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...

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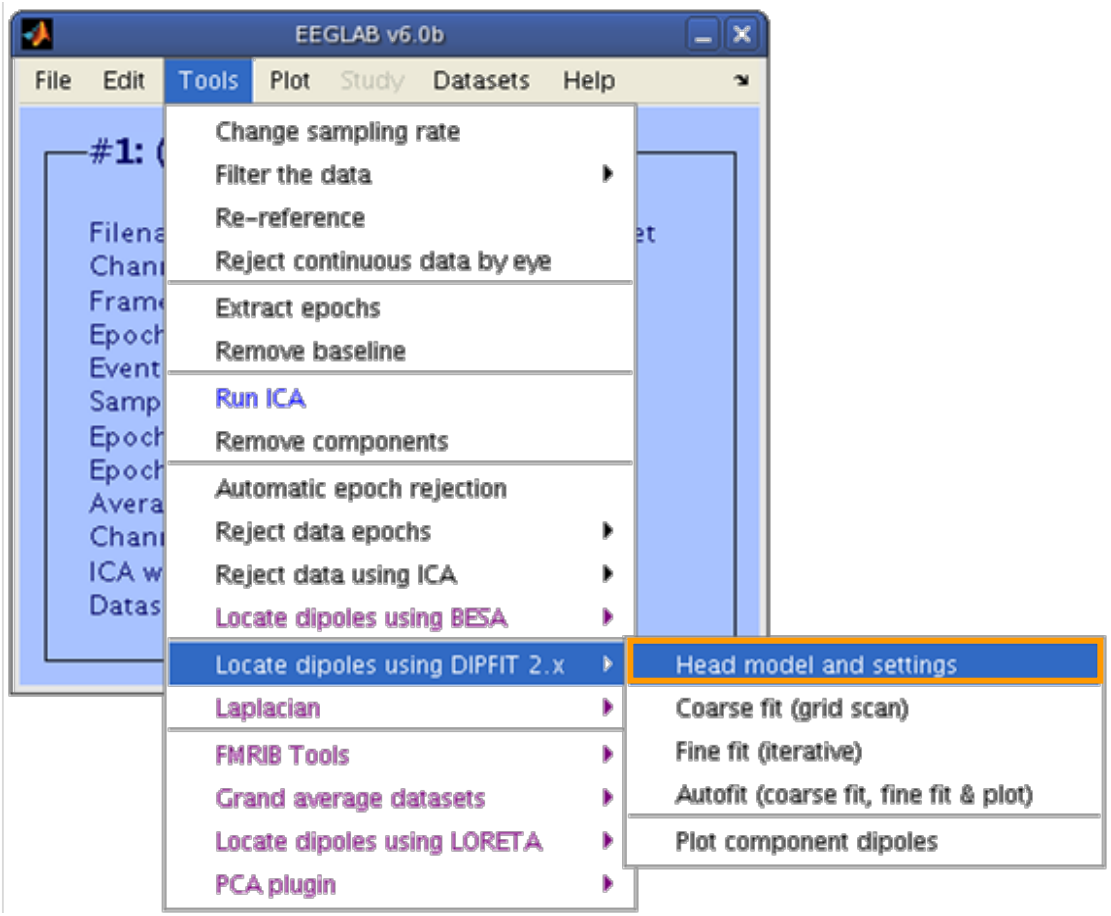
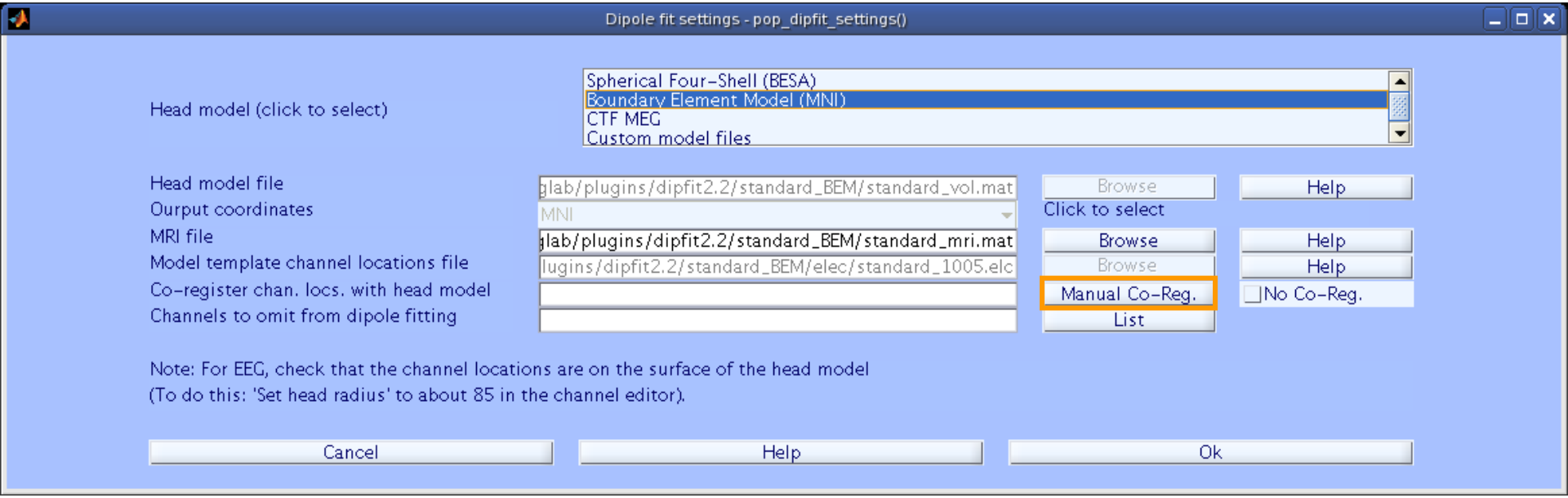
Exercise...

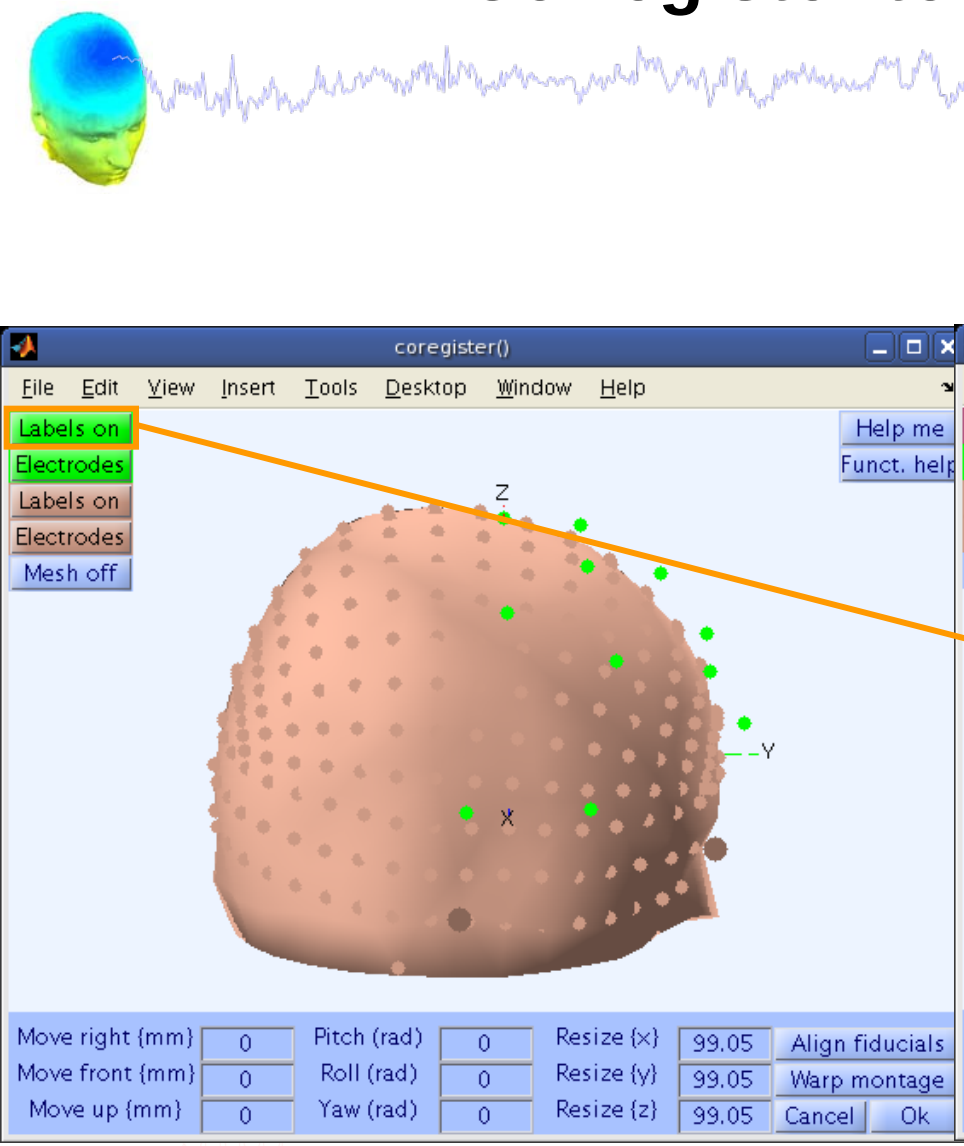
Finding dipole locations

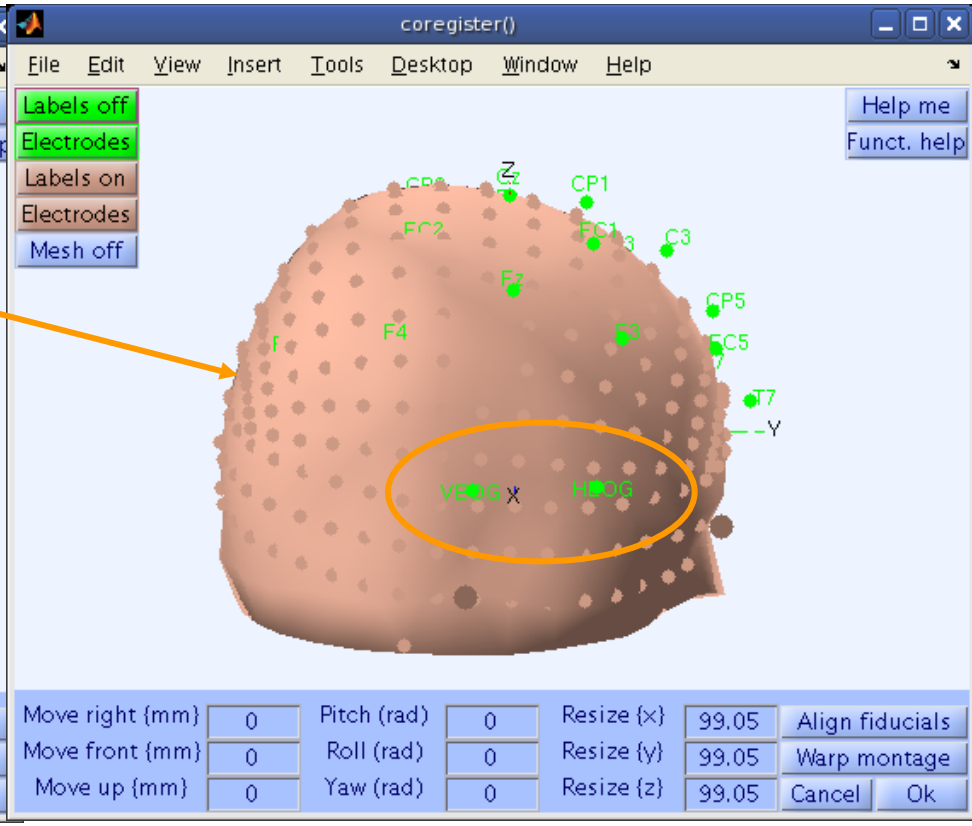


Co-register to model

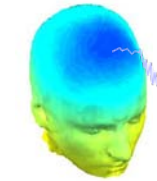


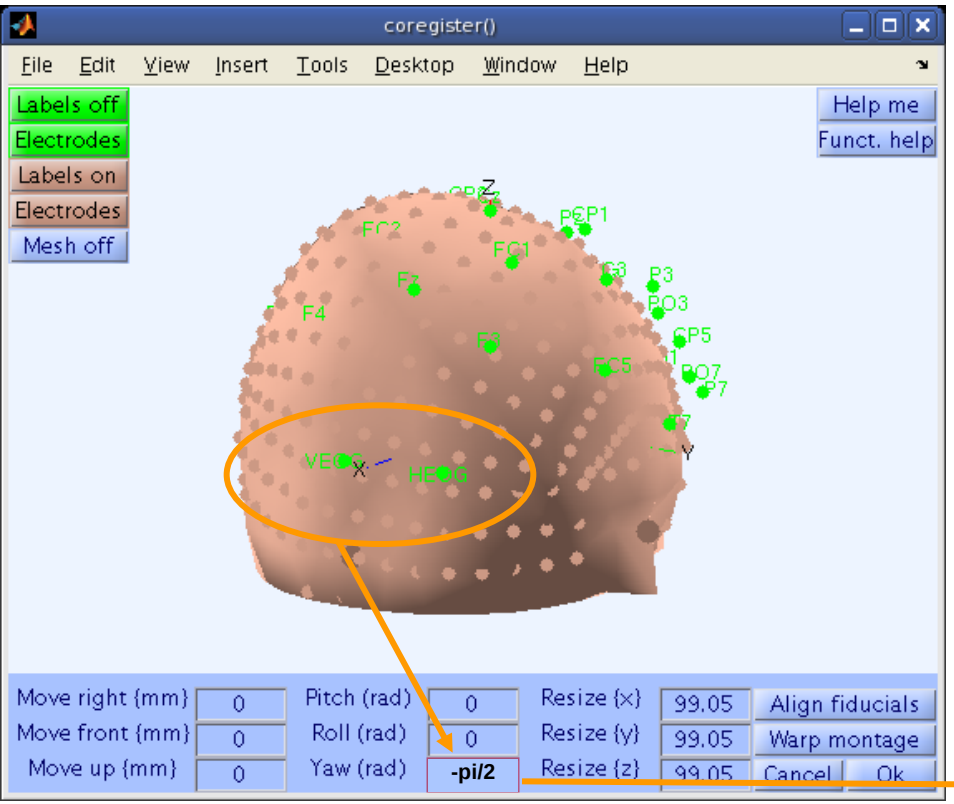
Co-register to model, cont'd

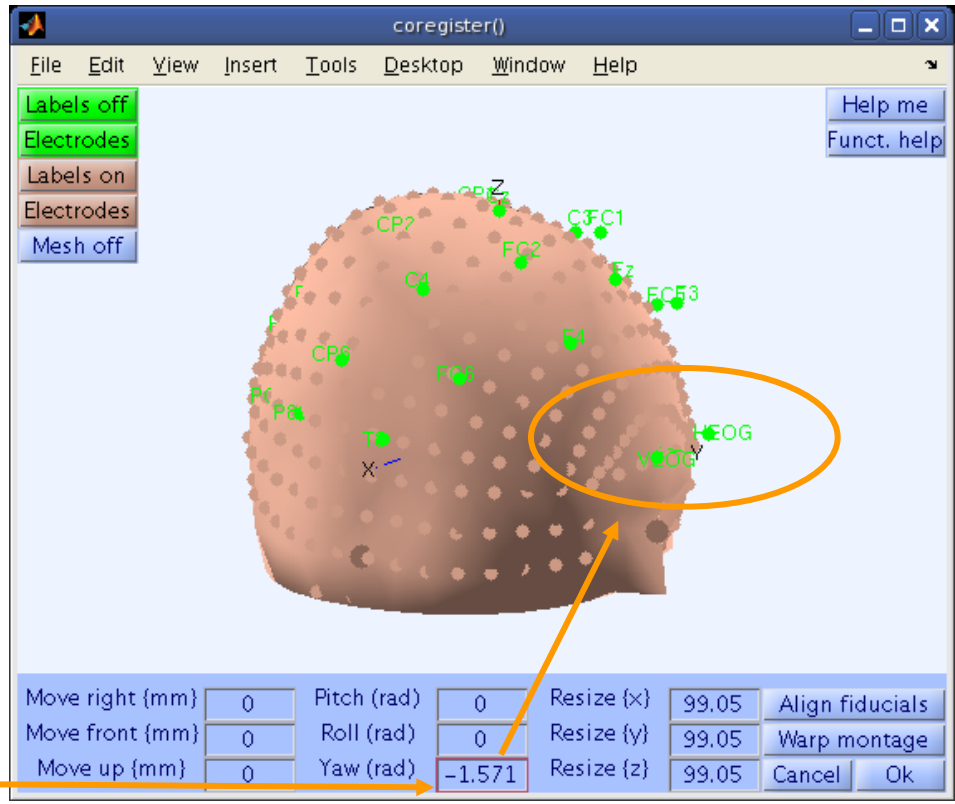




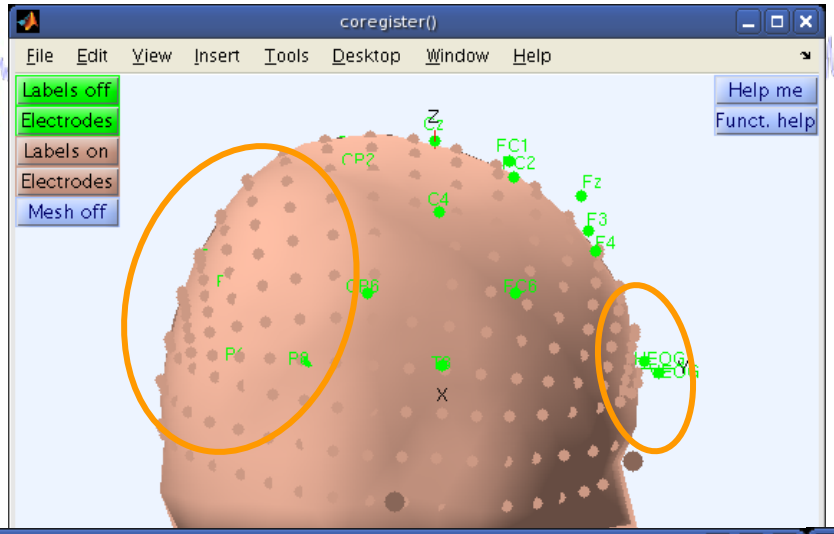
Perform translation of electrode positions

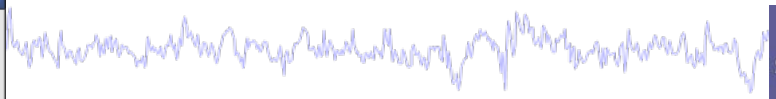






Perform translation of electrode positions

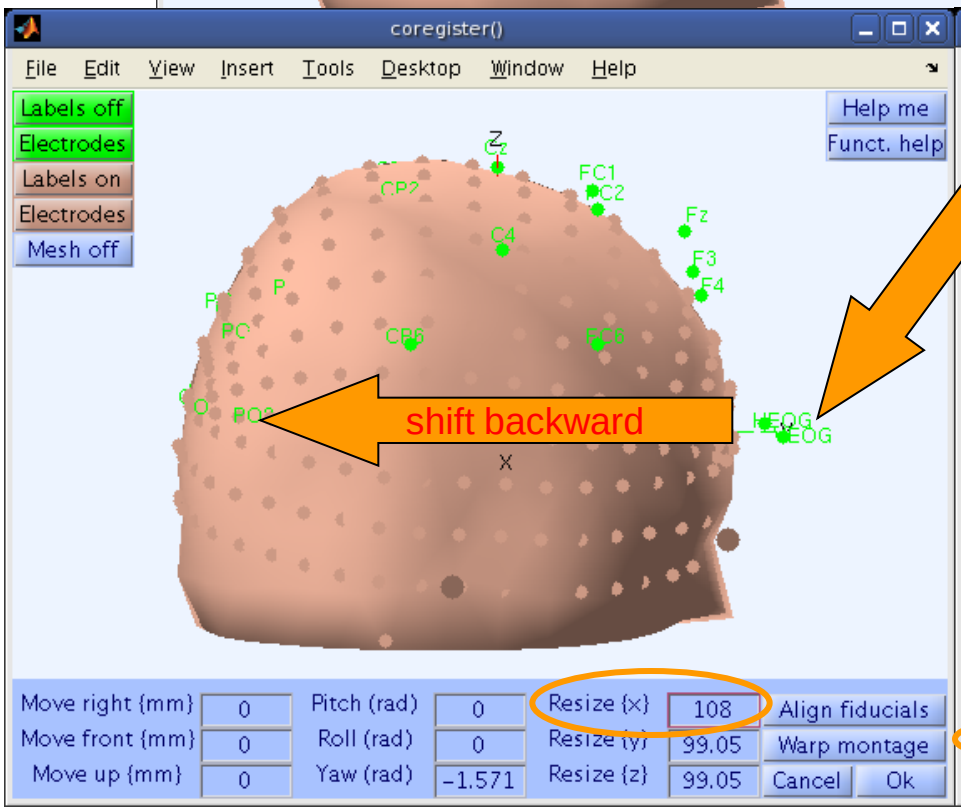


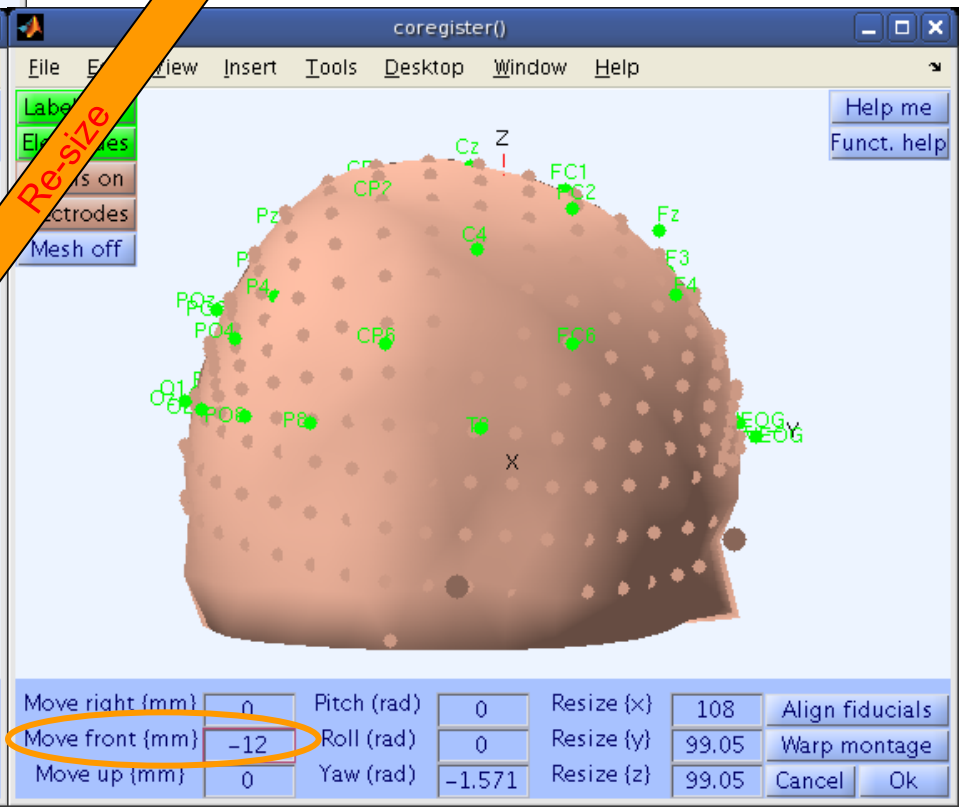


Requires a shift toward back of the head

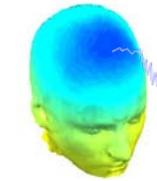
AND

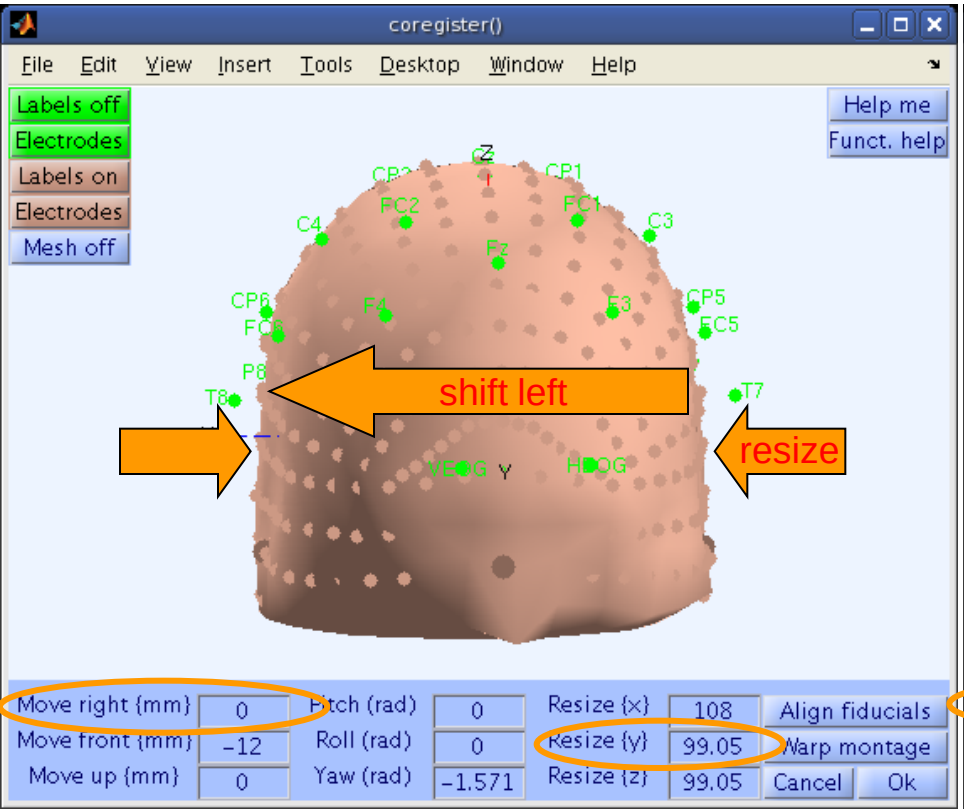
an expansion along the X-axis

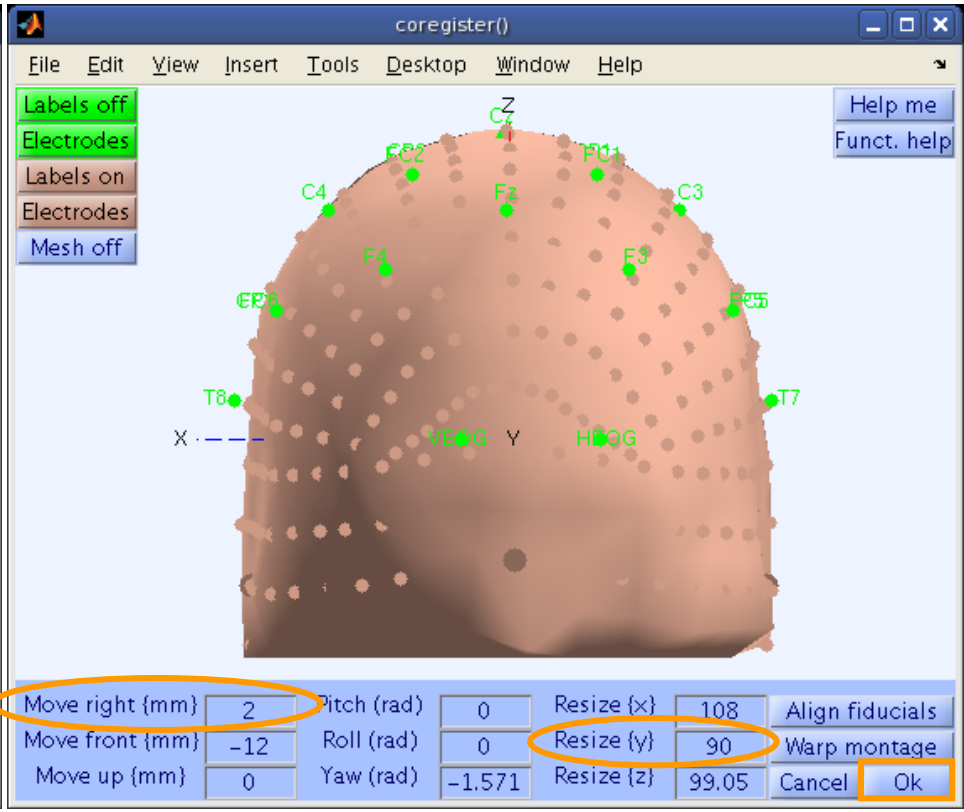




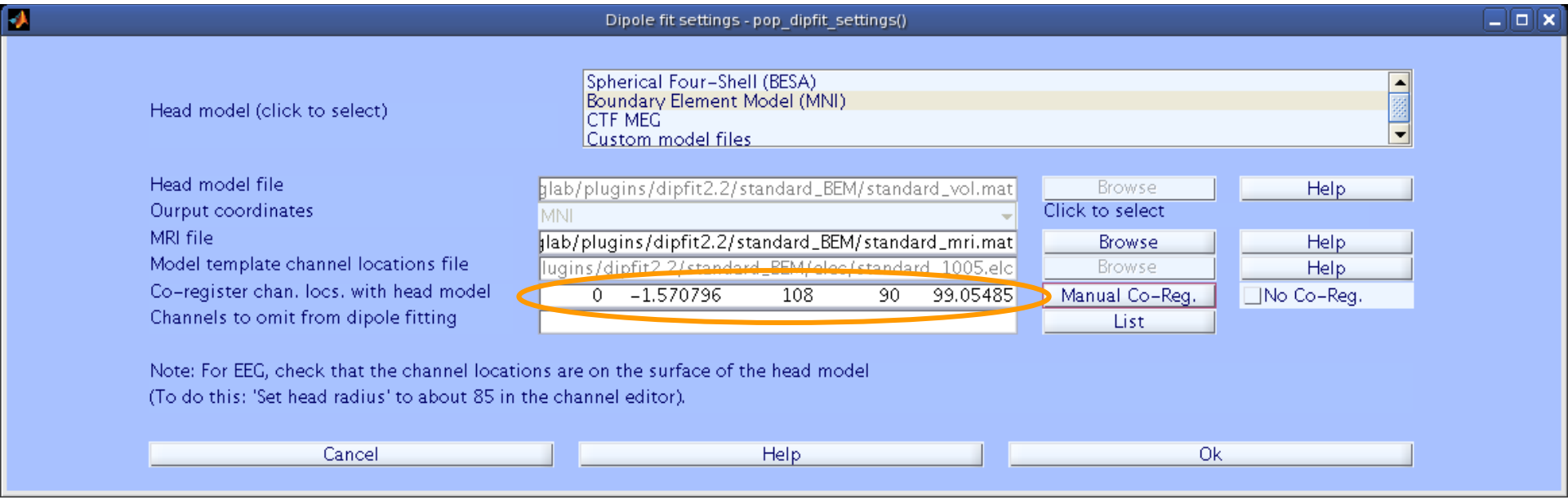
Perform translation of electrode positions



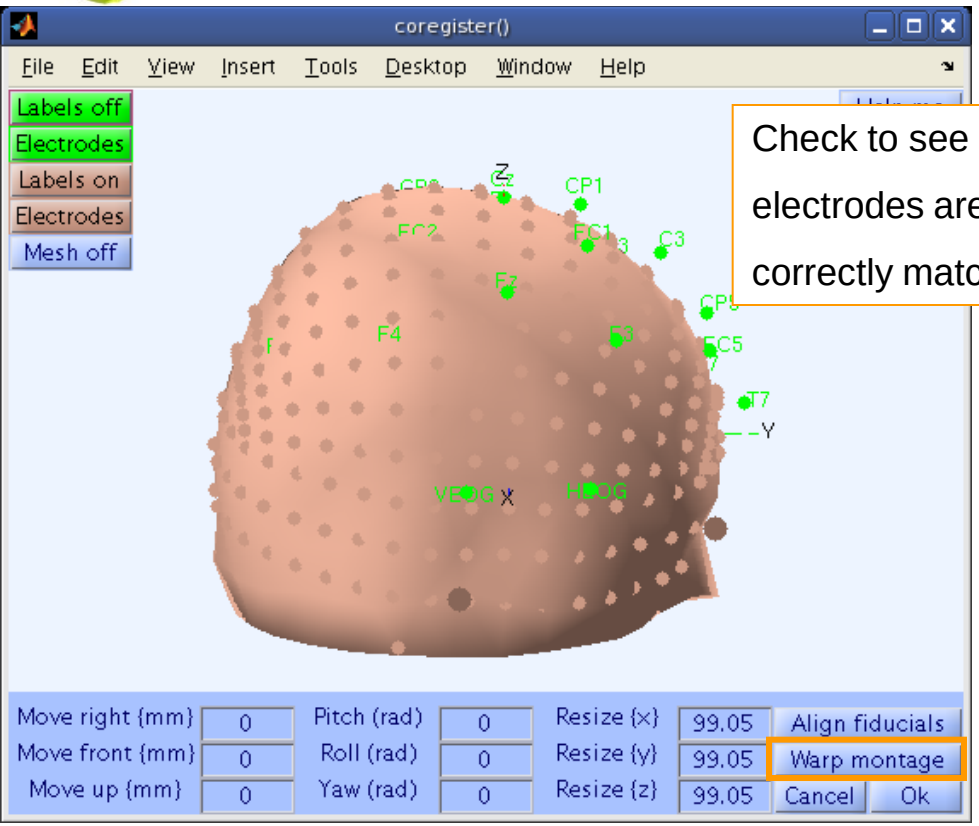




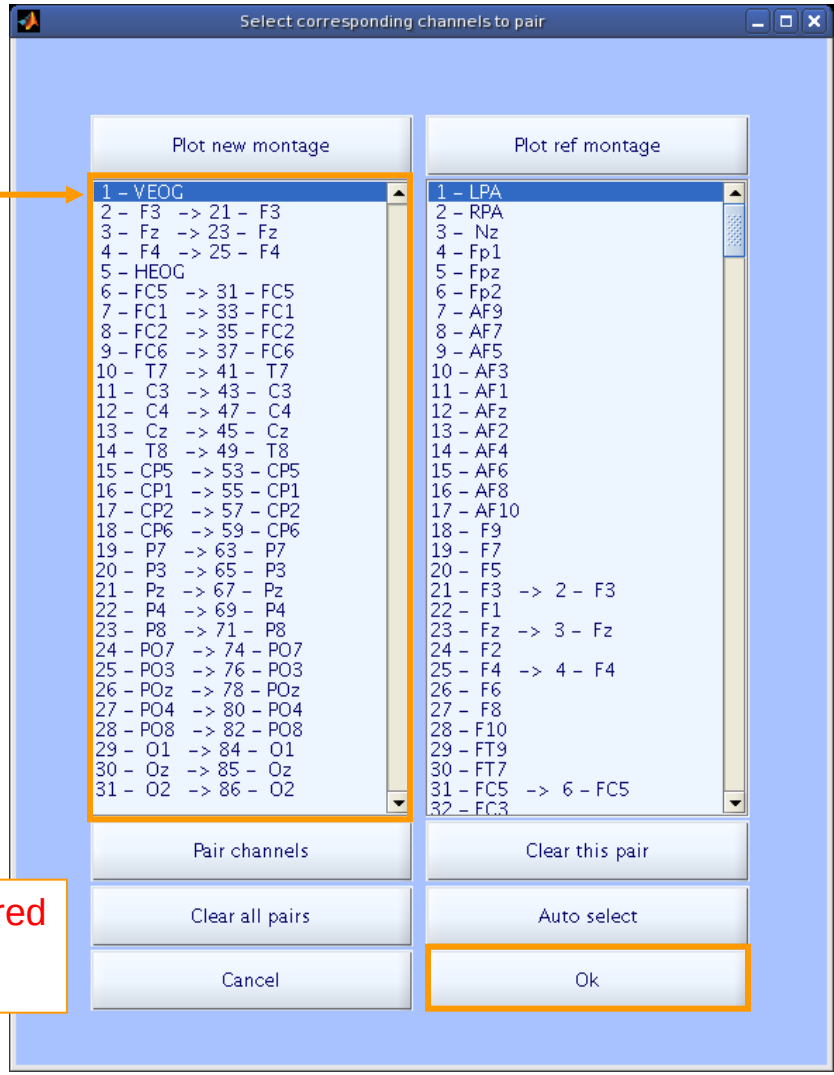
Confirm electrode transformation



Alternatively, warp to standard montage

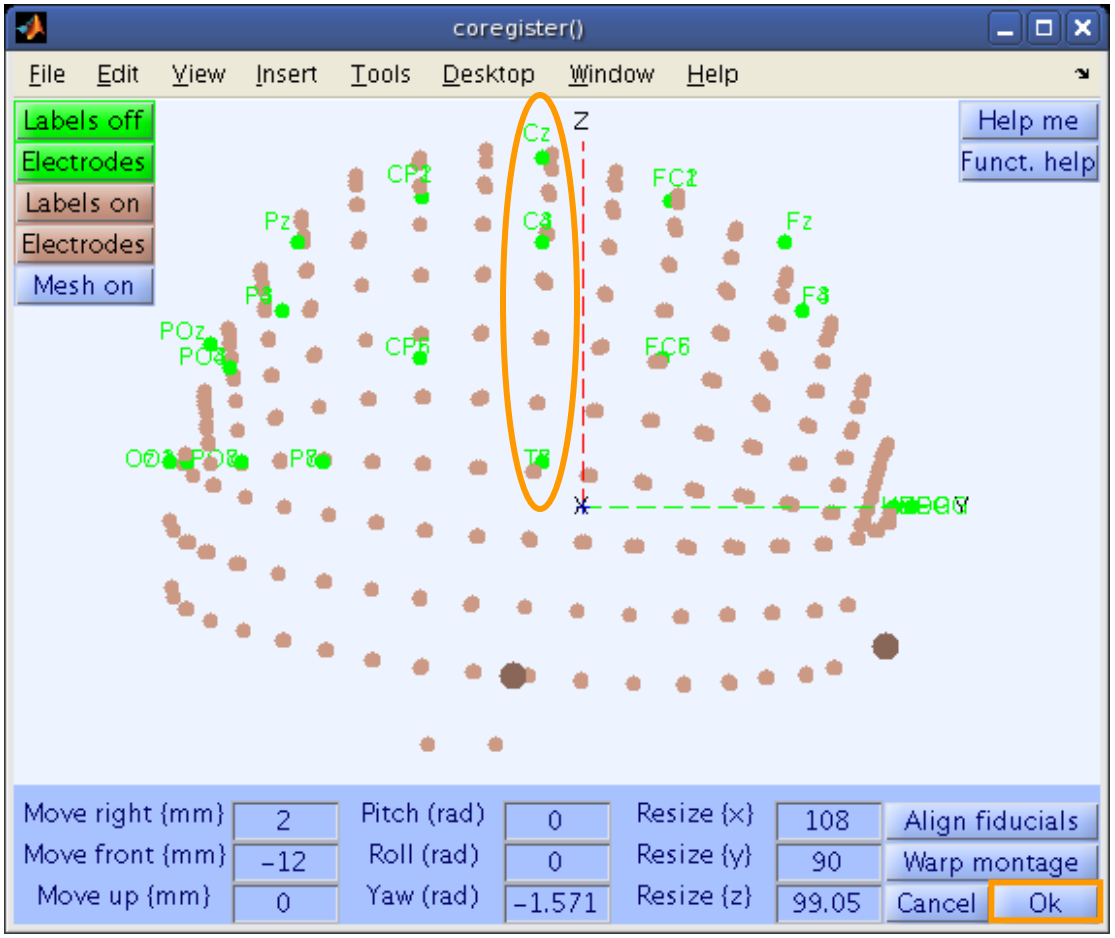


Check to see that electrodes are correctly matched



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

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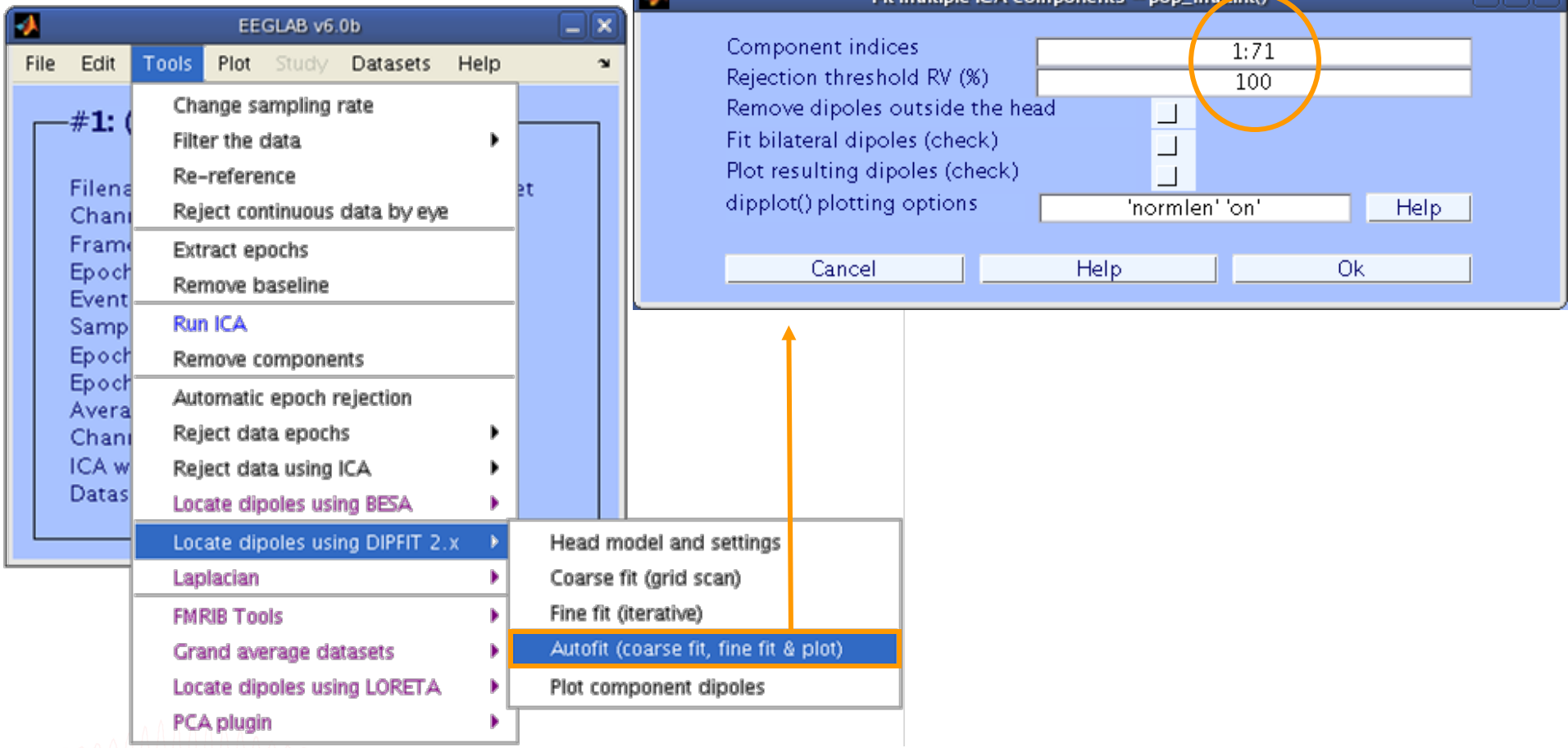
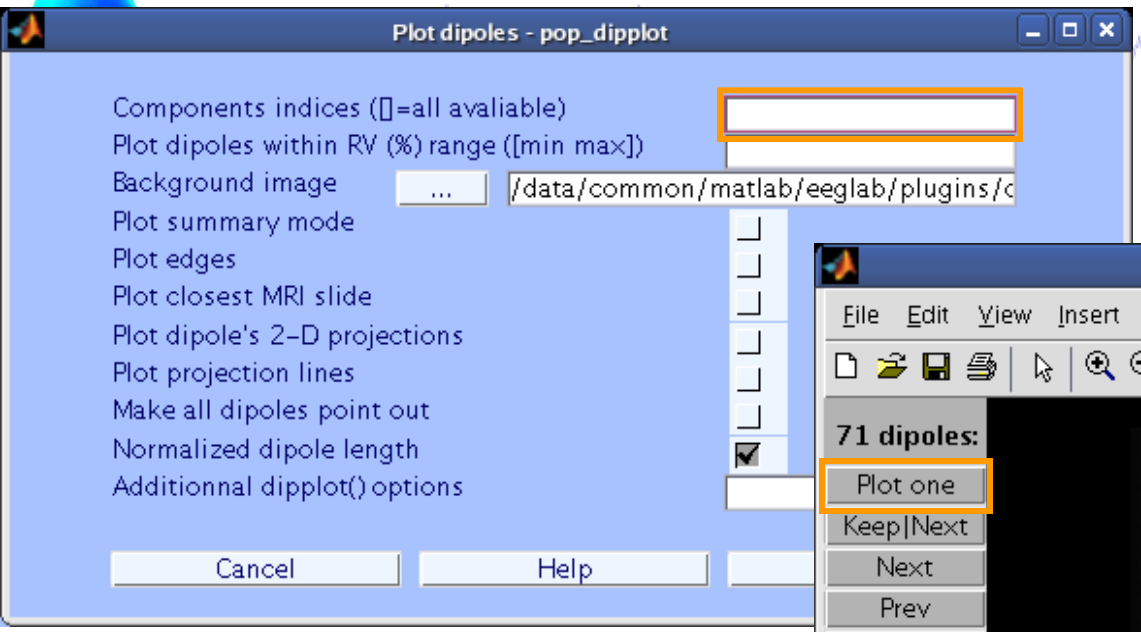
3D *headplot()* co-registration

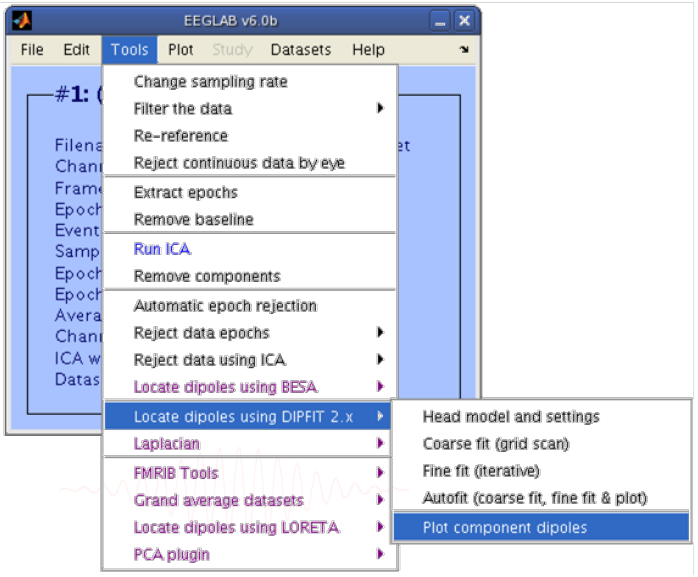
Exercise...

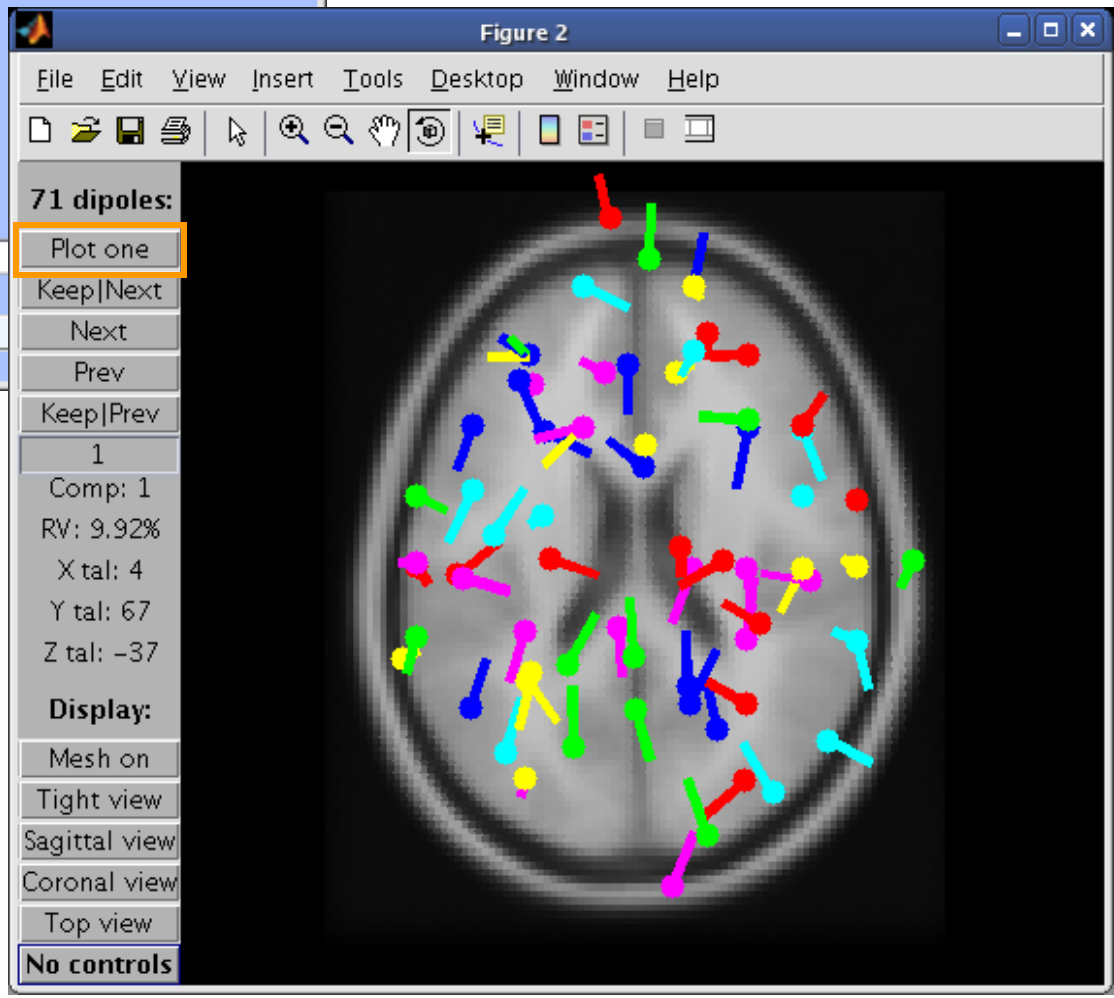
Autofit equivalent dipoles



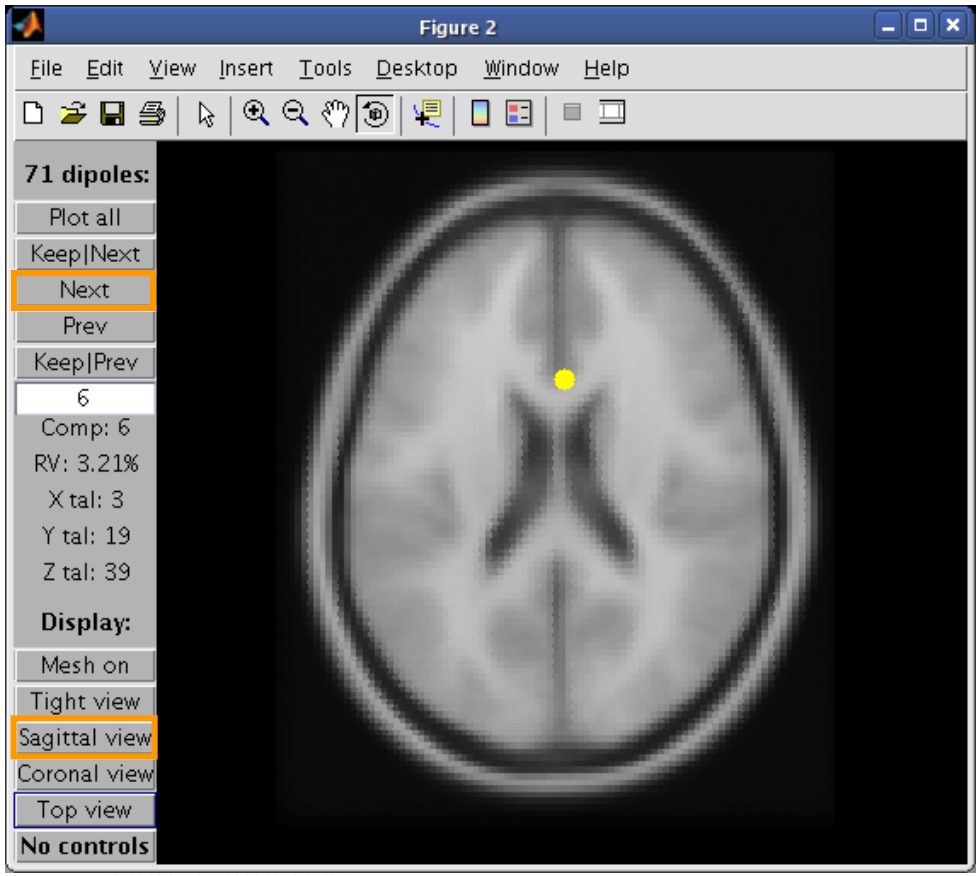
Plot dipoles

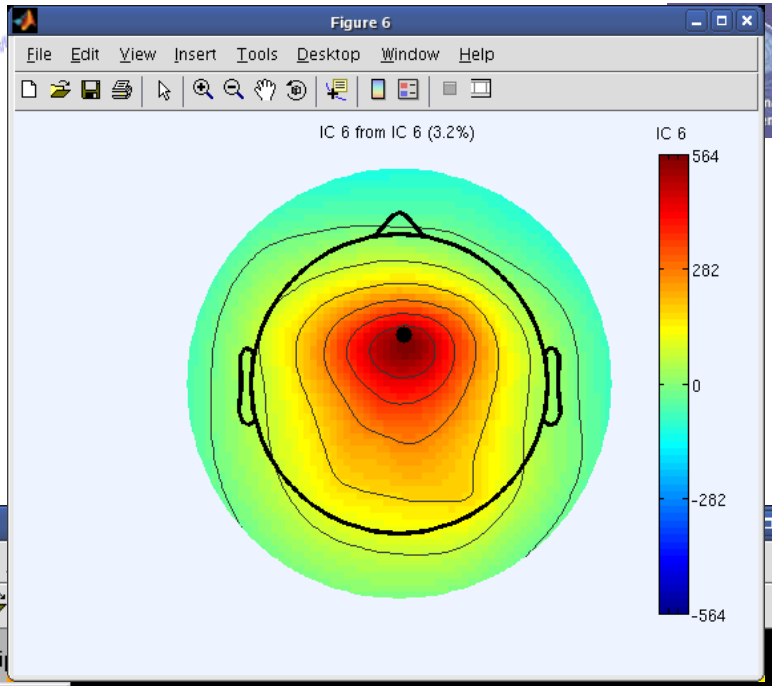


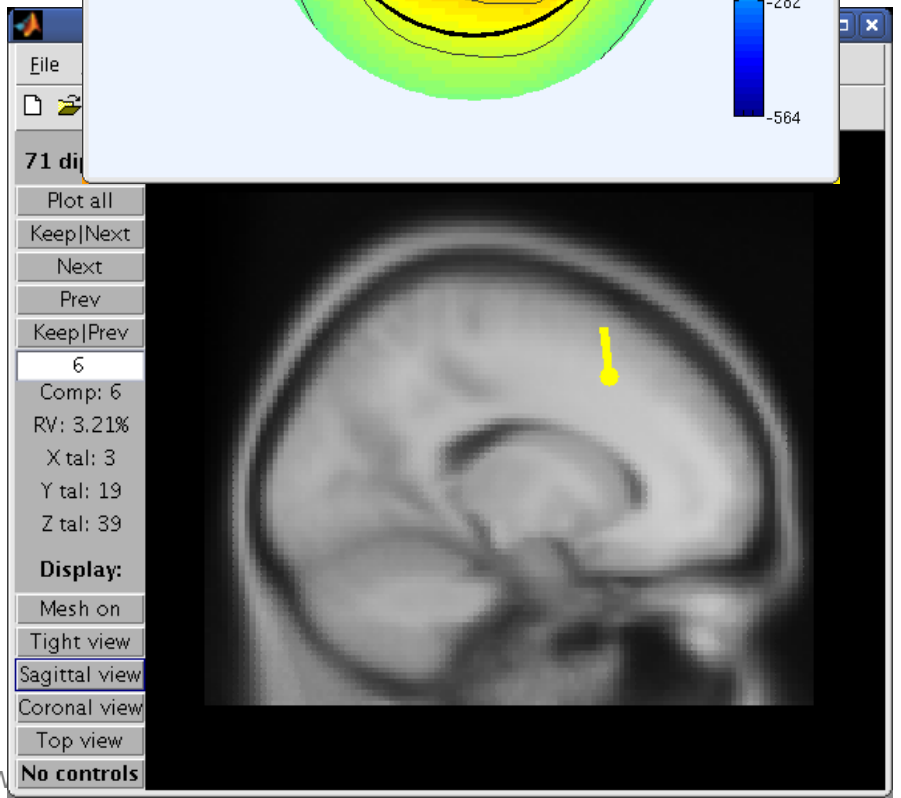




Scroll through dipoles







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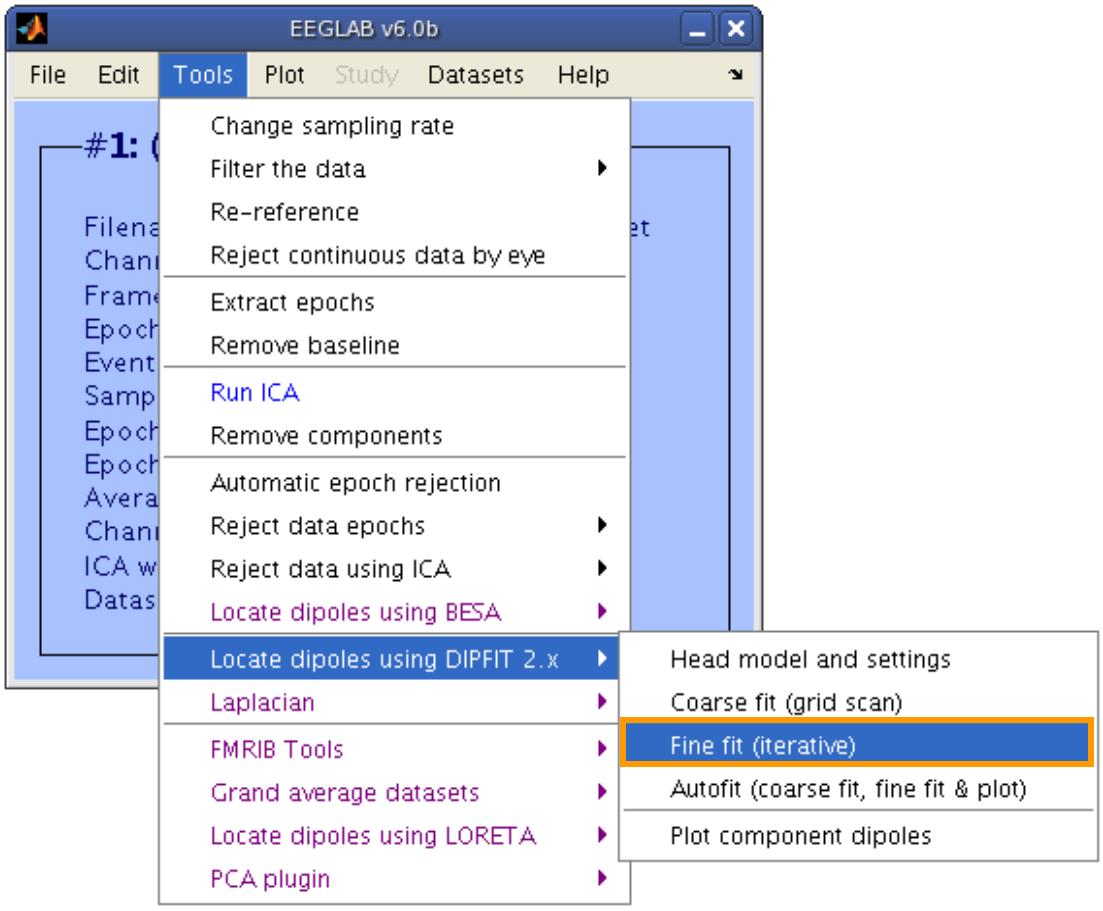
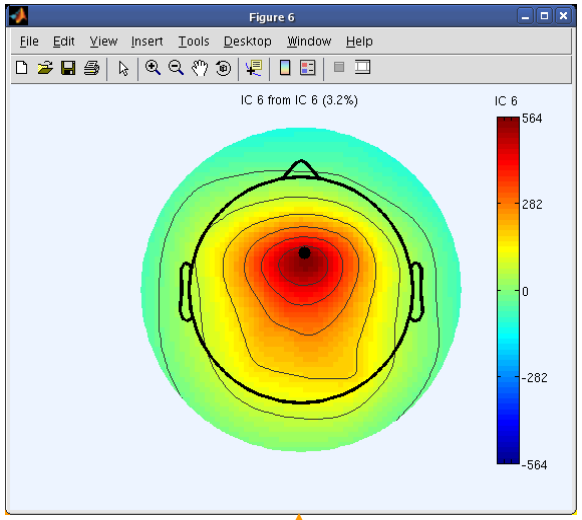
3D *headplot()* co-registration

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%

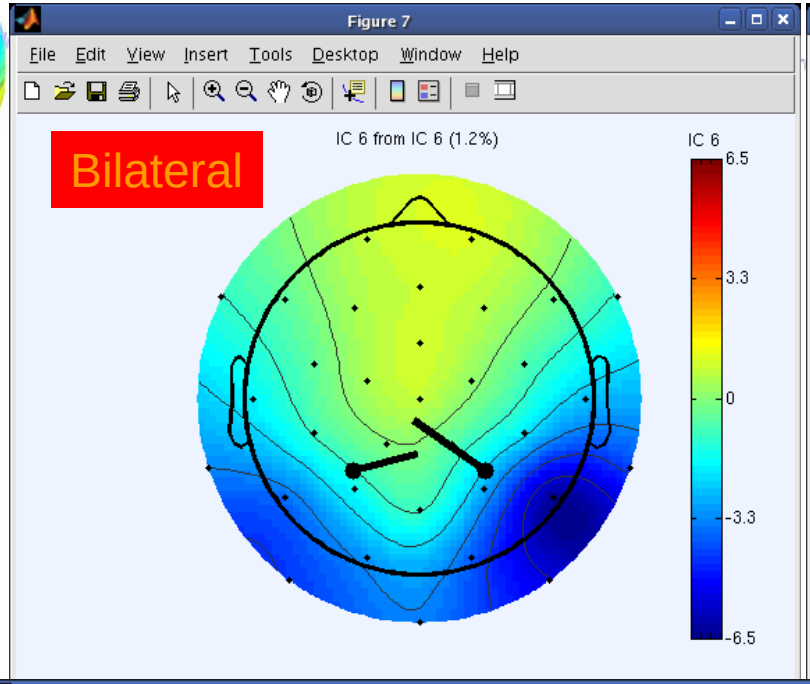
dipole	fit	position	moment	
#1	☑	28.222 -2.401 37.331	2.380 475942.653 3819304.288	Flip (in|out)
#2	☐	0.000 0.000 0.000	0.000 0.000 0.000	Flip (in|out)

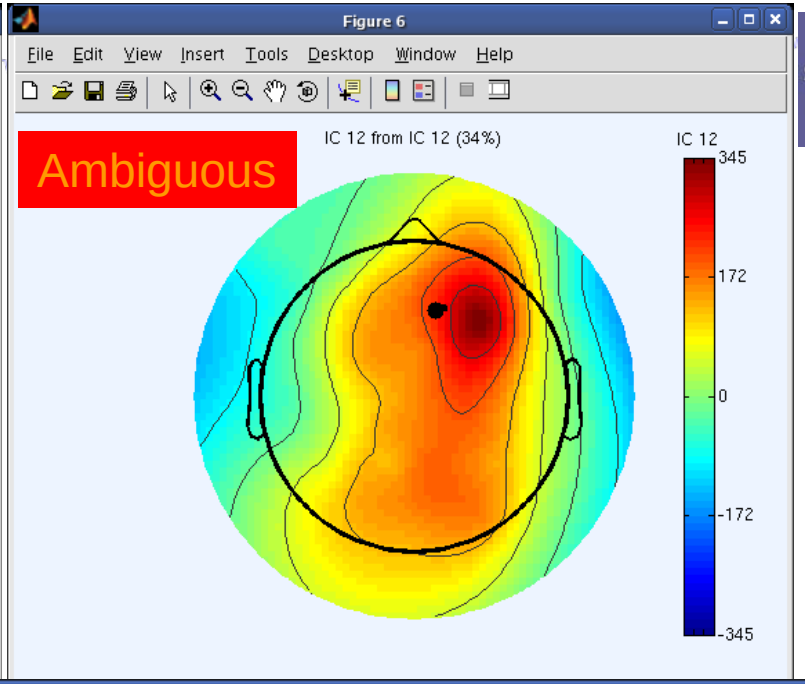
☑ Symmetry constrain for dipole ...

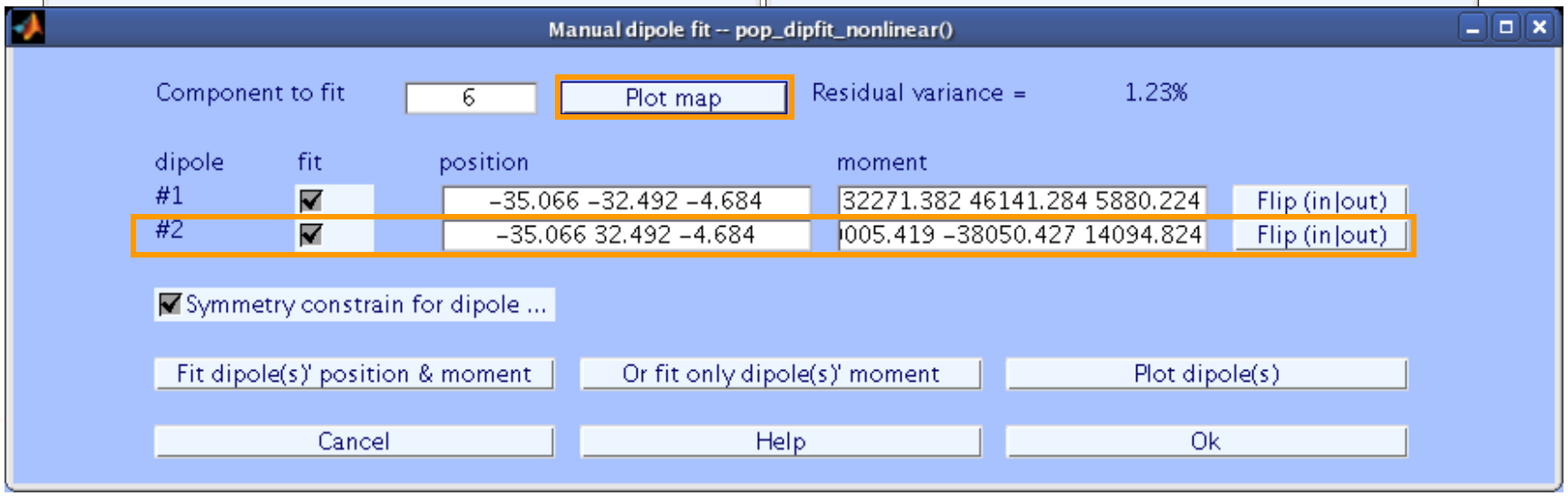
Fit dipole(s)' position & moment | Or fit only dipole(s)' moment | Plot dipole(s)

Cancel | Help | Ok

Bilateral dipoles







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]
```

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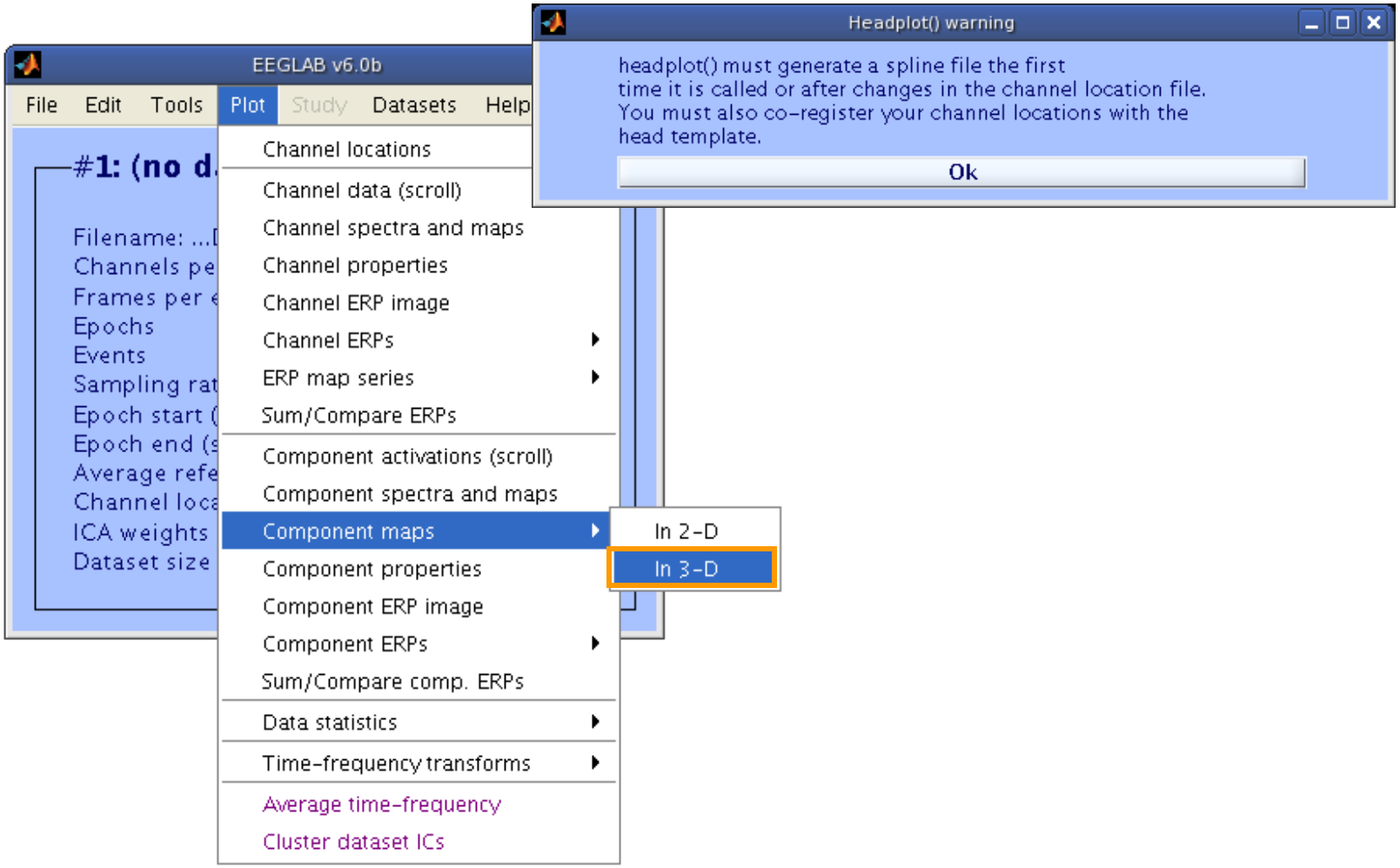
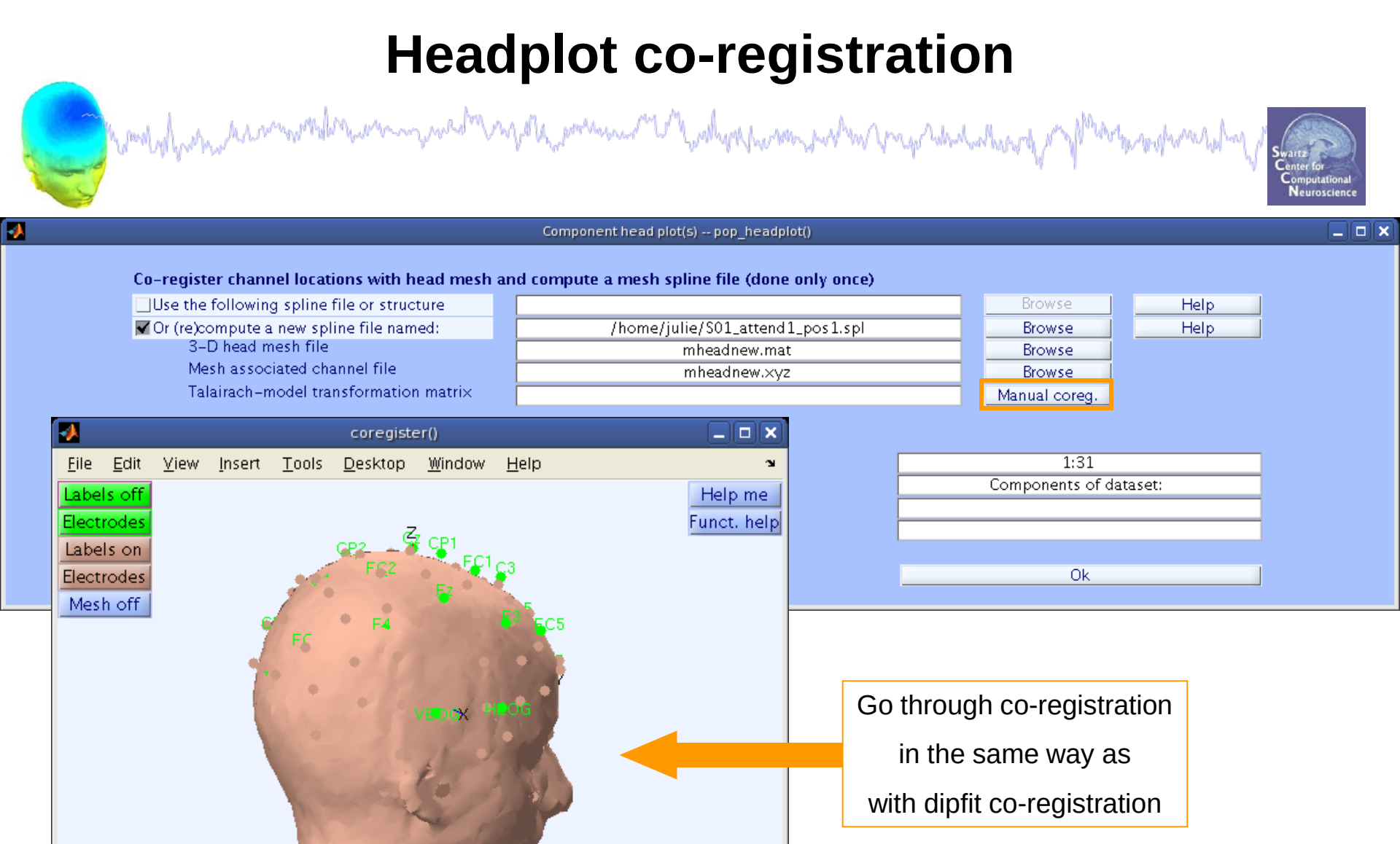
Exercise...

Plot scalp maps in 3D

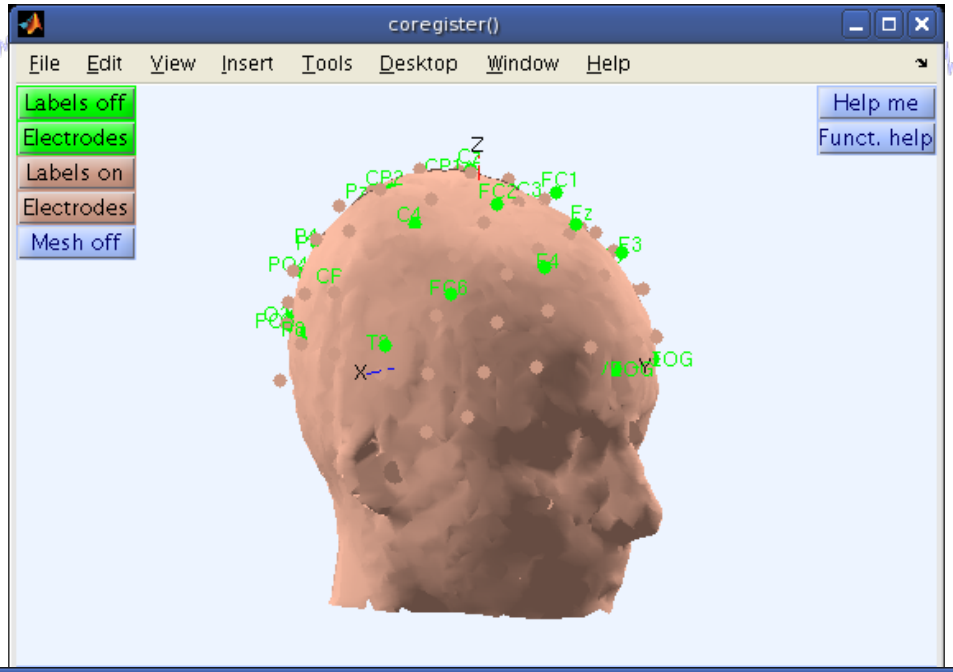


Headplot co-registration



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		Browse	Help
☑ Or (re)compute a new spline file named:	/home/julie/S01_attend1_pos1.spl	Browse	Help
3-D head mesh file	mheadnew.mat	Browse	
Mesh associated channel file	mheadnew.xyz	Browse	
Talairach-model transformation matrix	0 0 -1.570796 100 76 90.87264	Manual coreg.	

Plot interpolated activity onto 3-D head

Component numbers to plot (negative numbers invert comp. polarities): 1:31

Plot title: Components of dataset:

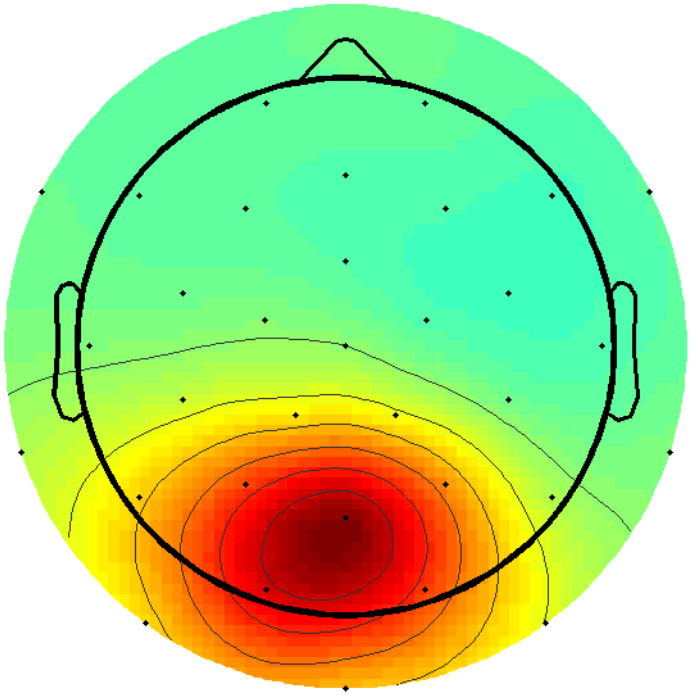
Plot geometry (rows,columns): (Default [] = near square)

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

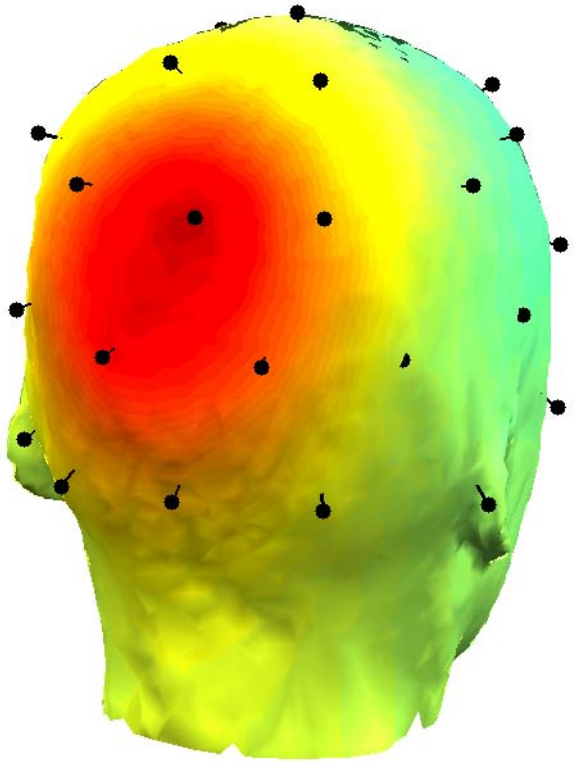
Cancel Ok

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?