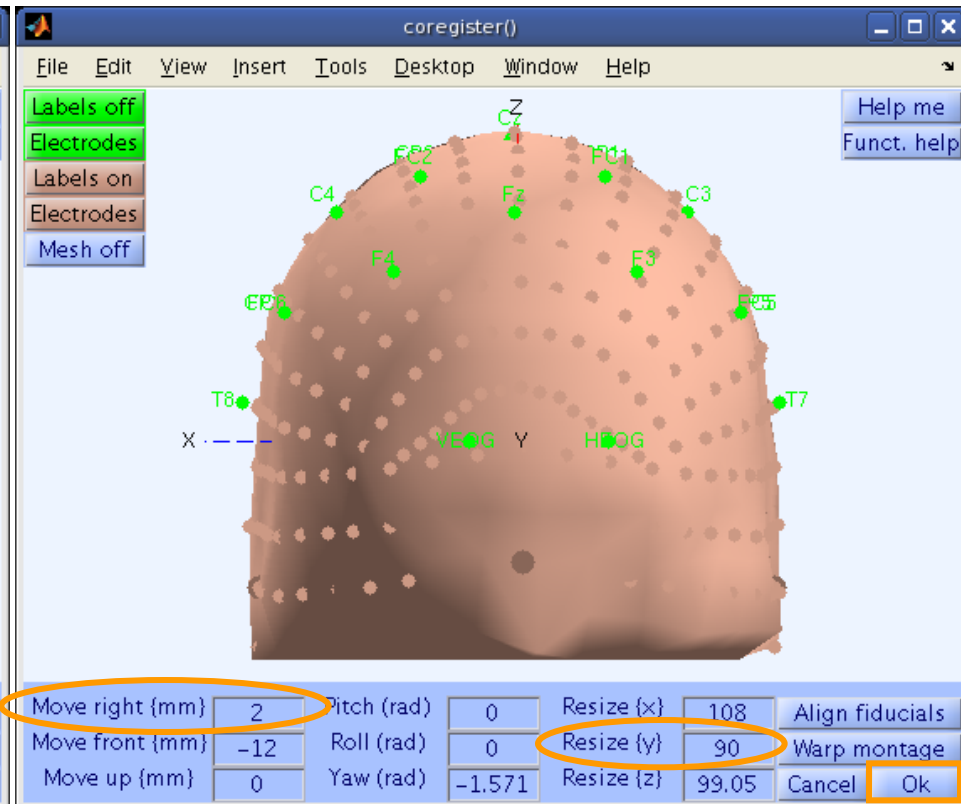
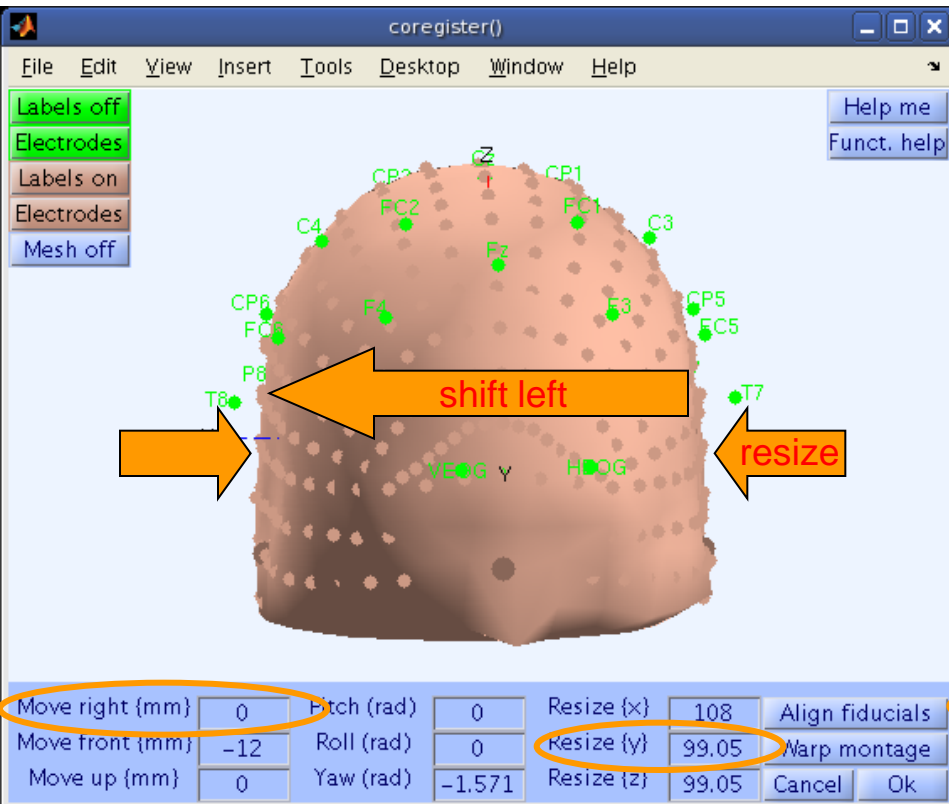
Requires a shift toward back of the head

AND

an expansion along the X-axis



Perform translation of electrode positions



Confirm electrode transformation



Dipole fit settings - pop_dipfit_settings()

Head model (click to select)

Spherical Four-Shell (BESA)
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

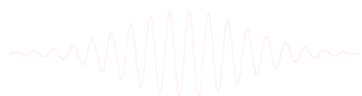
g:\lab\plugins\dipfit2.2\standard_BEM\standard_vol.mat
MNI
g:\lab\plugins\dipfit2.2\standard_BEM\standard_mri.mat
g:\lab\plugins\dipfit2.2\standard_BEM\elec\standard_1005.elc
0 -1.570796 108 90 99.05485

Browse
Click to select
Browse
Browse
Manual Co-Reg.
List

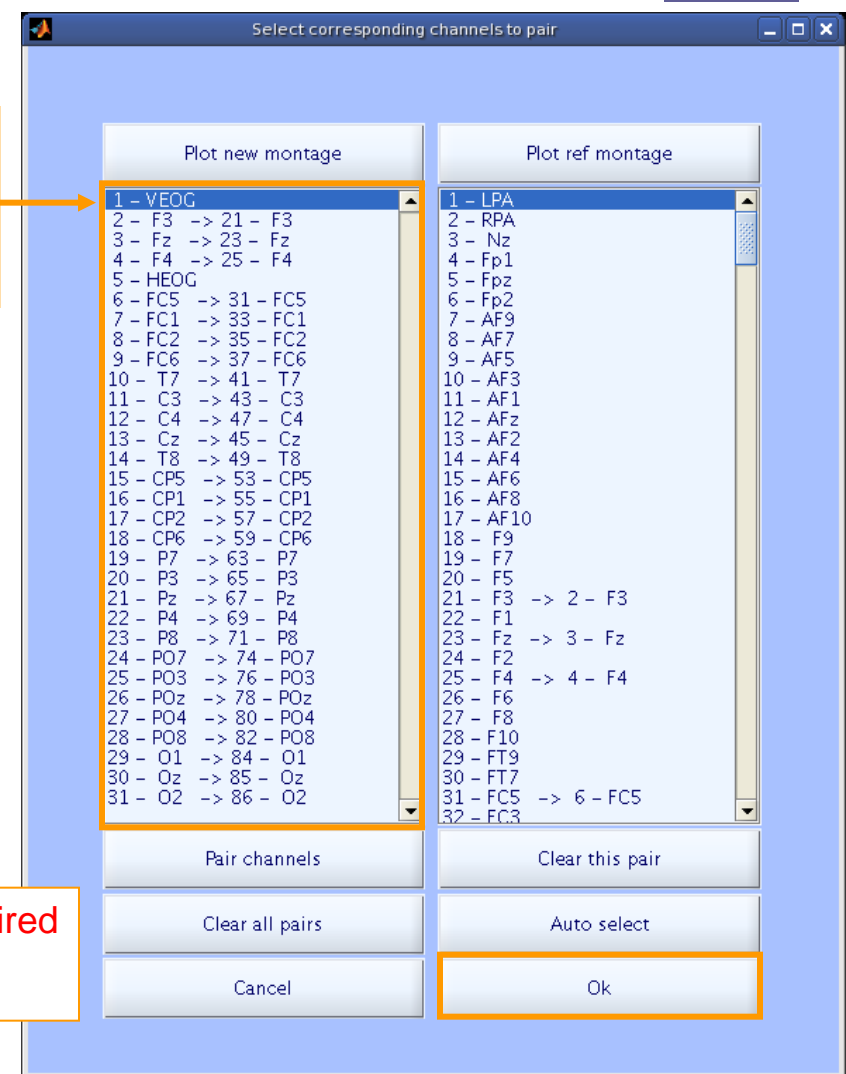
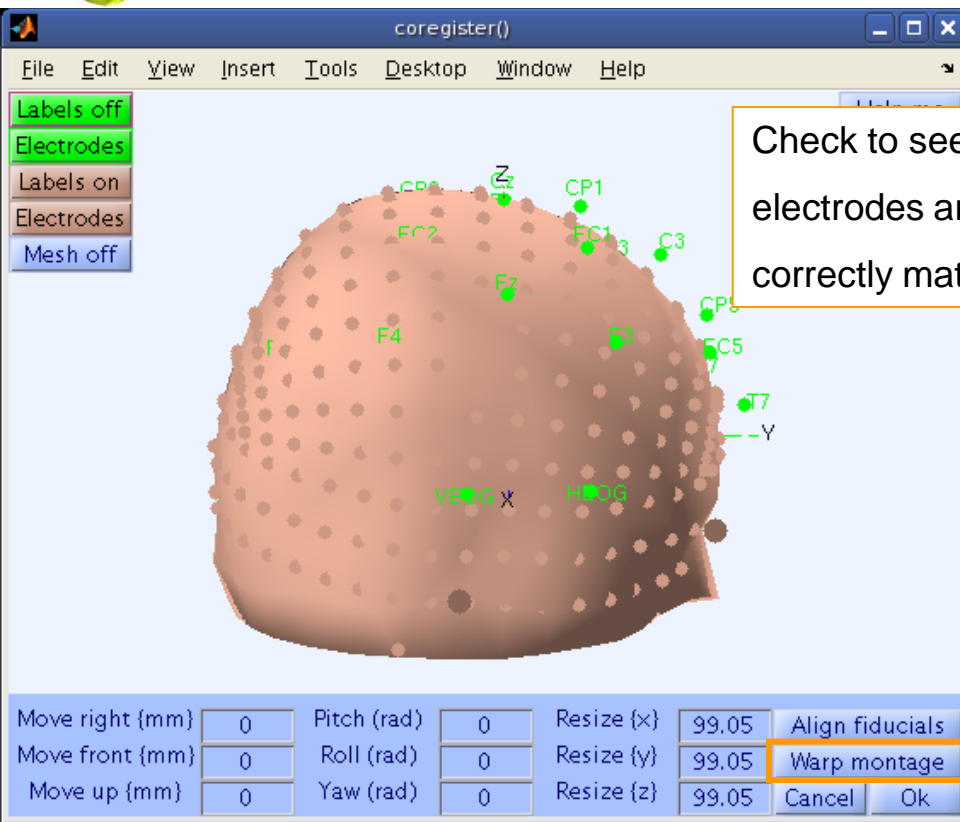
Help
Help
Help
No Co-Reg.

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

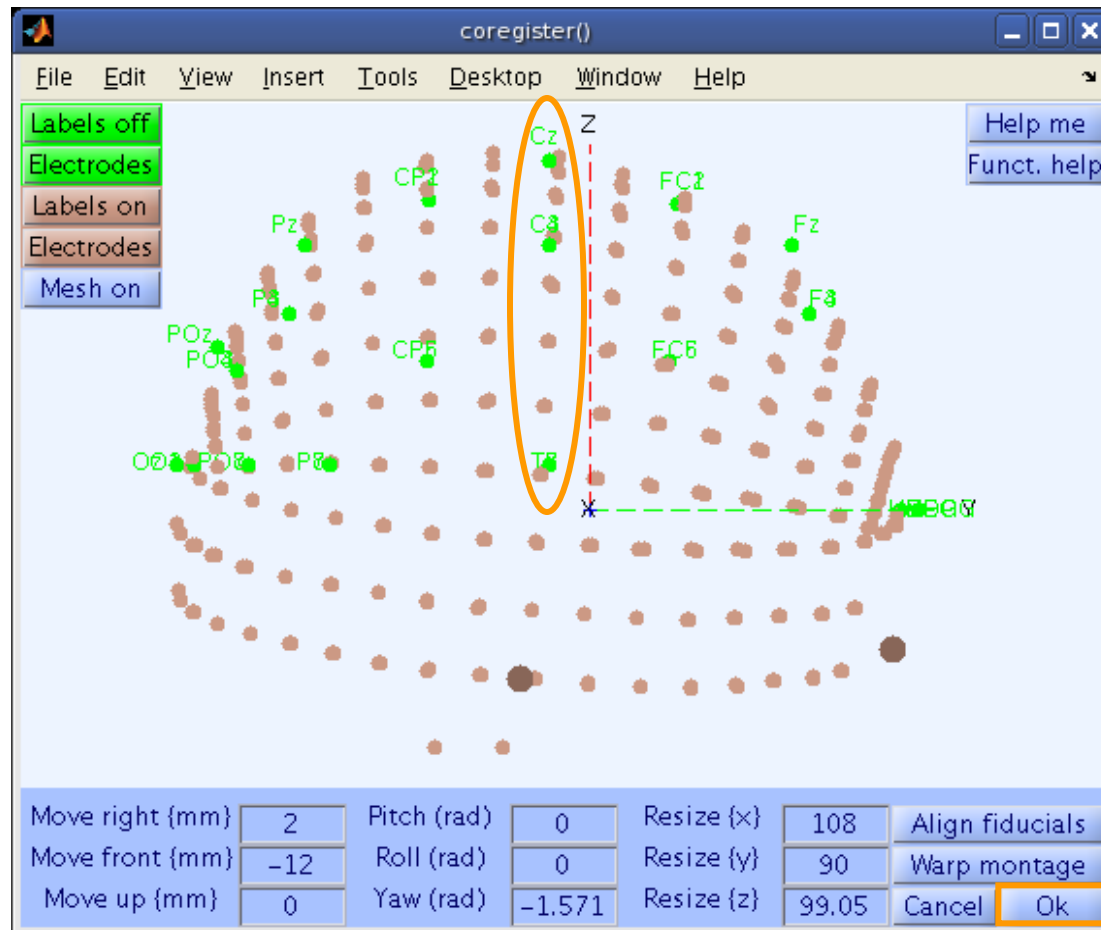
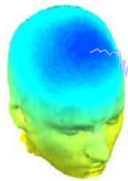


Alternatively, warp to standard montage



stats toolbox required
for warping

Check coregistration with model



EEG.dipfit structure



```
>> EEG.dipfit
```

```
ans =
```

```
    hdmfile: [1x76 char]
```

```
    mrifile: [1x71 char]
```

```
    chanfile: [1x83 char]
```

```
    chansel: [1x33 double]
```

```
 coordformat: 'spherical'
```

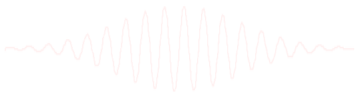
```
    model: [1x33 struct]
```

```
   current: 32
```

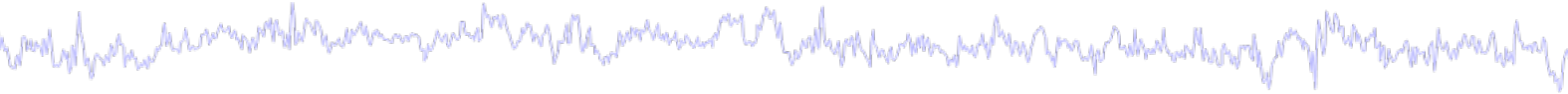
```
    vol: [1x1 struct]
```

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

From head model transformations



DIPFIT and model co-registration



Task 1

Co-register electrodes with model

Task 2

Autofit equivalent dipoles

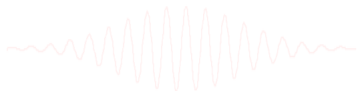
Task 3

Fine fit options

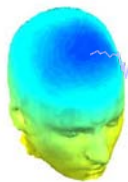
Task 4

3D *headplot()* co-registration

Exercise...



Autofit equivalent dipoles



EEGLAB v6.0b

File Edit **Tools** Plot Study Datasets Help

- Change sampling rate
- Filter the data
- Re-reference
- Reject continuous data by eye
- Extract epochs
- Remove baseline
- Run ICA
- Remove components
- Automatic epoch rejection
- Reject data epochs
- Reject data using ICA
- Locate dipoles using BESA
- Locate dipoles using DIPFIT 2.x
 - Head model and settings
 - Coarse fit (grid scan)
 - Fine fit (iterative)
 - Autofit (coarse fit, fine fit & plot)**
 - Plot component dipoles
- Laplacian
- FMRIB Tools
- Grand average datasets
- Locate dipoles using LORETA
- PCA plugin

Fit multiple ICA components -- pop_multifit()

Component indices: 1:71

Rejection threshold RV (%): 100

Remove dipoles outside the head: ☐

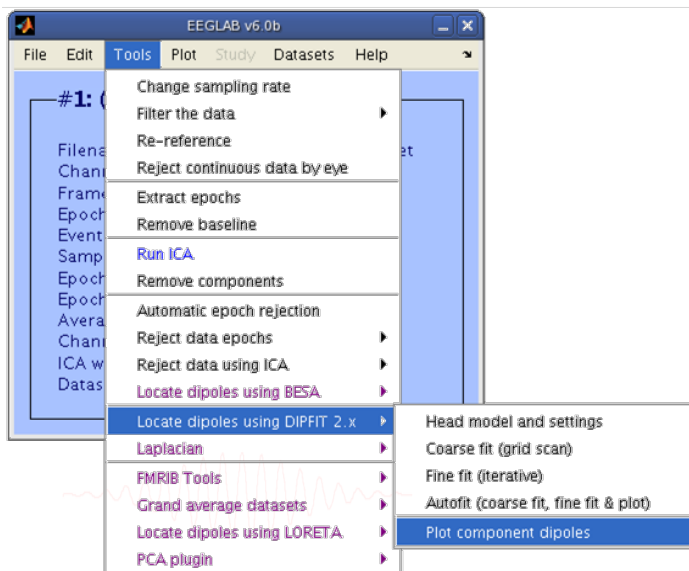
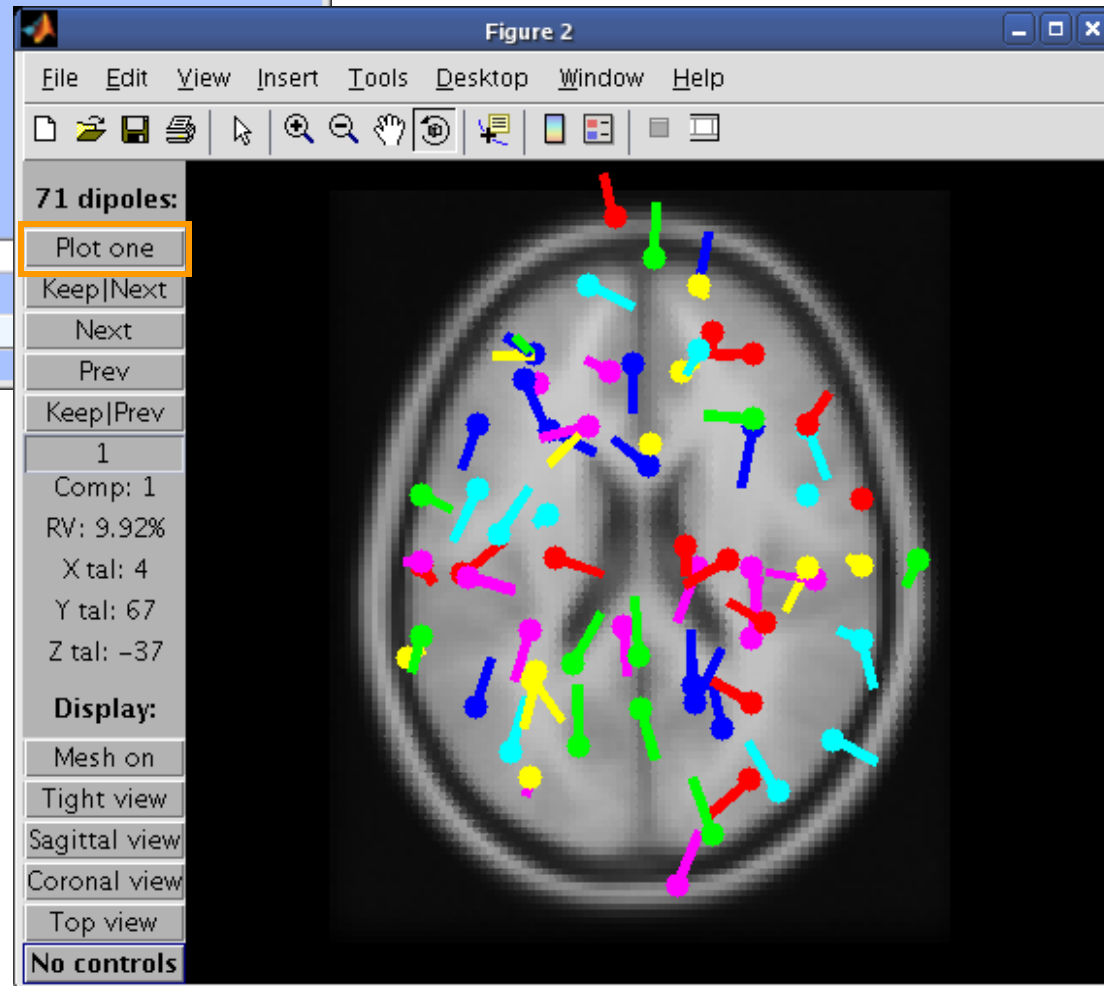
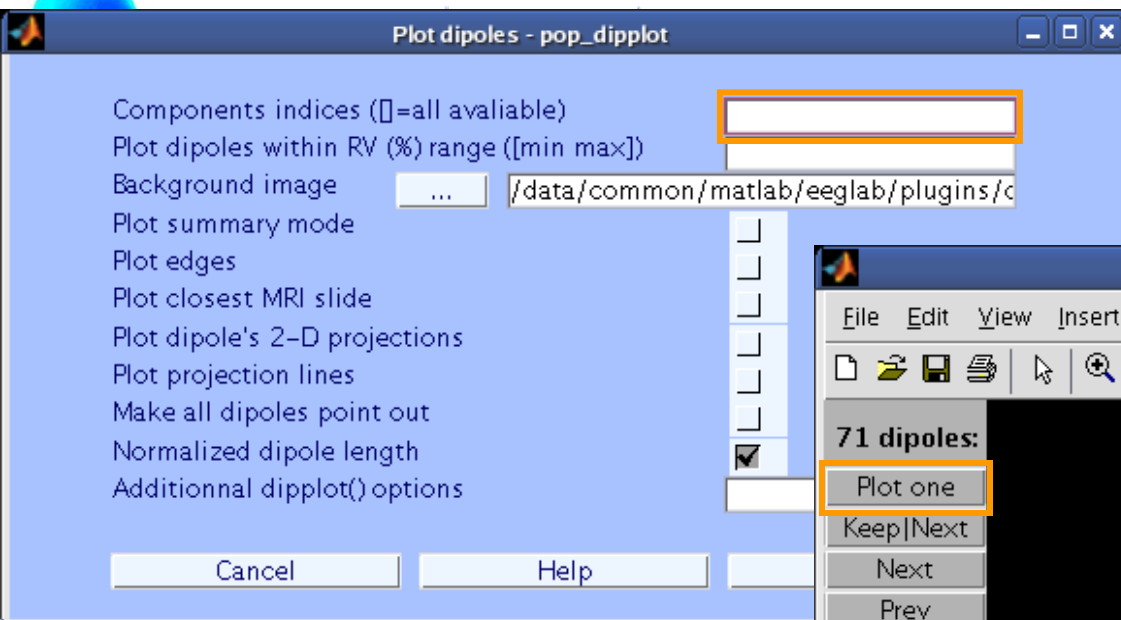
Fit bilateral dipoles (check): ☐

Plot resulting dipoles (check): ☐

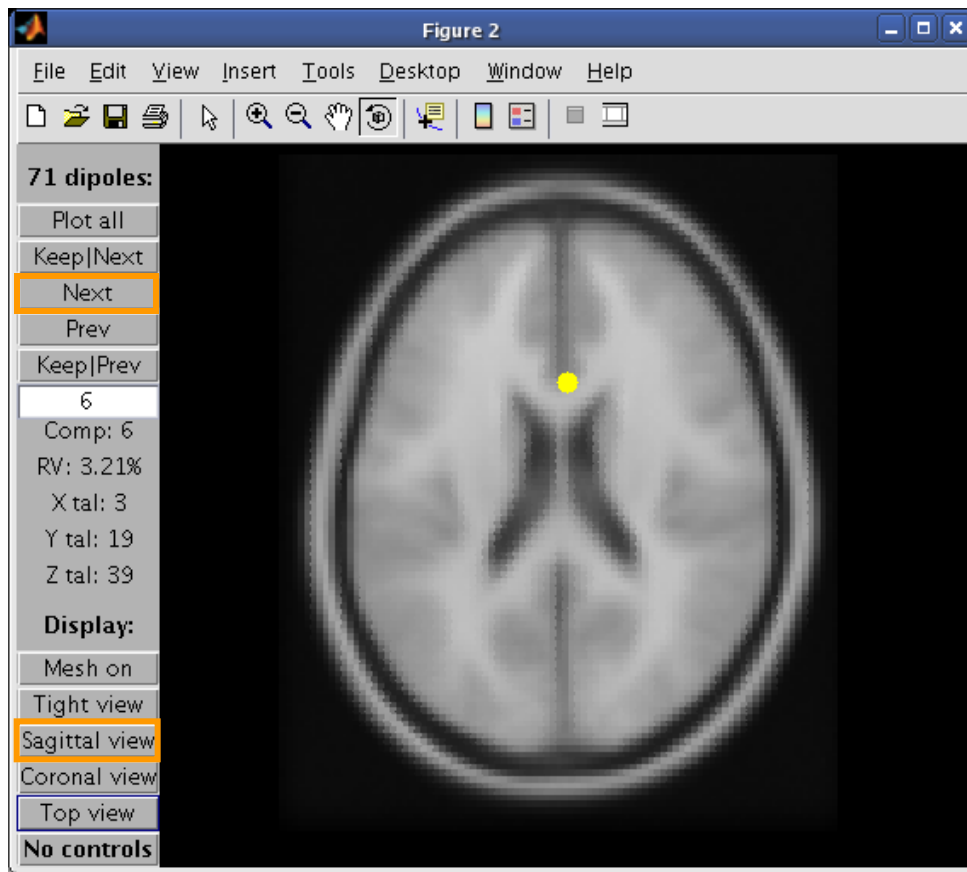
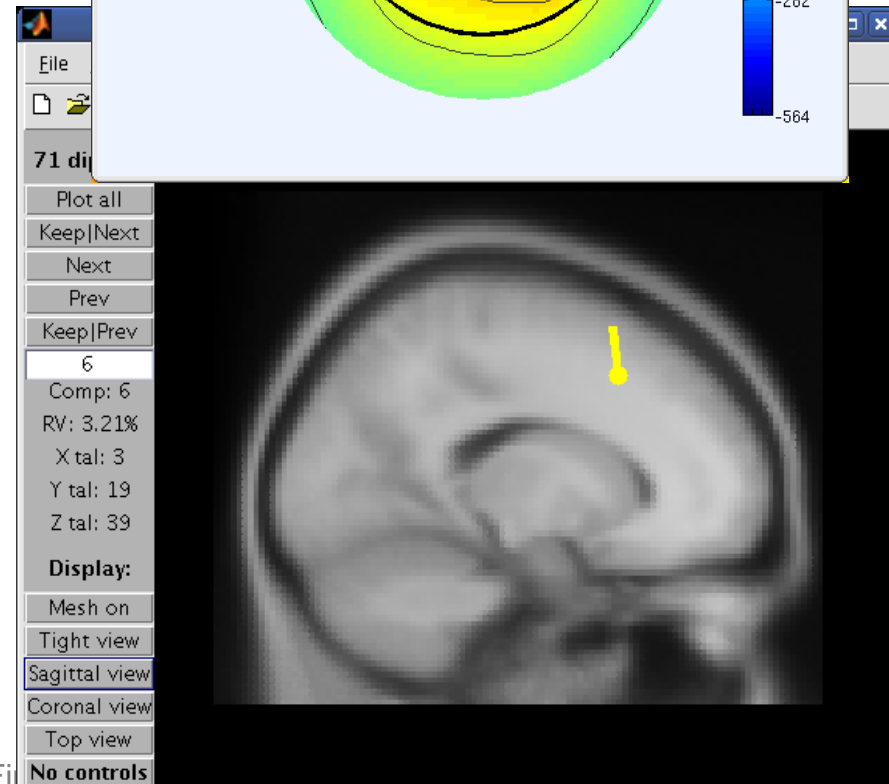
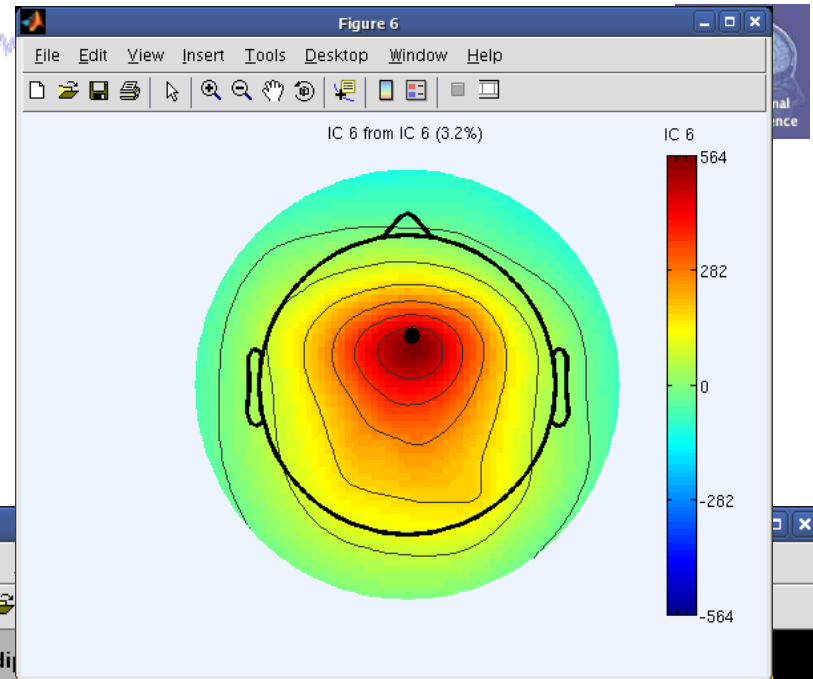
dipplot() plotting options: 'normlen' 'on' Help

Cancel Help Ok

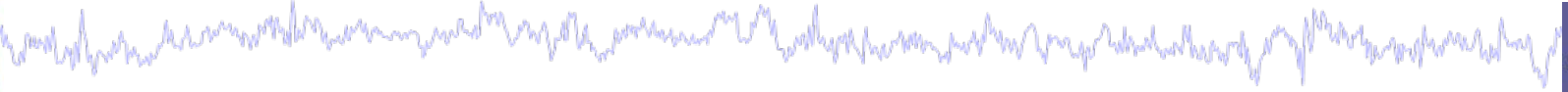
Plot dipoles



Scroll through dipoles



DIPFIT and model co-registration



Task 1

Co-register electrodes with model

Task 2

Autofit equivalent dipoles

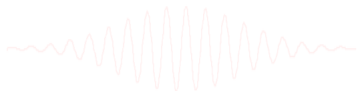
Task 3

Fine fit options

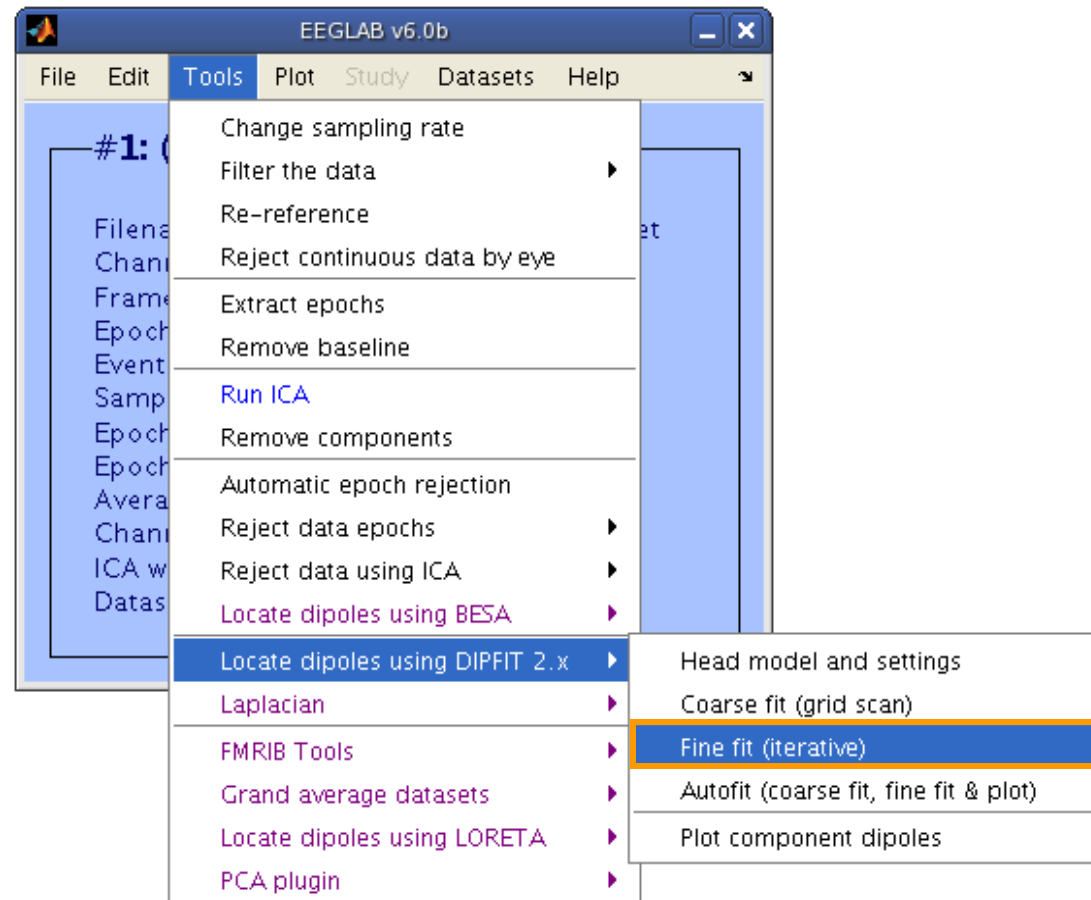
Task 4

3D *headplot()* co-registration

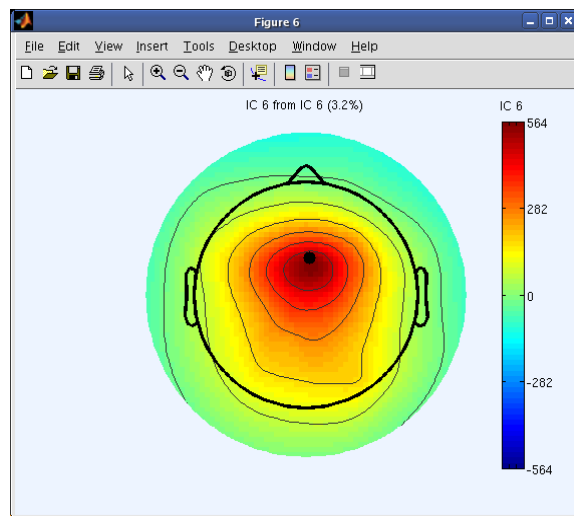
Exercise...



Fine fit options in DIPFIT



Fine fit menu



Manual dipole fit -- pop_dipfit_nonlinear()

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

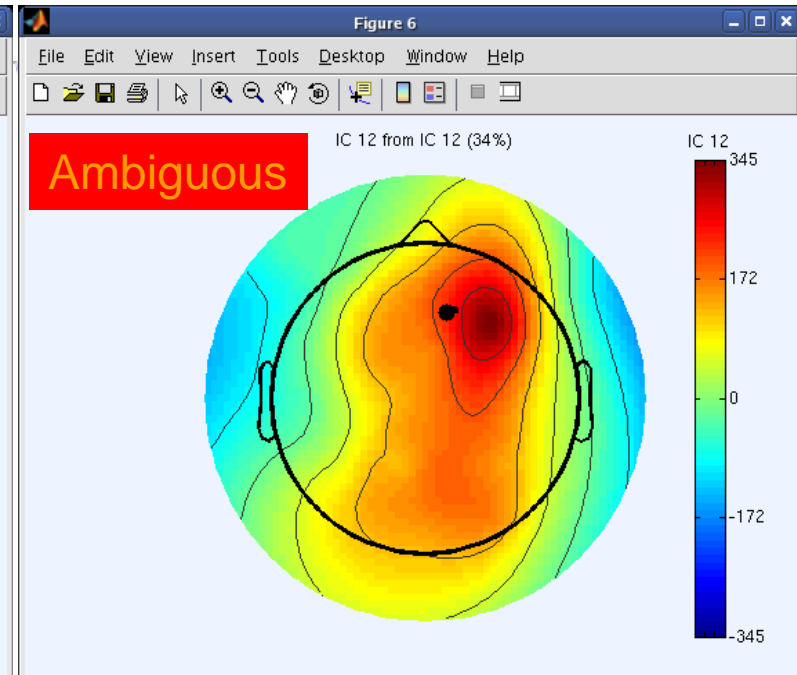
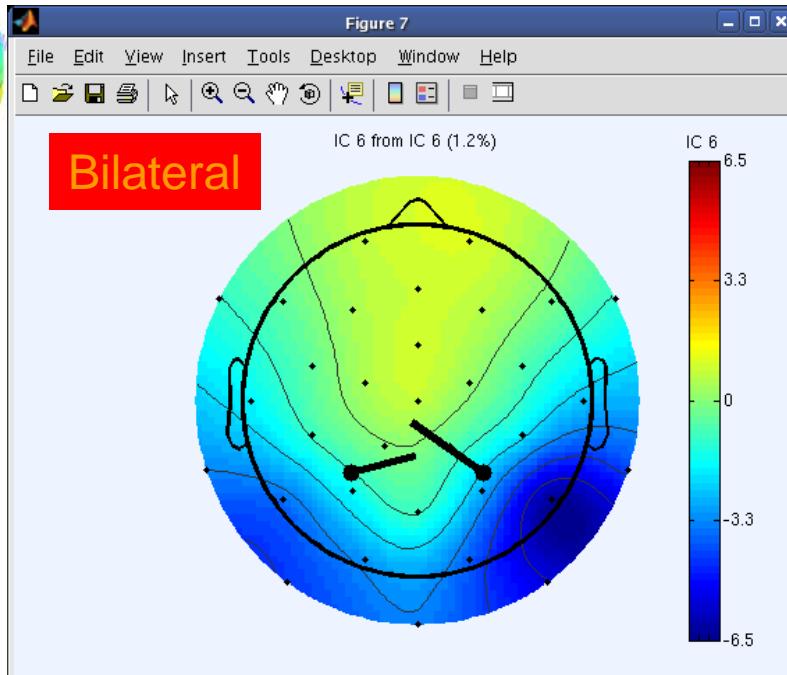
dipole	fit	position	moment	
#1	<input checked="" type="checkbox"/>	28.222 -2.401 37.331	2.380 475942.653 3819304.288	Flip (in out)
#2	<input type="checkbox"/>	0.000 0.000 0.000	0.000 0.000 0.000	Flip (in out)

☒ Symmetry constrain for dipole ...

Fit dipole(s)' position & moment Or fit only dipole(s)' moment Plot dipole(s)

Cancel Help Ok

Bilateral dipoles



Manual dipole fit -- pop_dipfit_nonlinear()

Component to fit: 6 Plot map Residual variance = 1.23%

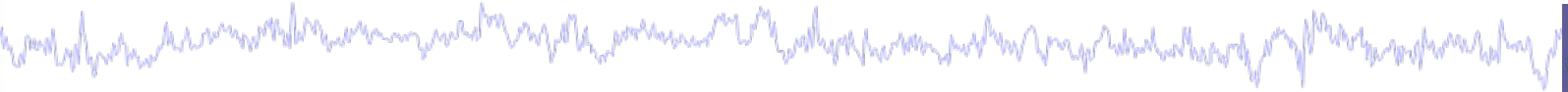
dipole	fit	position	moment	
#1	<input checked="" type="checkbox"/>	-35.066 -32.492 -4.684	32271.382 46141.284 5880.224	Flip (in out)
#2	<input checked="" type="checkbox"/>	-35.066 32.492 -4.684	1005.419 -38050.427 14094.824	Flip (in out)

☒ Symmetry constrain for dipole ...

Fit dipole(s)' position & moment Or fit only dipole(s)' moment Plot dipole(s)

Cancel Help Ok

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
```

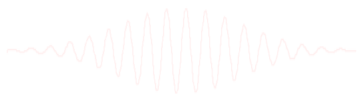
```
select: 1
```

X

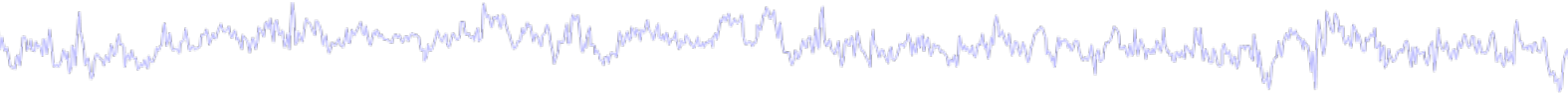
Y

Z

[14.9791 -86.0094 47.9448]



DIPFIT and model co-registration



Task 1

Co-register electrodes with model

Task 2

Autofit equivalent dipoles

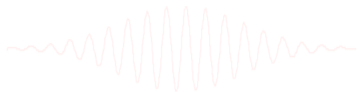
Task 3

Fine fit options

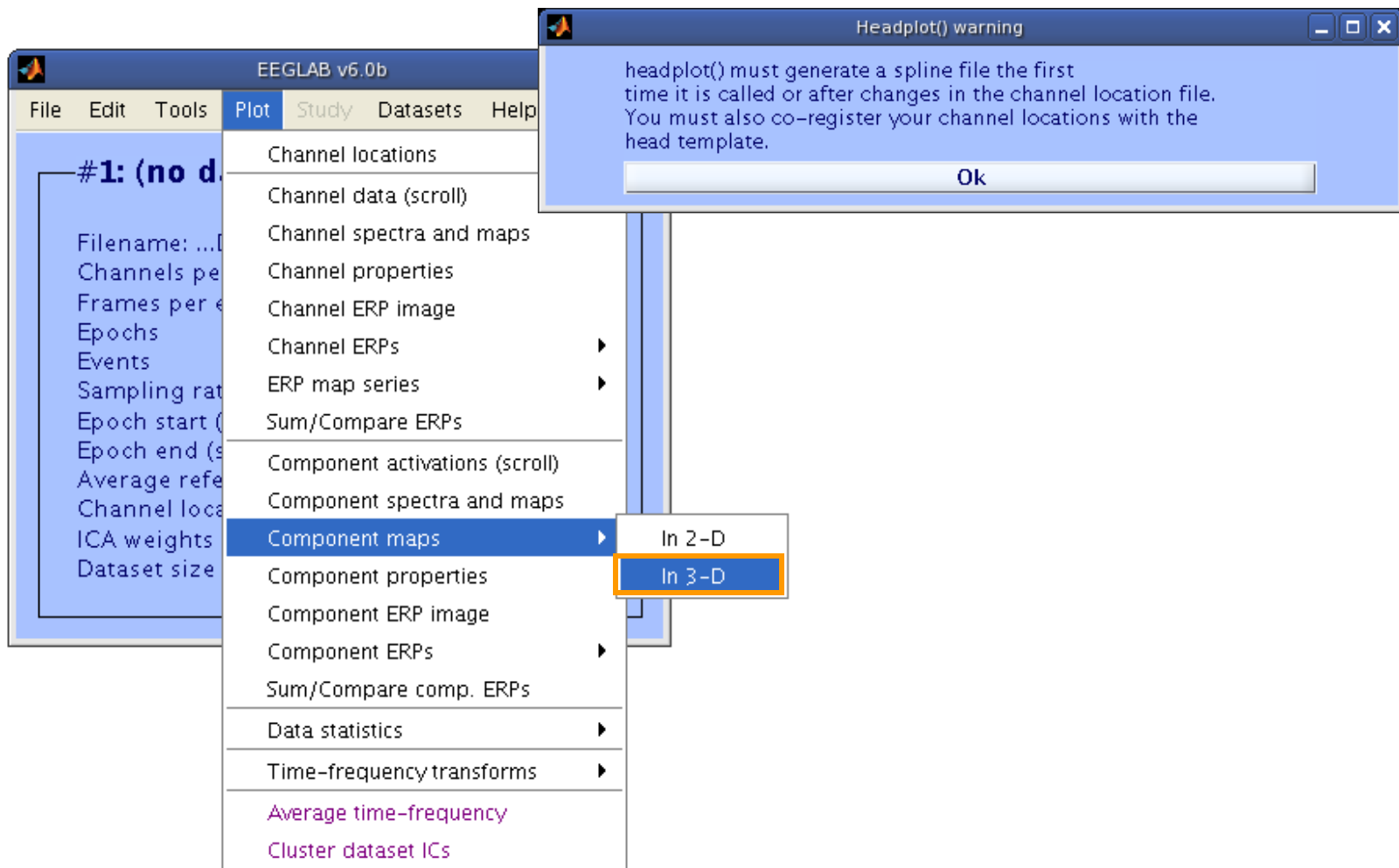
Task 4

3D *headplot()* co-registration

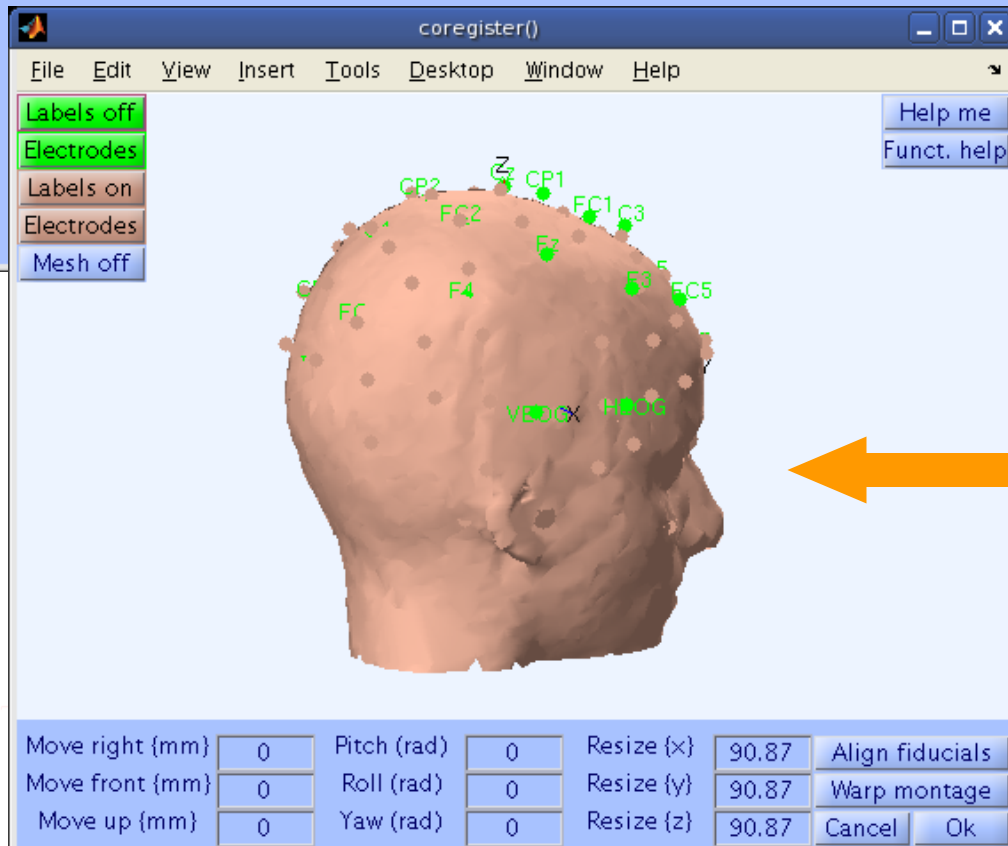
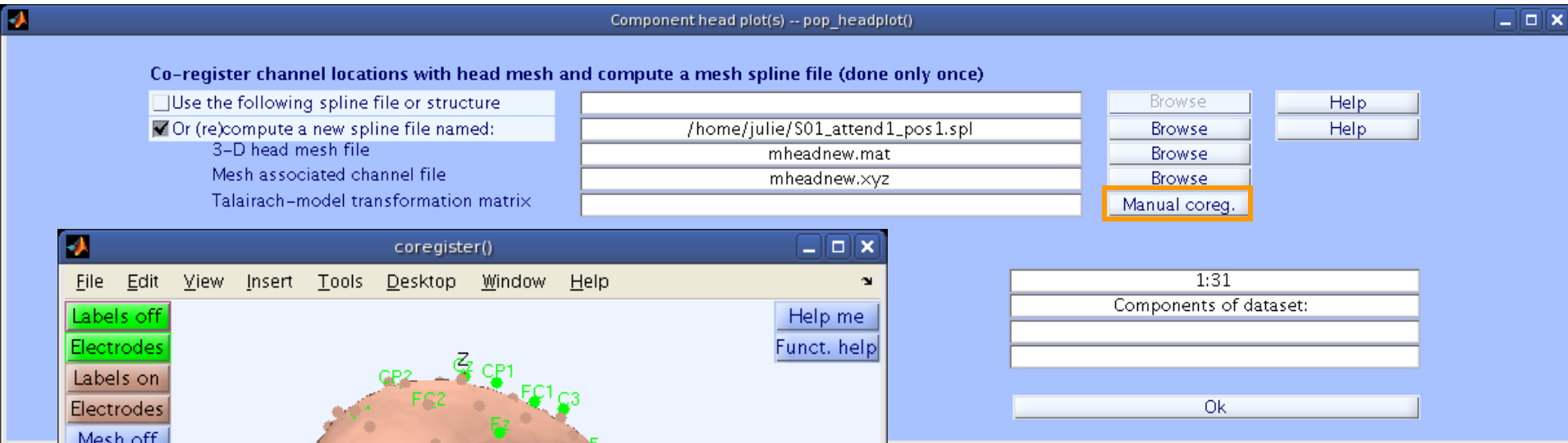
Exercise...



Plot scalp maps in 3D

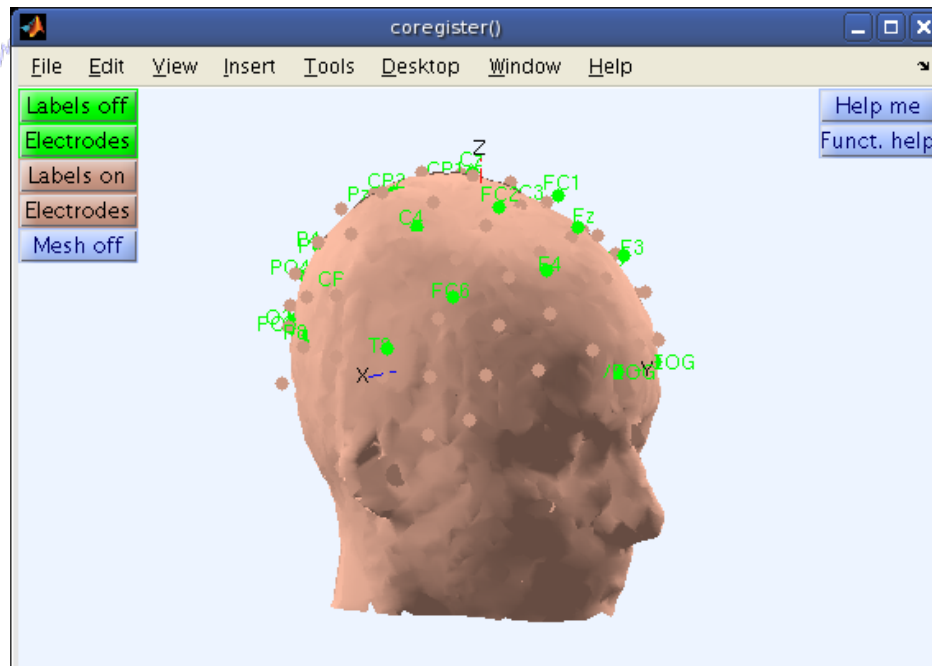


Headplot co-registration



Go through co-registration
in the same way as
with dipfit co-registration

Confirm headplot co-registration



Component head plot(s) -- pop_headplot()

Co-register channel locations with head mesh and compute a mesh spline file (done only once)

☐ Use the following spline file or structure

☒ Or (re)compute a new spline file named:

3-D head mesh file

Mesh associated channel file

Talairach-model transformation matrix

/home/julie/S01_attend1_pos1.spl					
mheadnew.mat					
mheadnew.xyz					
0	0	-1.570796	100	76	90.87264

Browse

Browse

Browse

Browse

Manual coreg.

Help

Help

Plot interpolated activity onto 3-D head

Component numbers to plot (negative numbers invert comp. polarities):

Plot title:

Plot geometry (rows,columns): (Default [] = near square)

-> headplot() options (See >> help headplot):

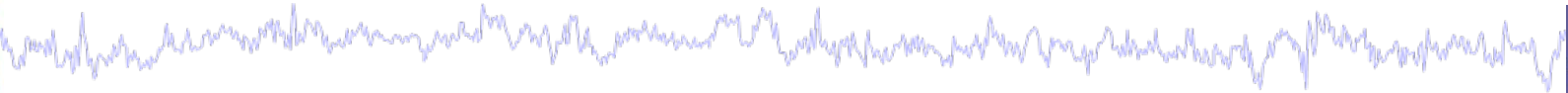
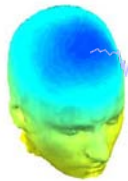
1:31

Components of dataset:

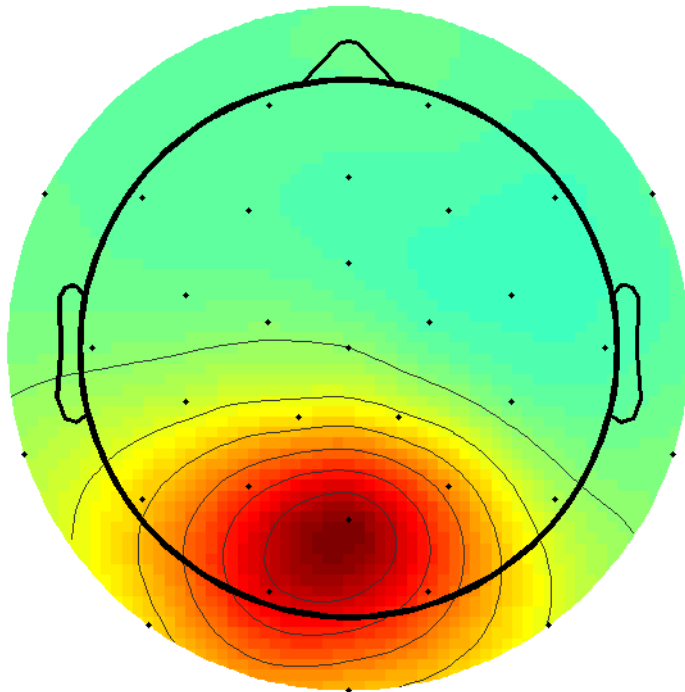
Cancel

Ok

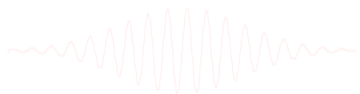
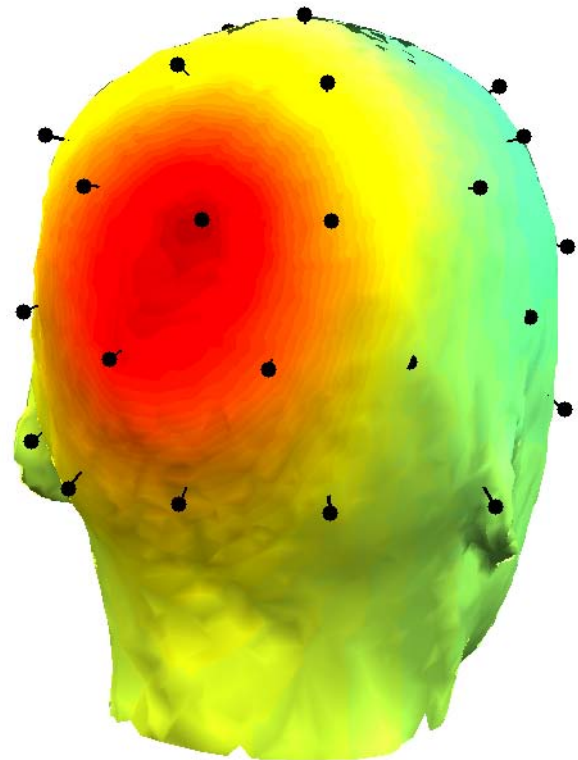
Spline file in EEG structure



2D scalp map for IC 12



3D scalp map for IC 12



Exercise



- **All**
 - Load 'stern.set' from 'data' folder
- **Novice**
 - Plot dipoles from the GUI and scroll through components individually,
 - Try all viewing parameters
- **Intermediate / Advanced**
 - In the Finefit menu, try fitting a bilateral dipole, what happens to the residual variance?
 - Co-register the head model for 3D scalp map plotting. Then plot some ICs in 3D.
 - Can you gain any further insight about source projections using this display?