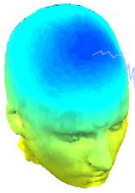
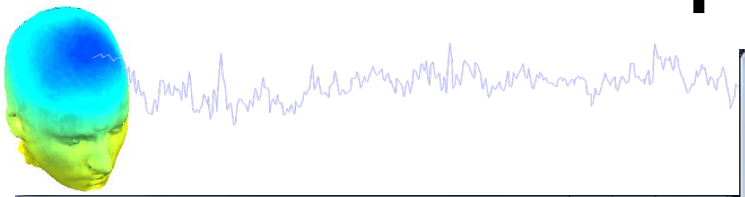
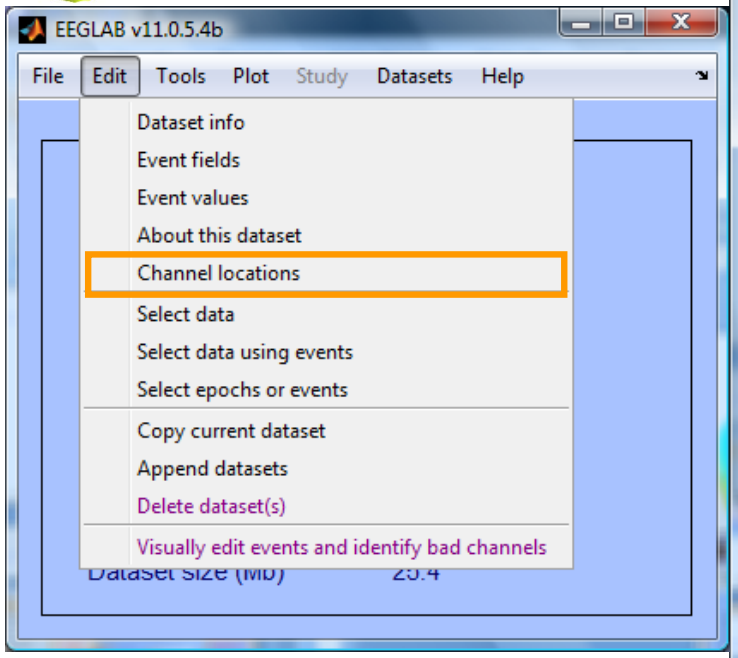
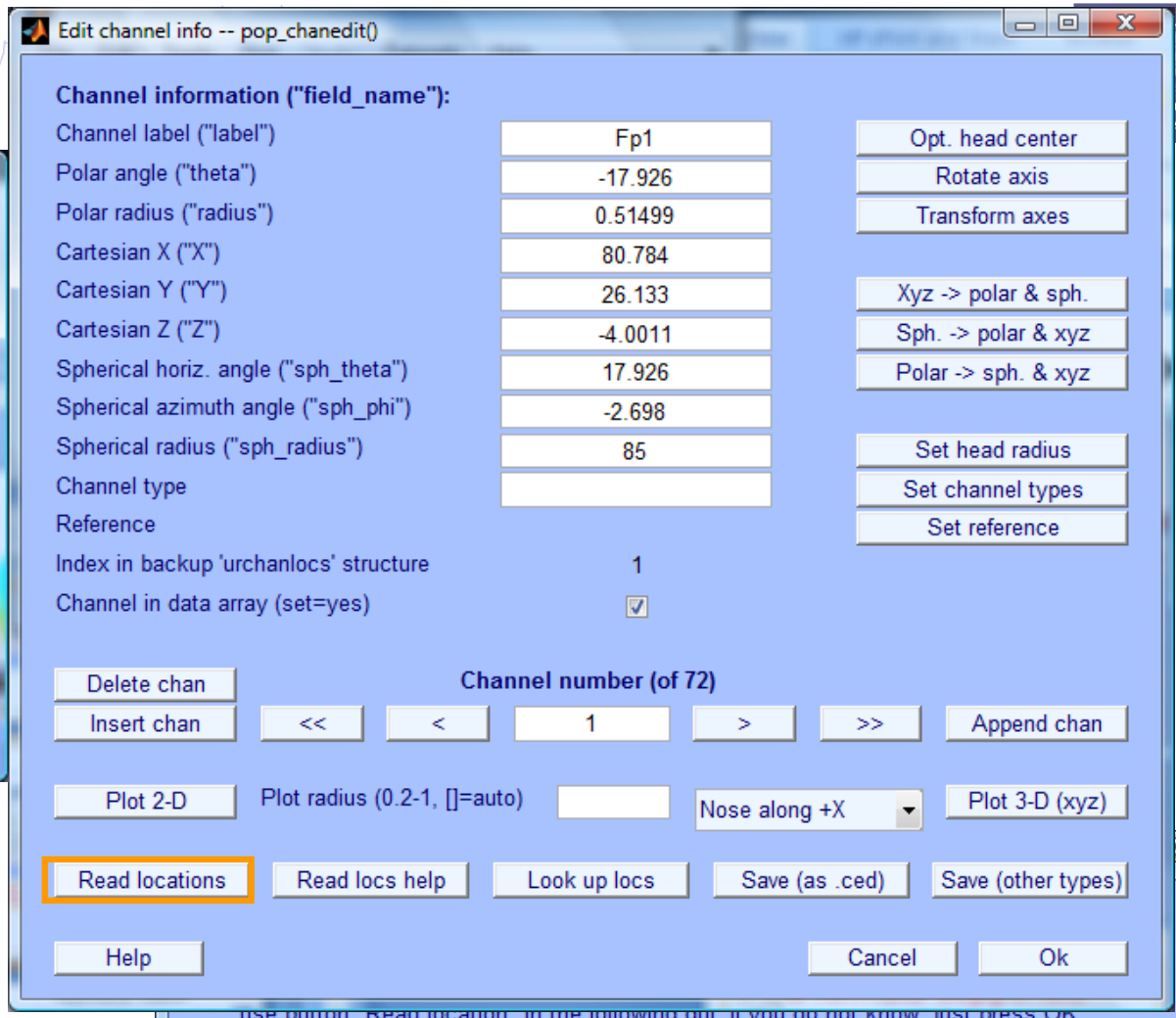


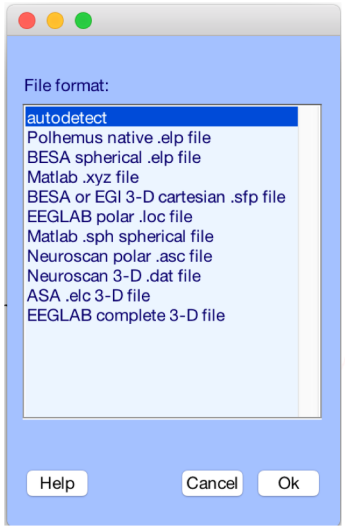
Channel coordinates and source localization

Import channel locations

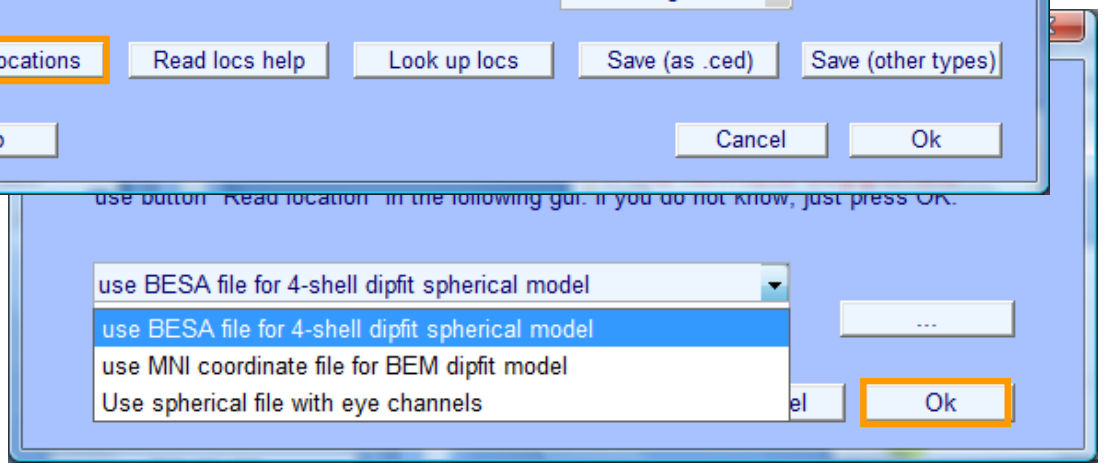


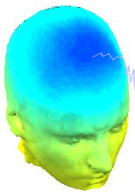






10 file formats supported (Polhemus, BESA, …)





Edit channel info -- pop_chanedit()

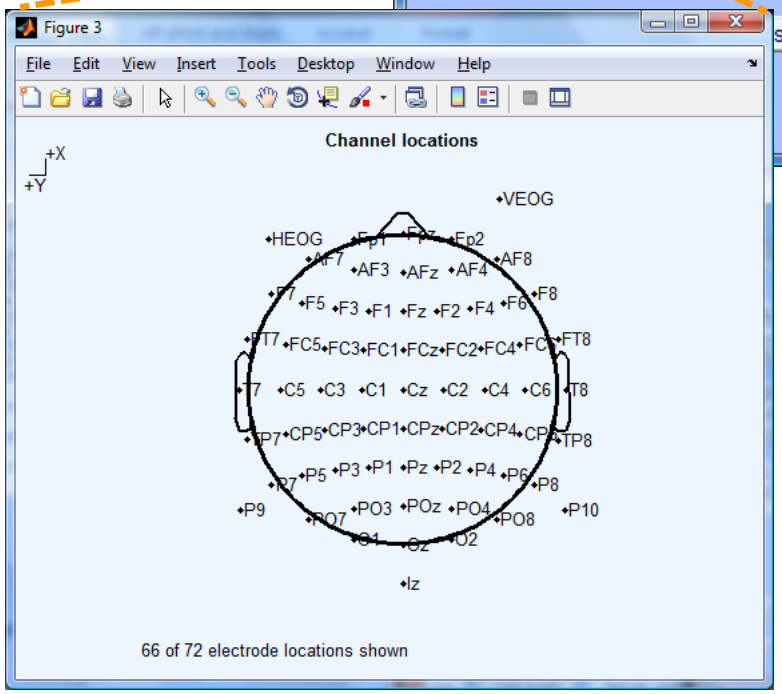
Channel information ("field_name"):

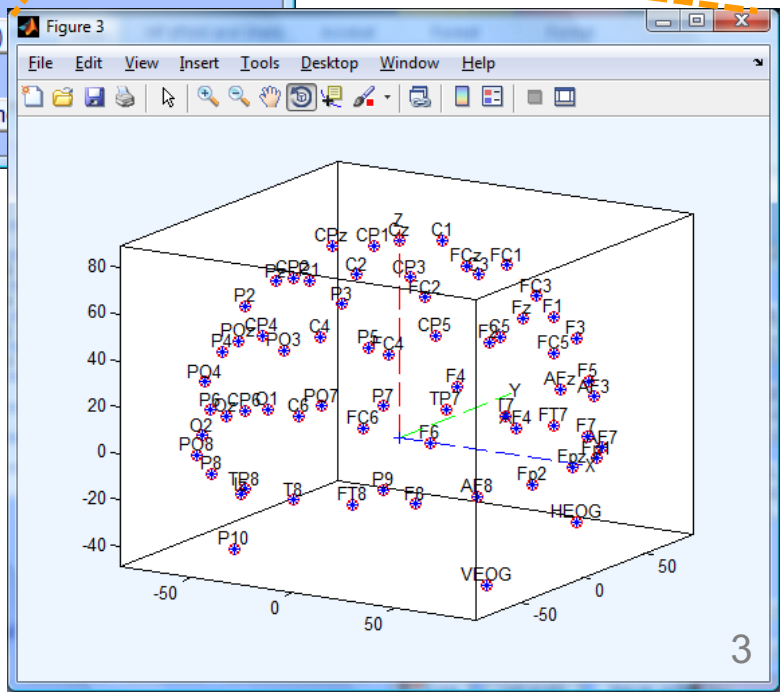
Channel label ("label")	HEOG	Opt. head center
Polar angle ("theta")	-42	Rotate axis
Polar radius ("radius")	0.65556	Transform axes
Cartesian X ("X")	55.7734	
Cartesian Y ("Y")	50.2186	Xyz -> polar & sph.
Cartesian Z ("Z")	-39.9051	Sph. -> polar & xyz
Spherical horiz. angle ("sph_theta")	42	Polar -> sph. & xyz
Spherical azimuth angle ("sph_phi")	-28	
Spherical radius ("sph_radius")	85	Set head radius
Channel type		Set channel types
Reference		Set reference
Index in backup 'urchanlocs' structure	68	
Channel in data array (set=yes)	☑	

Delete chan | Insert chan | **Channel number (of 72)** | << | < | 68 | > | >> | Append chan

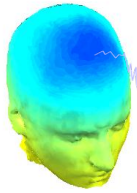
Plot 2-D | Plot radius (0.2-1, []=auto) | | Nose along +X | Plot 3-D (xyz)

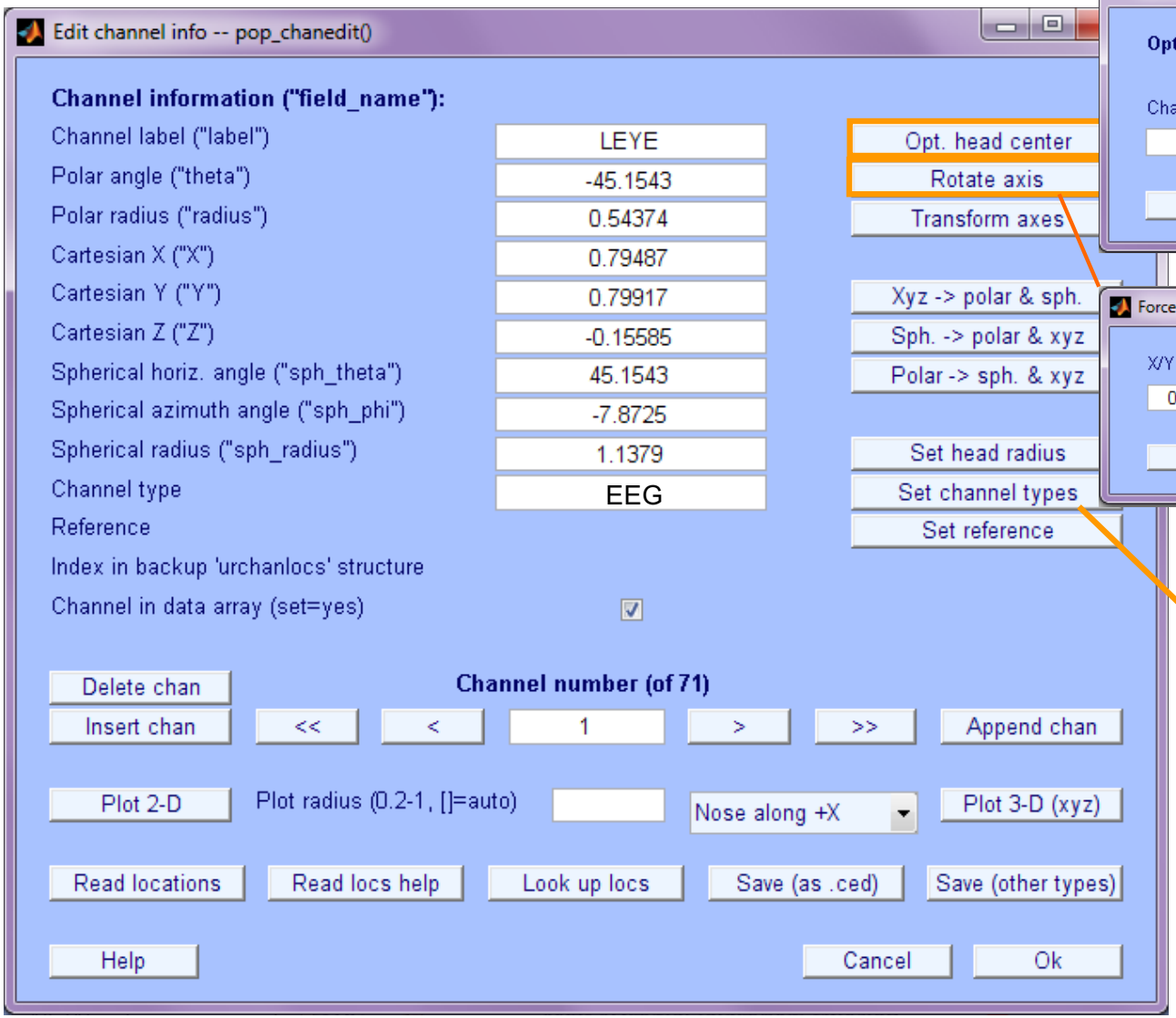
s help | Look up locs | Save (as .ced) | Can

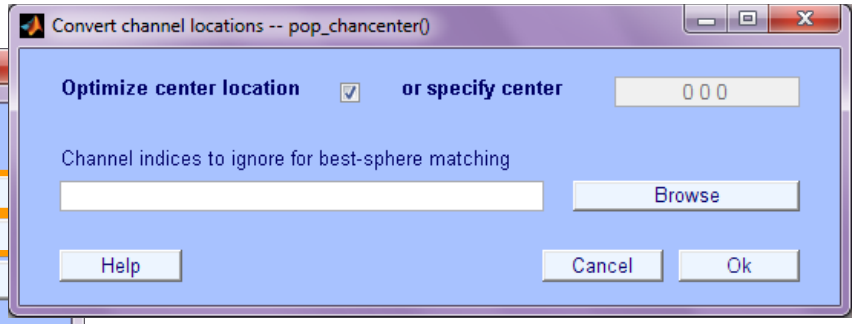


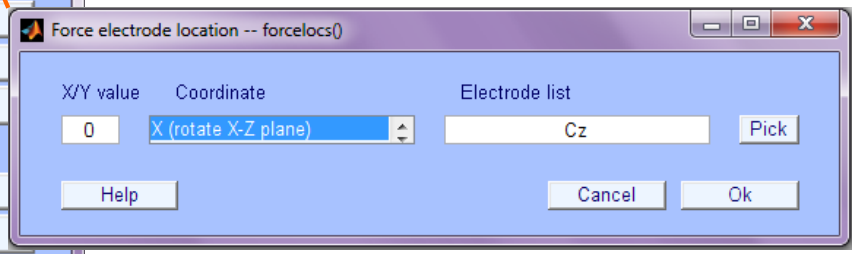


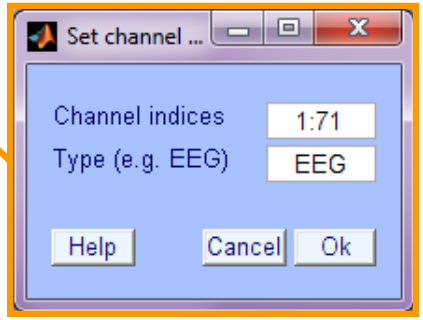
Import channel locations



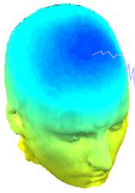






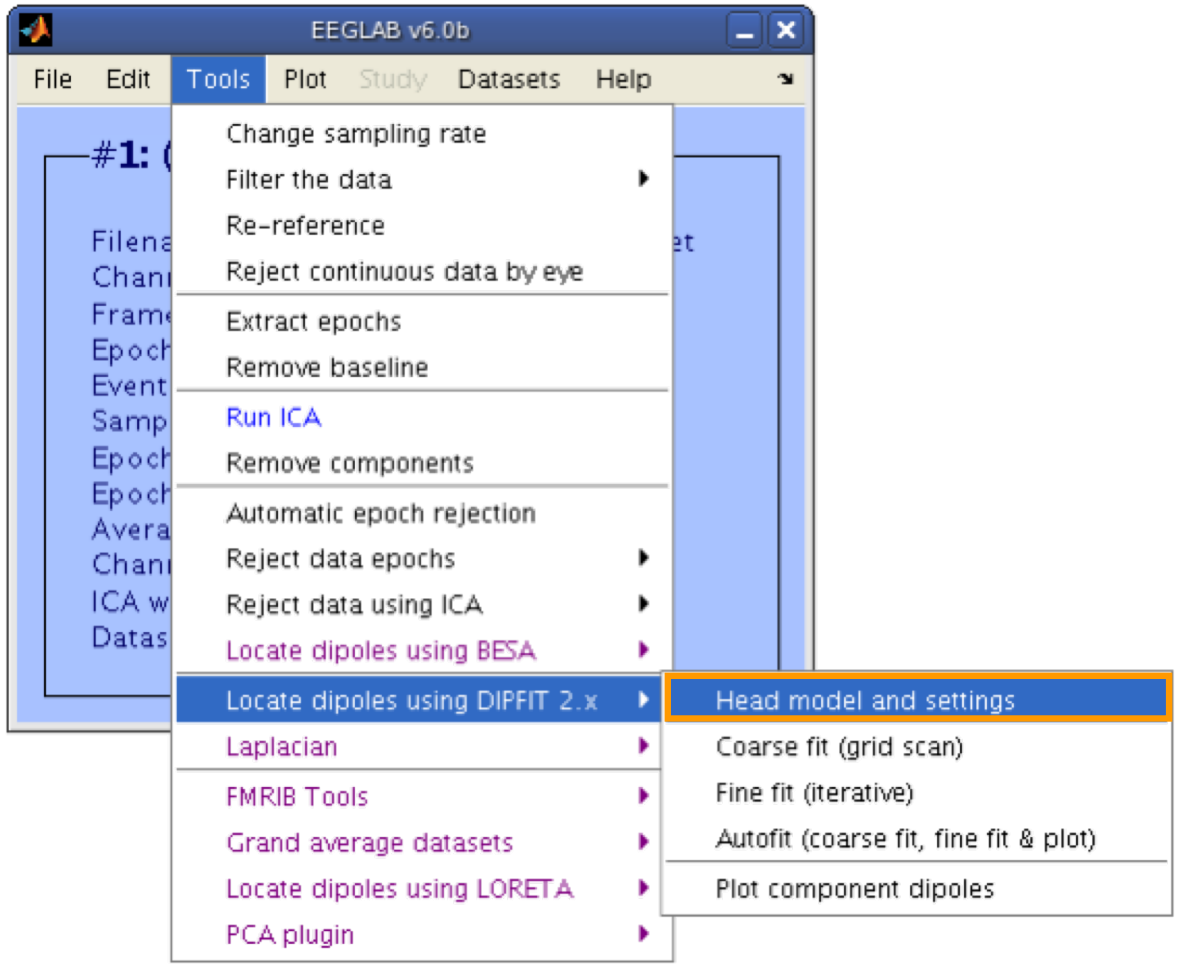


DIPFIT and model co-registration

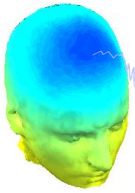


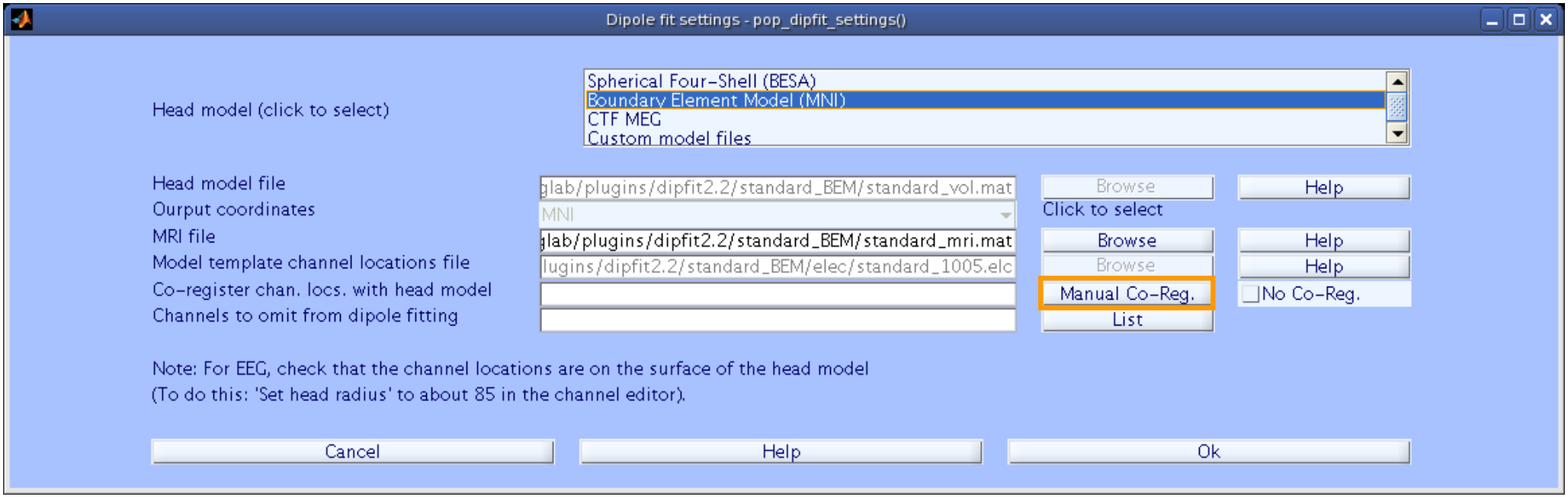
1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration

Finding dipole locations using DIPFIT in EEGLAB

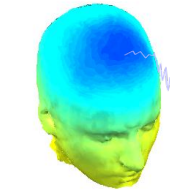


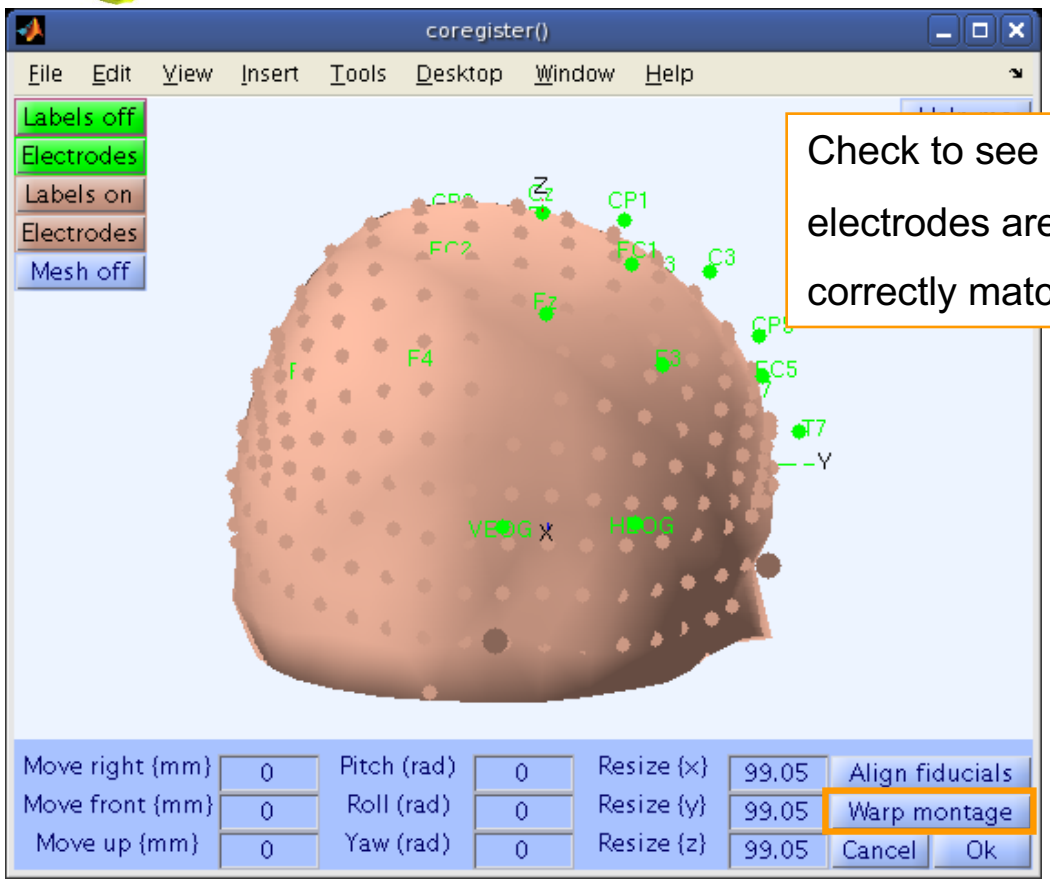
Co-register to model



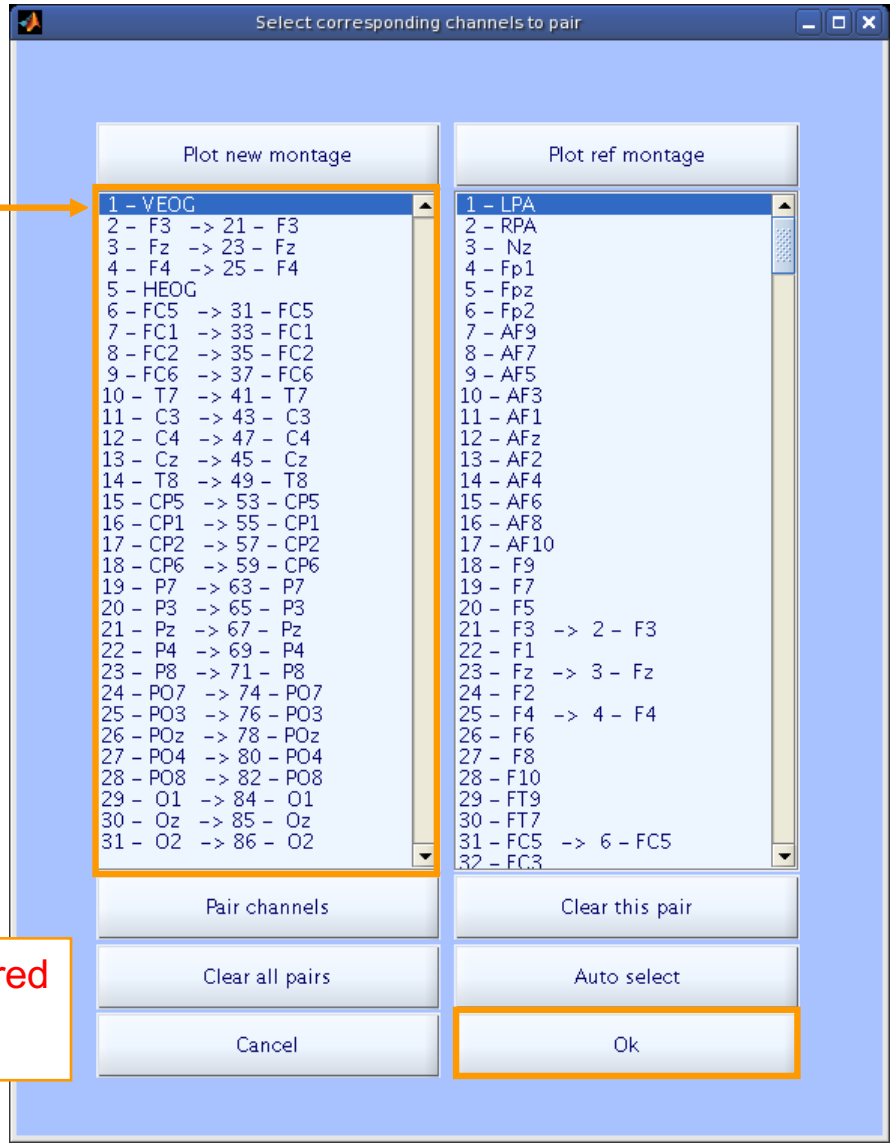


Alternatively, warp to standard montage



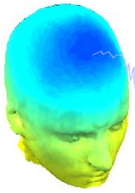


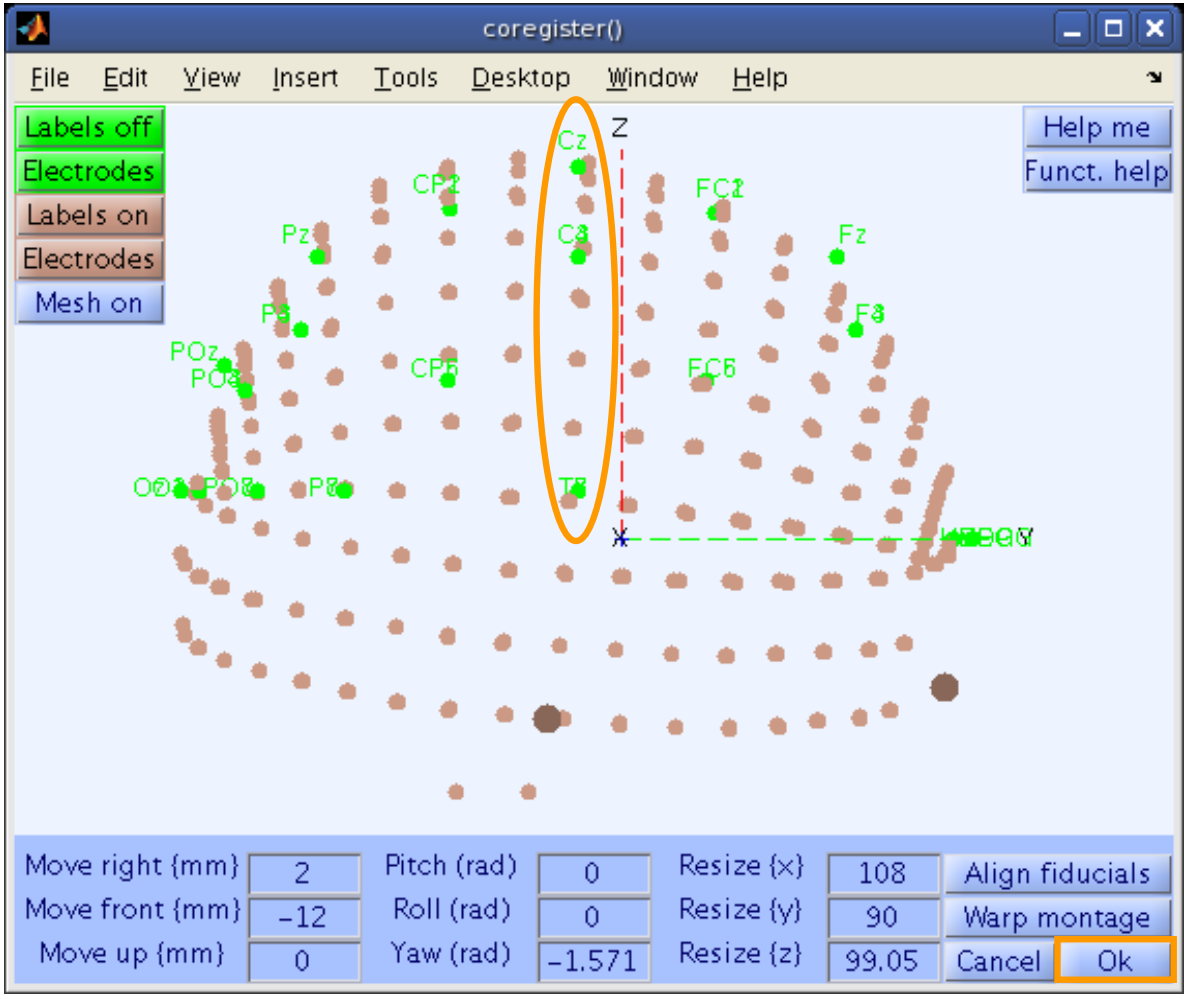
Check to see that electrodes are correctly matched



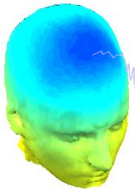
stats toolbox required for warping

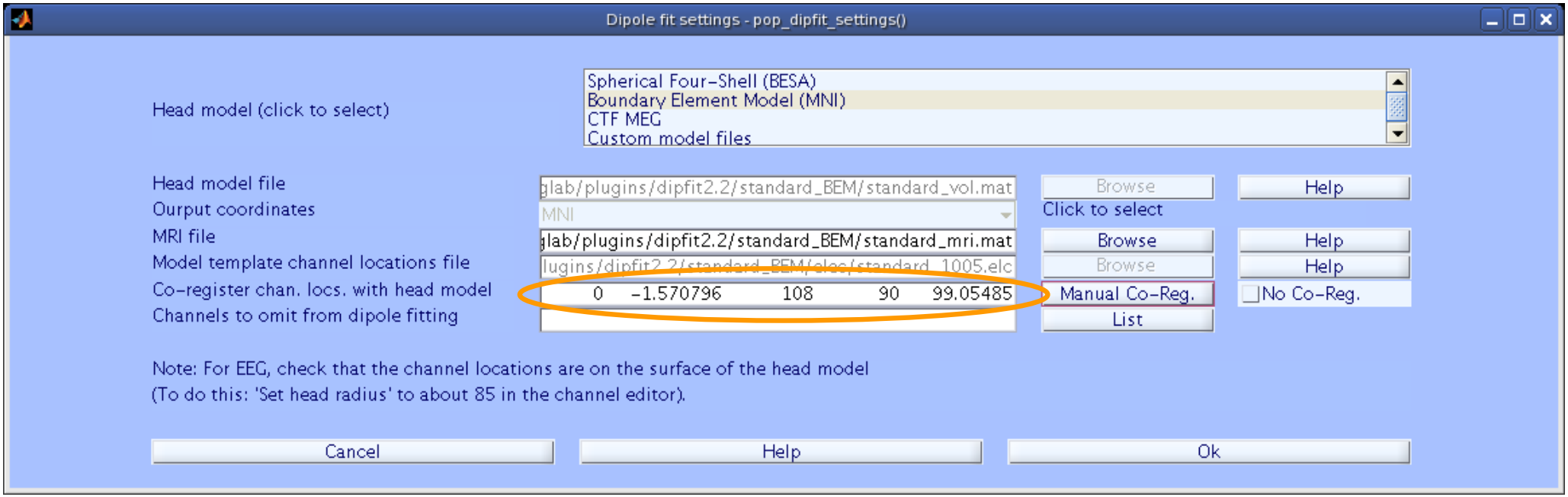
Check coregistration with model



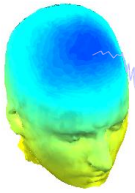


Confirm electrode transformation



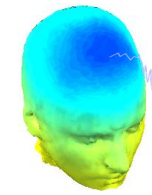


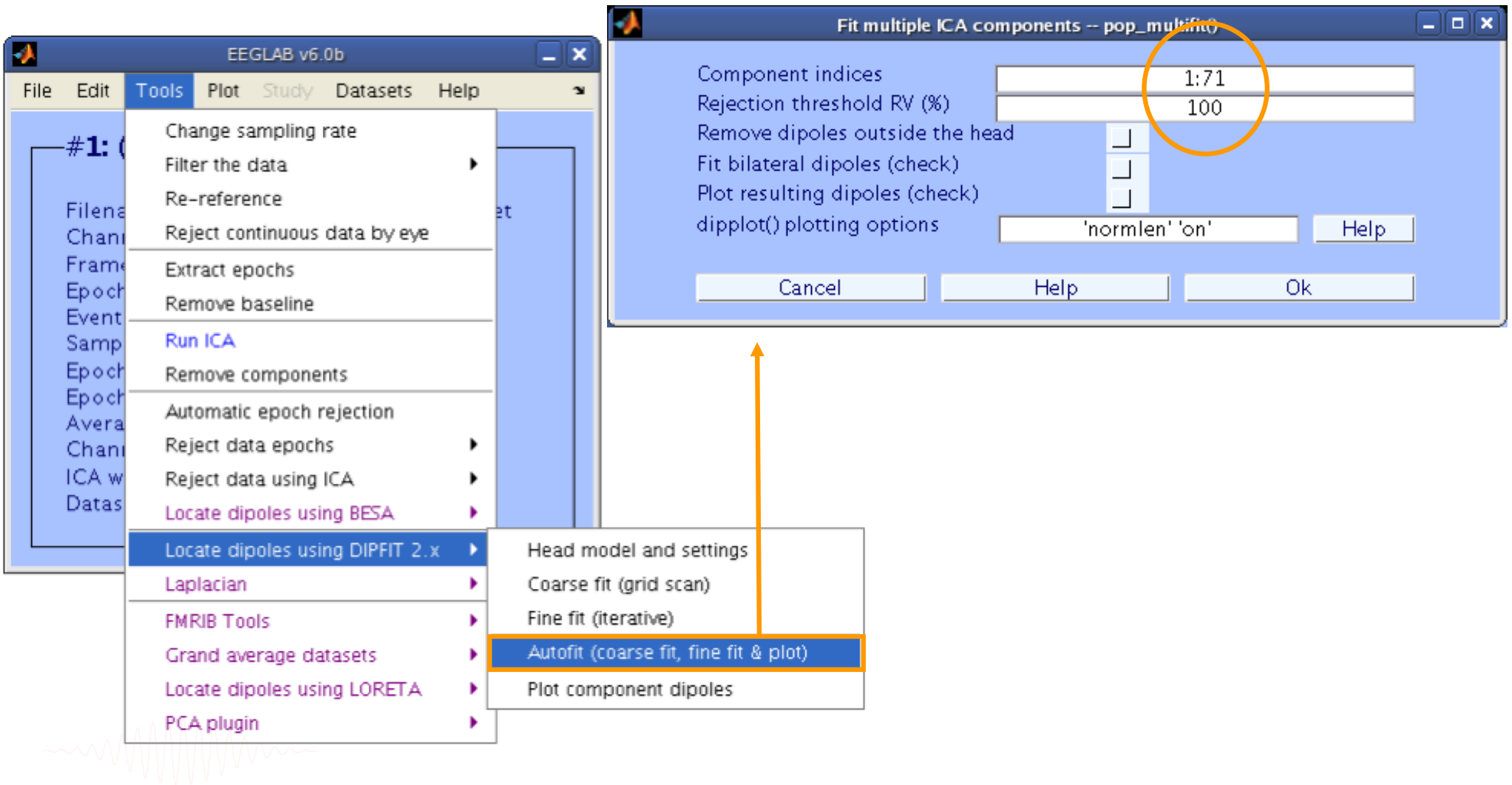
DIPFIT and model co-registration



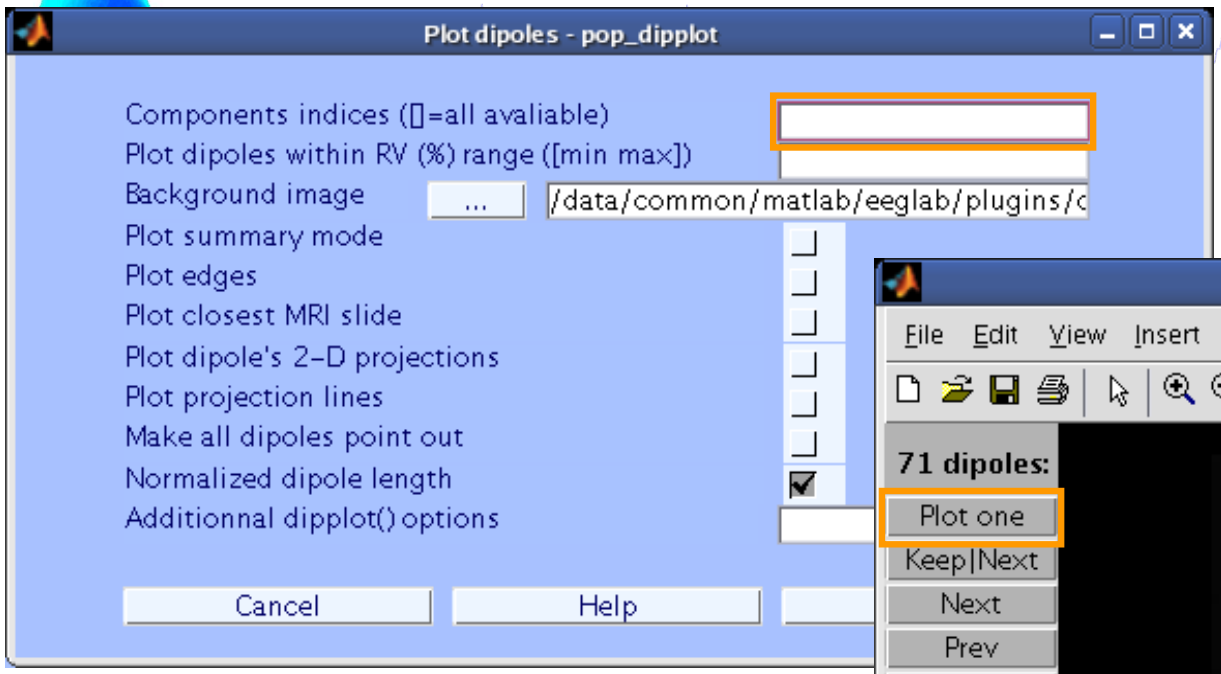
1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration

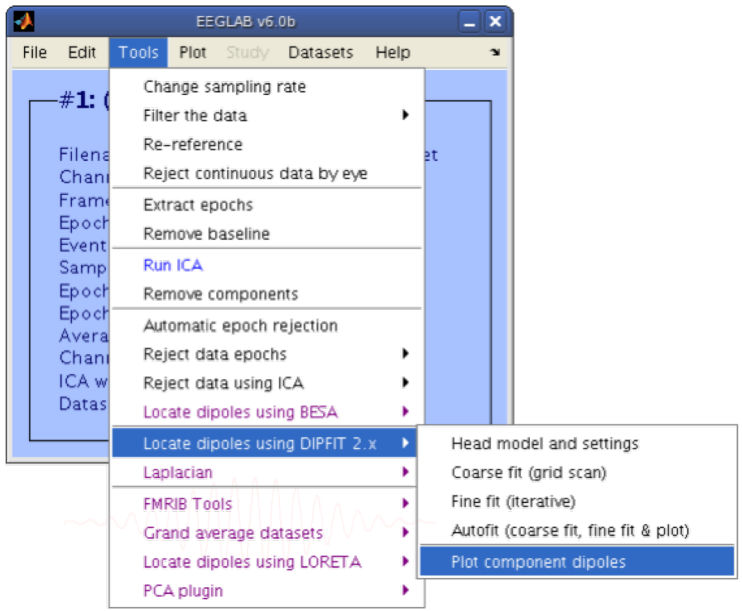
Autofit equivalent dipoles

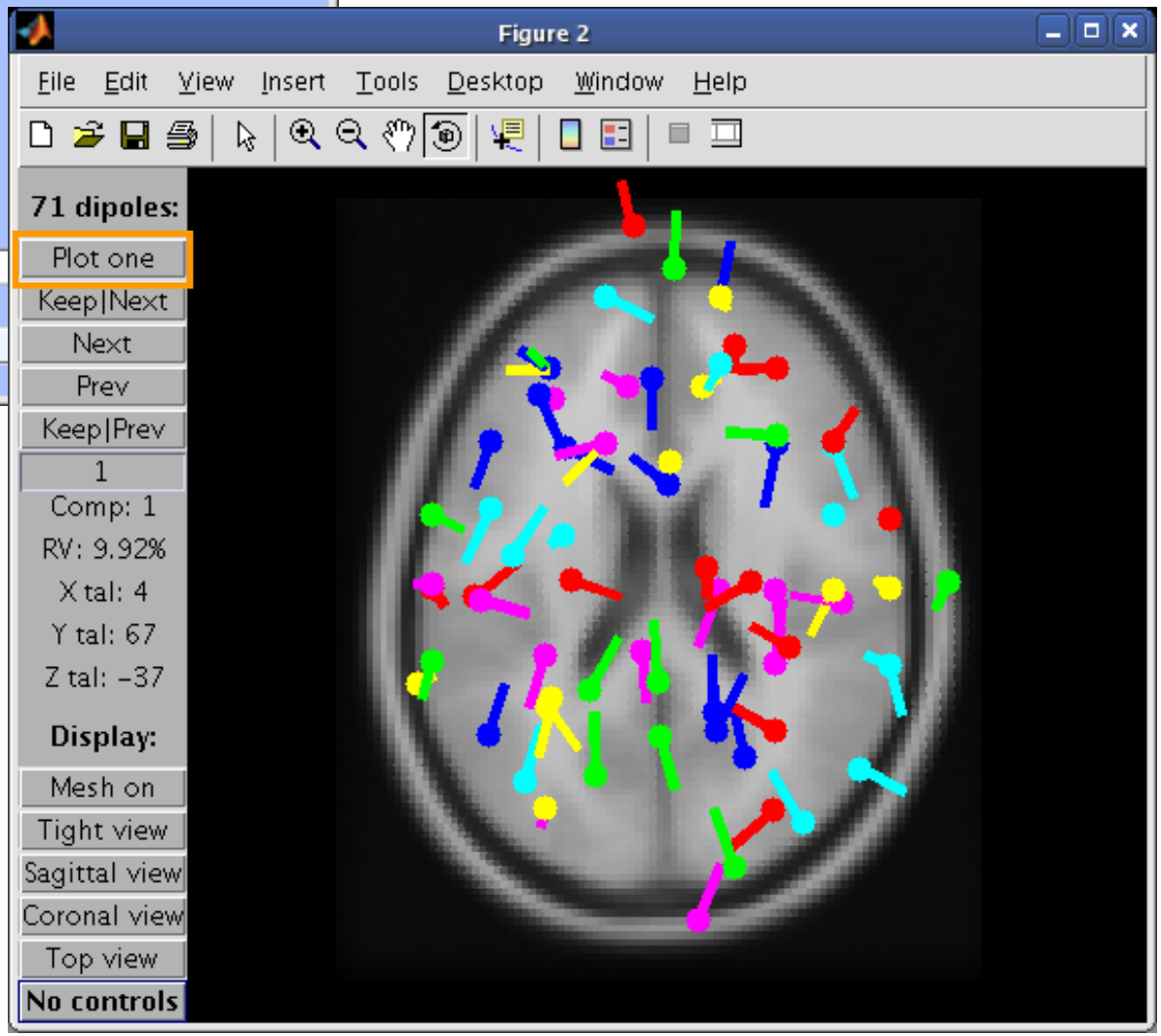




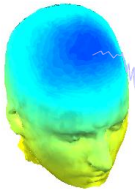
Plot dipoles

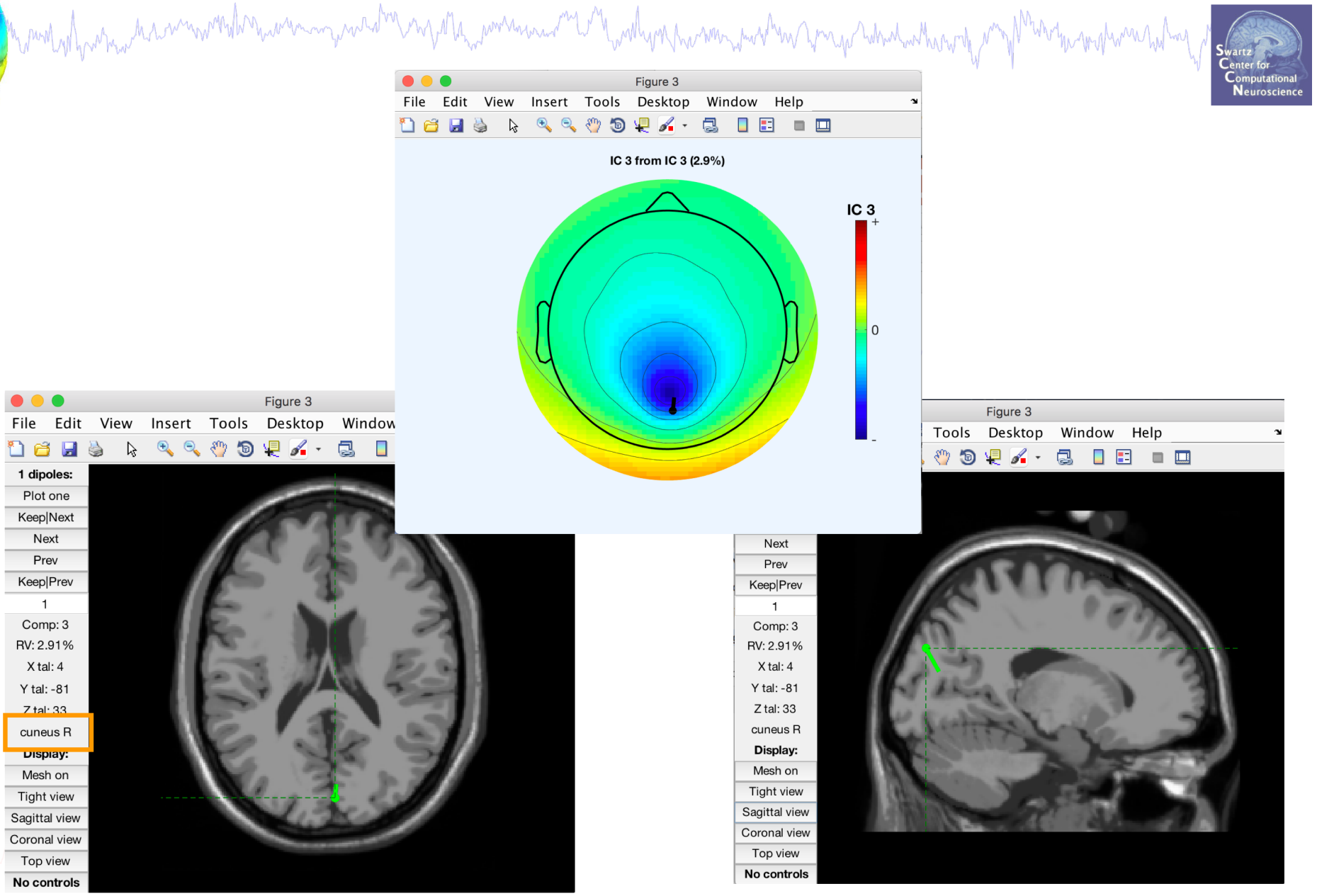




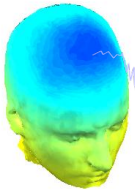


Scroll through dipoles



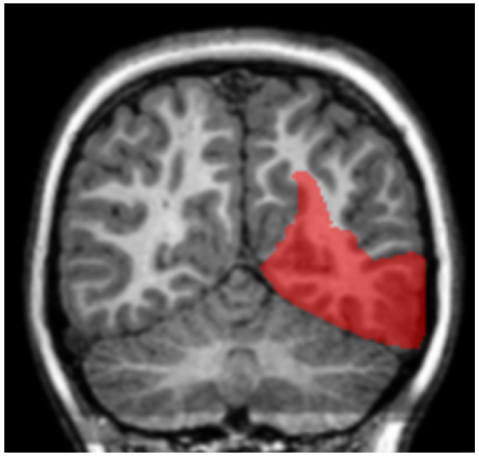


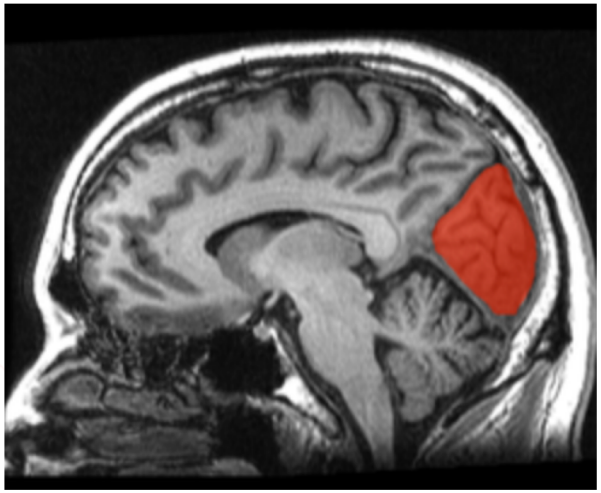
Desikan-Killiany Atlas



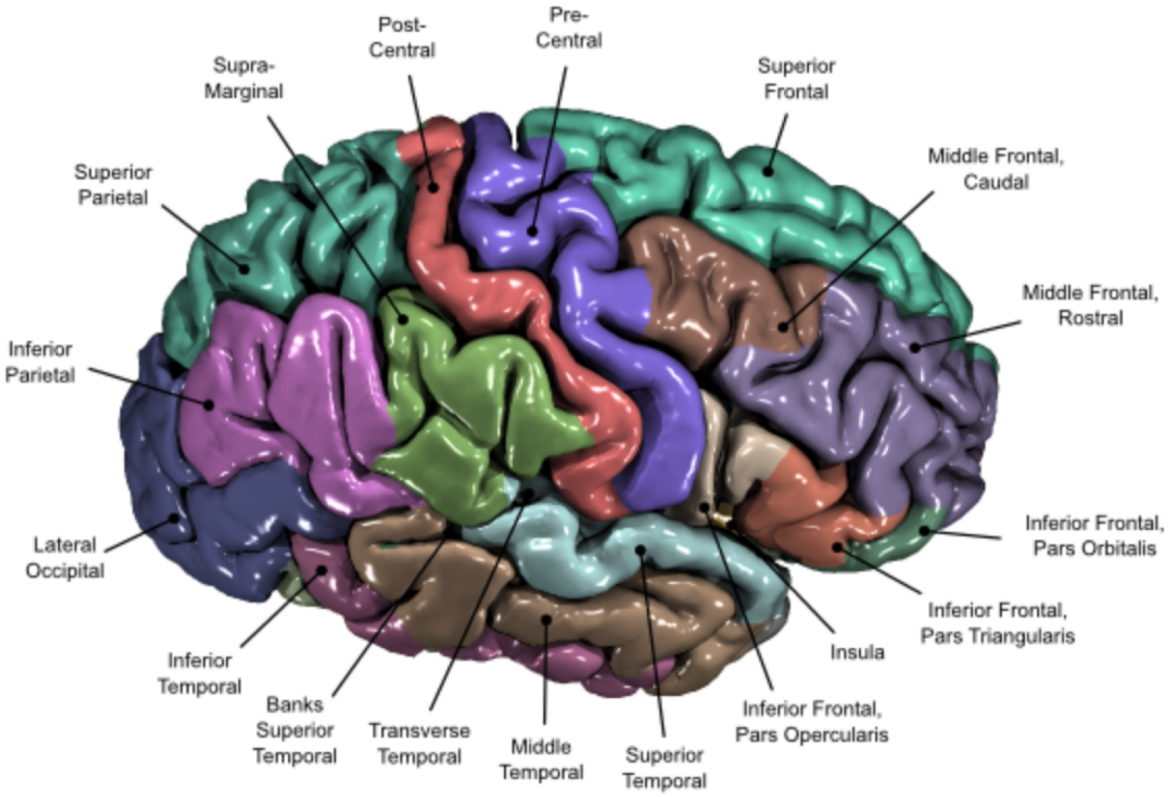
Swartz Center for Computational Neuroscience

Right Cuneus

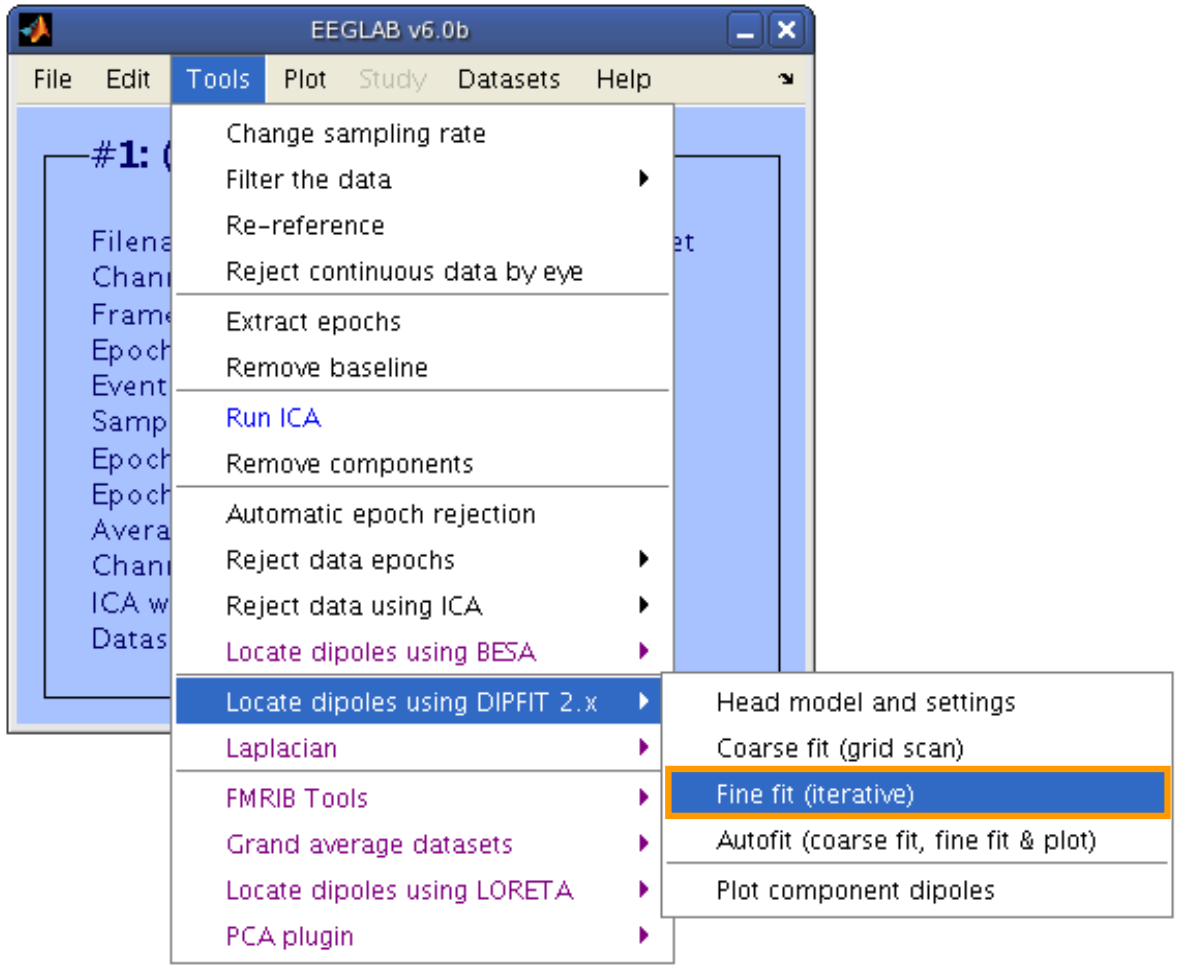




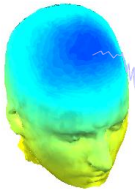
68 brain areas

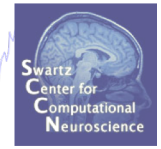


Fine fit options in DIPFIT



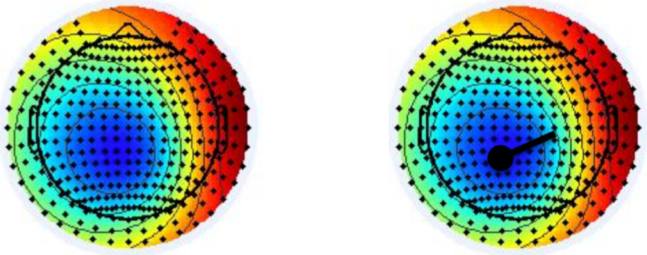
Computing residual variance





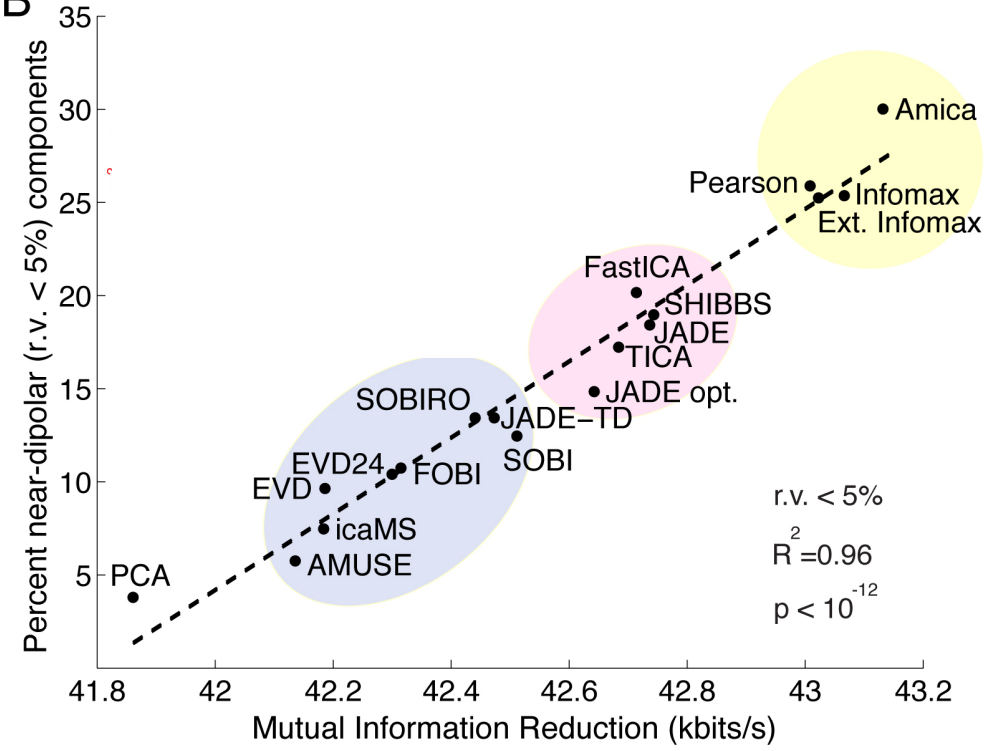
Actual

Dipole projection

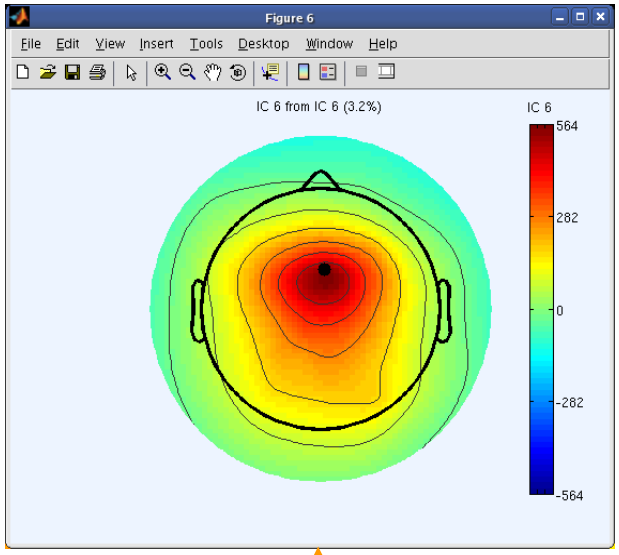


$$r = \Sigma(x_i - \tilde{x}_i)^2 / \Sigma x_i^2$$

B



Fine fit menu



Manual dipole fit -- pop_dipfit_nonlinear()

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

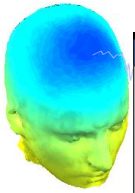
dipole	fit	position	moment	
#1	☑	28.222 -2.401 37.331	2.380 475942.653 3819304.288	Flip (in|out)
#2	☐	0.000 0.000 0.000	0.000 0.000 0.000	Flip (in|out)

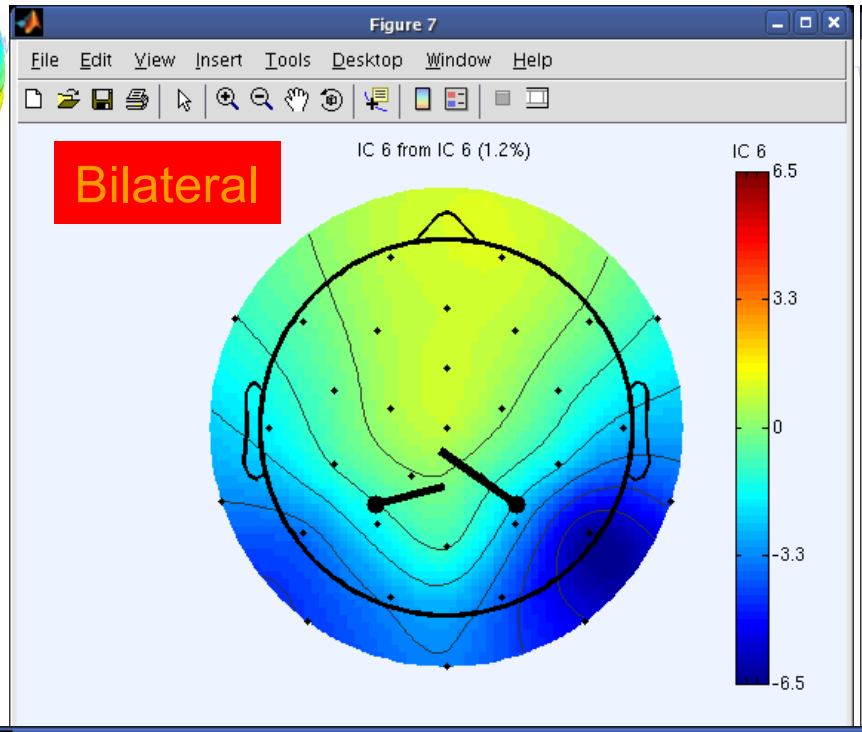
☑ Symmetry constrain for dipole ...

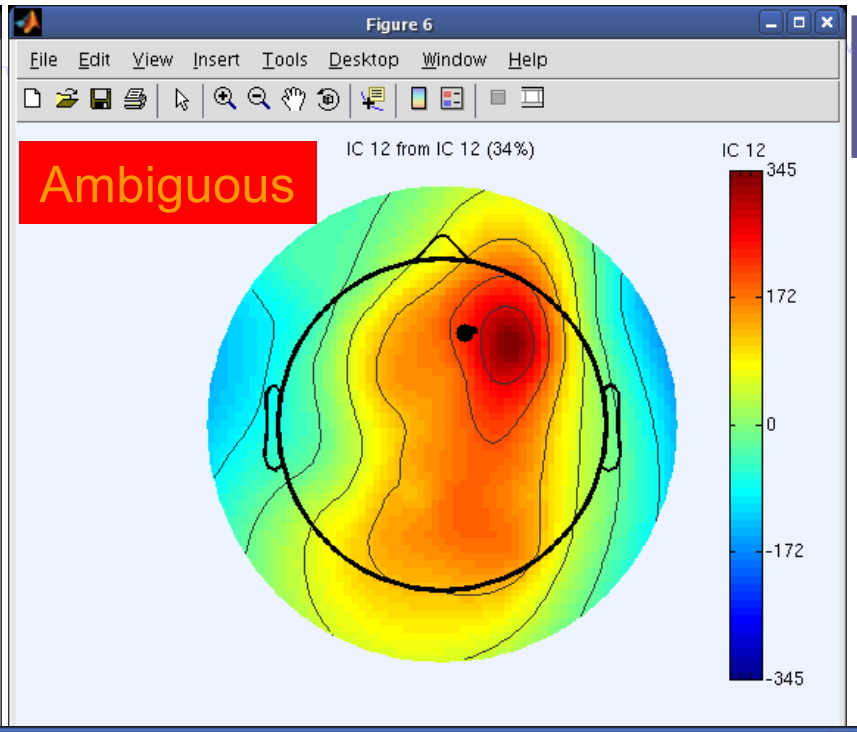
Fit dipole(s)' position & moment | Or fit only dipole(s)' moment | Plot dipole(s)

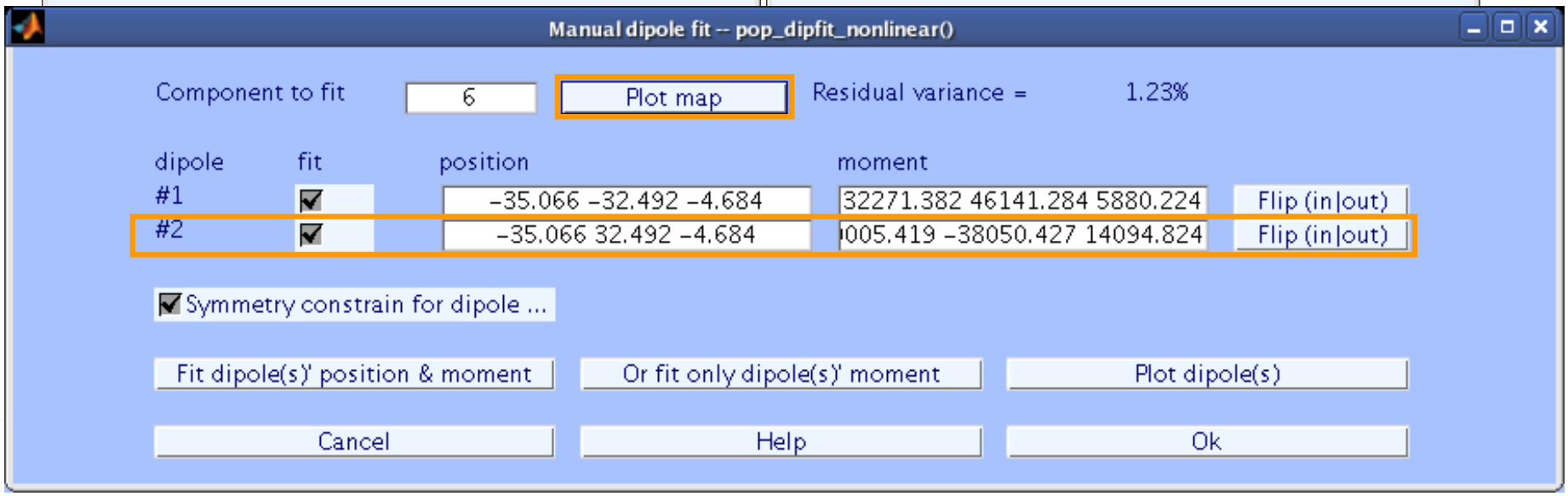
Cancel | Help | Ok

Bilateral dipoles

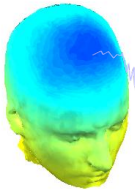


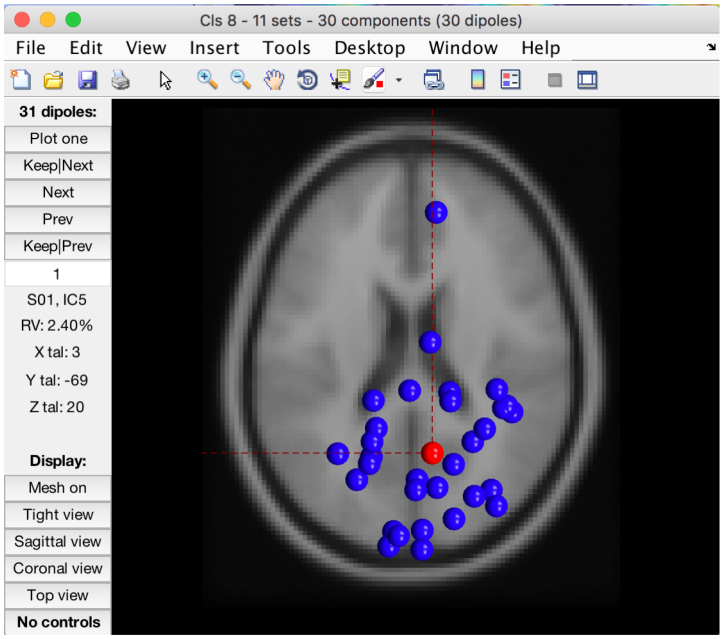


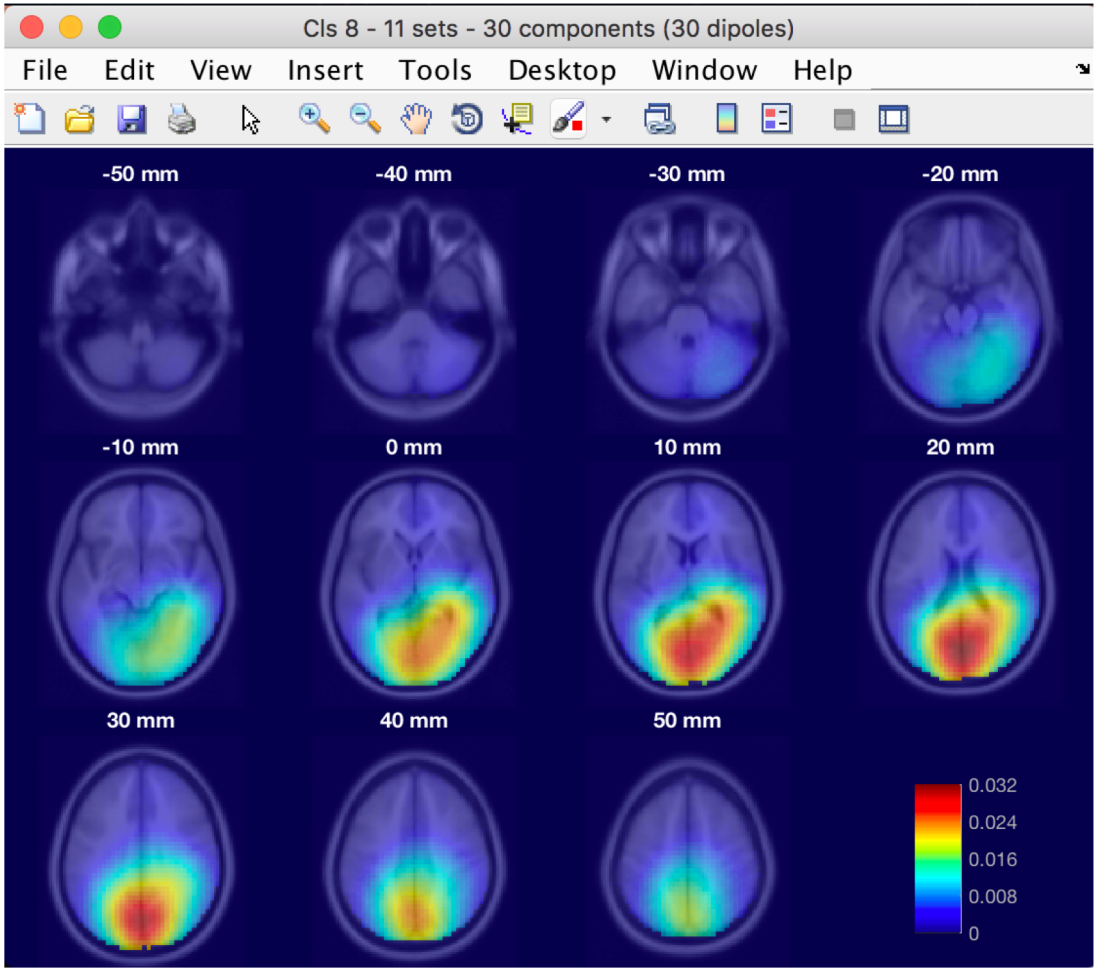




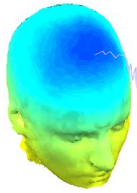
Visualizing ICA component clusters

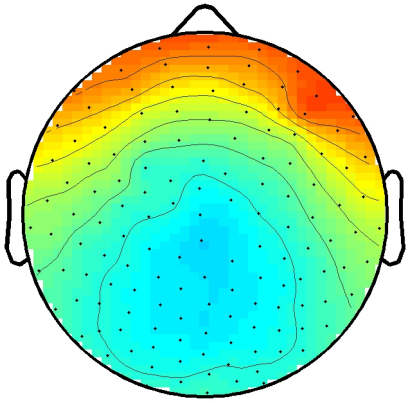


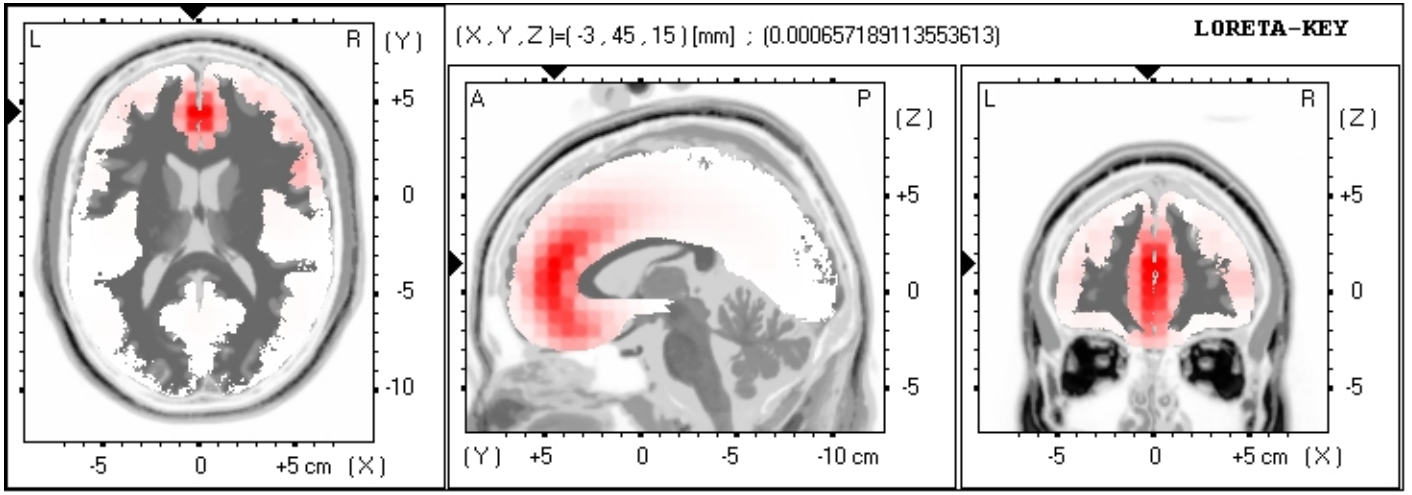


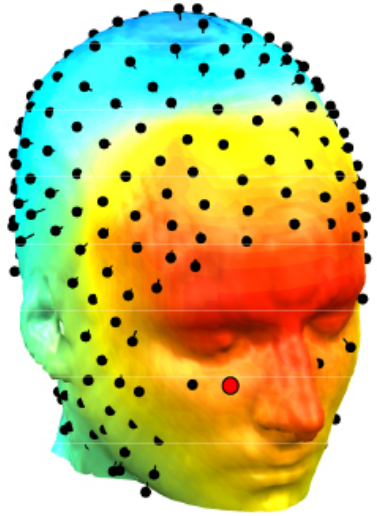


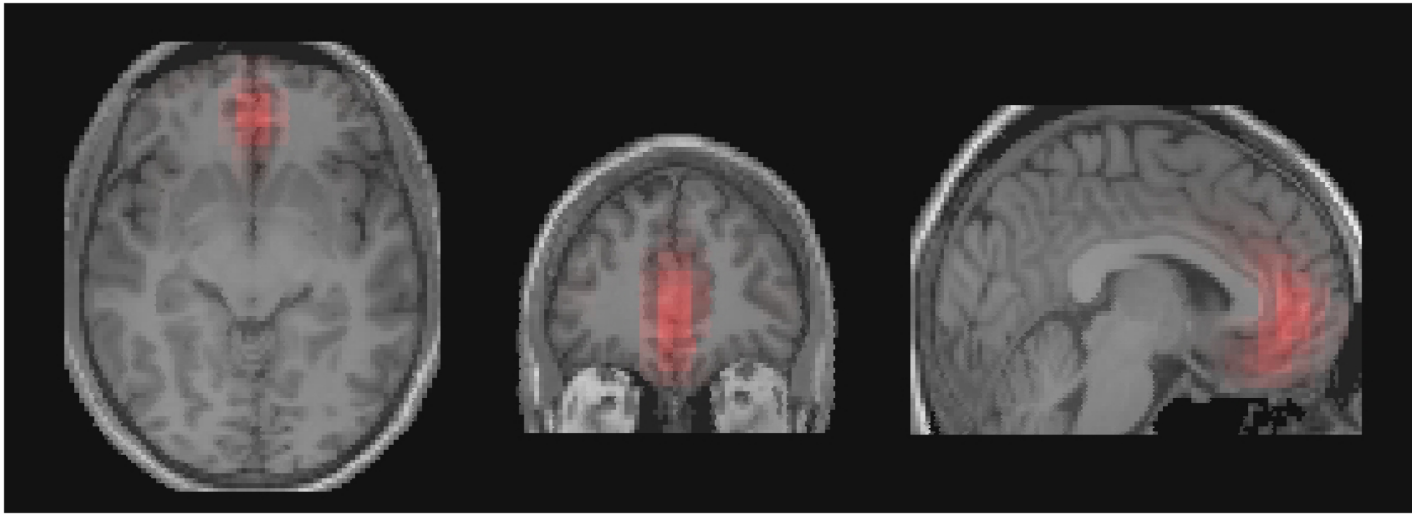
Localization of activity using Loreta



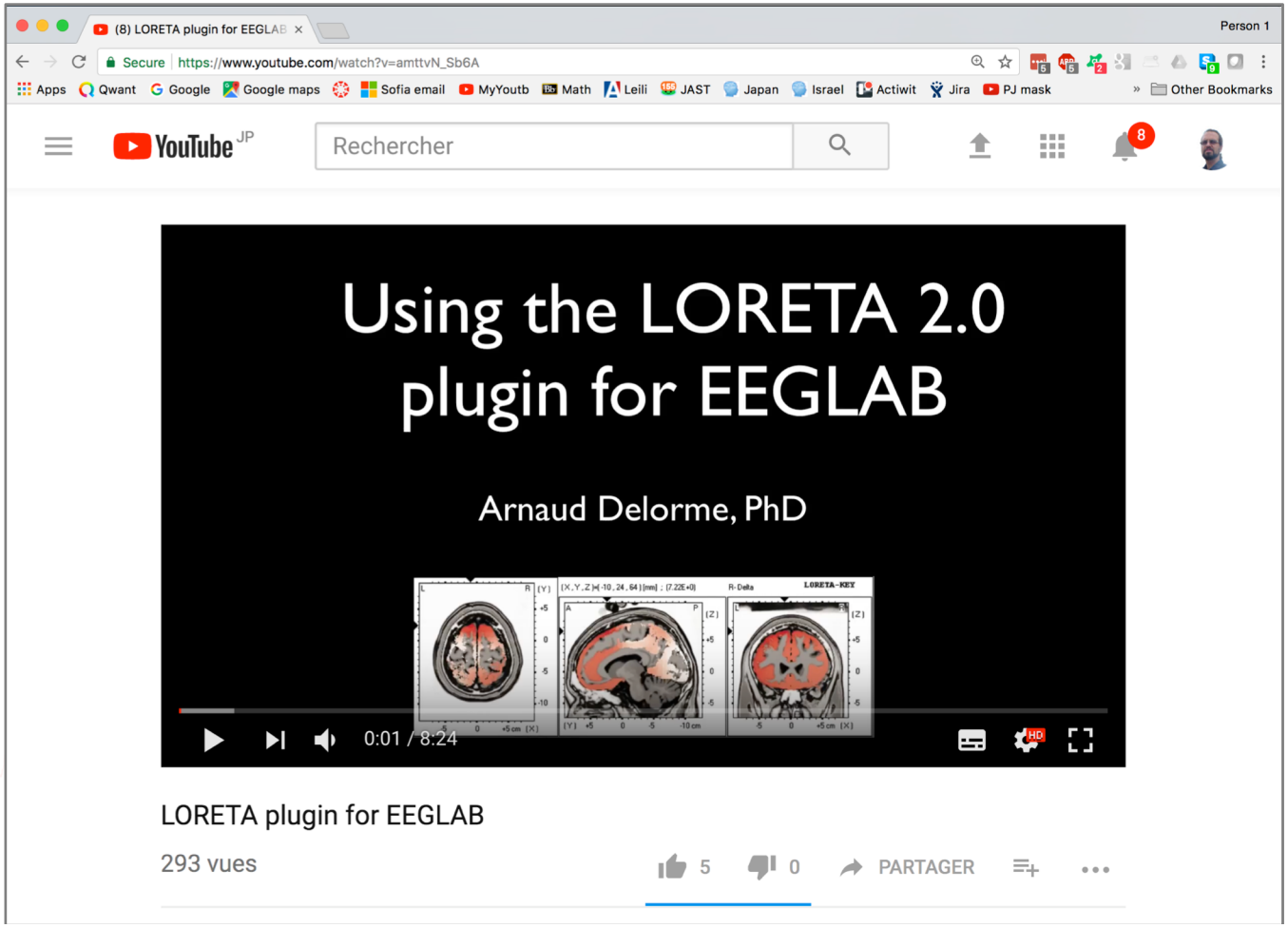




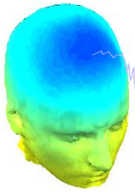




https://sccn.ucsd.edu/wiki/LORETA_for_EEGLAB

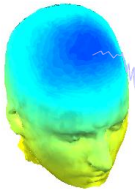


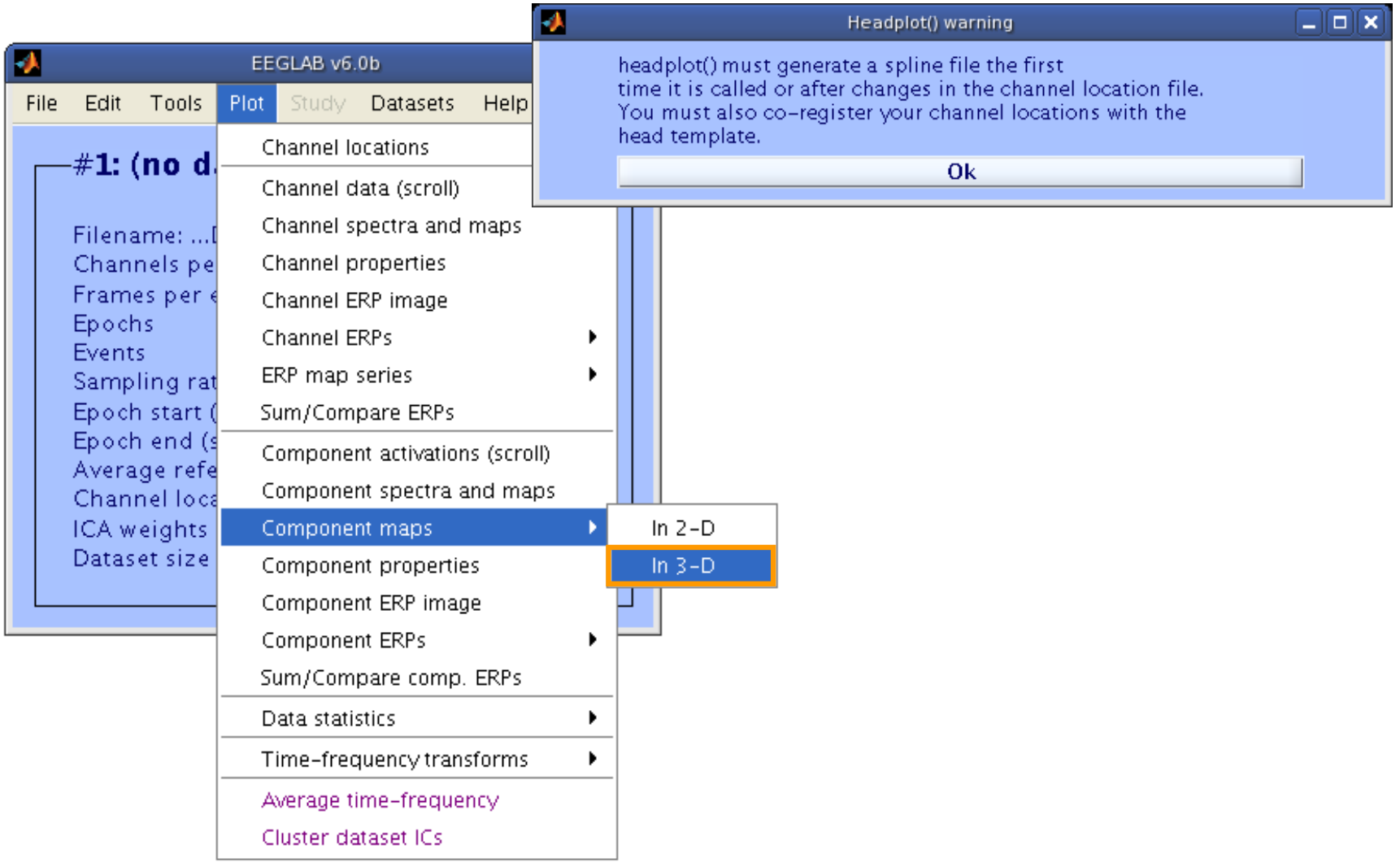
DIPFIT and model co-registration



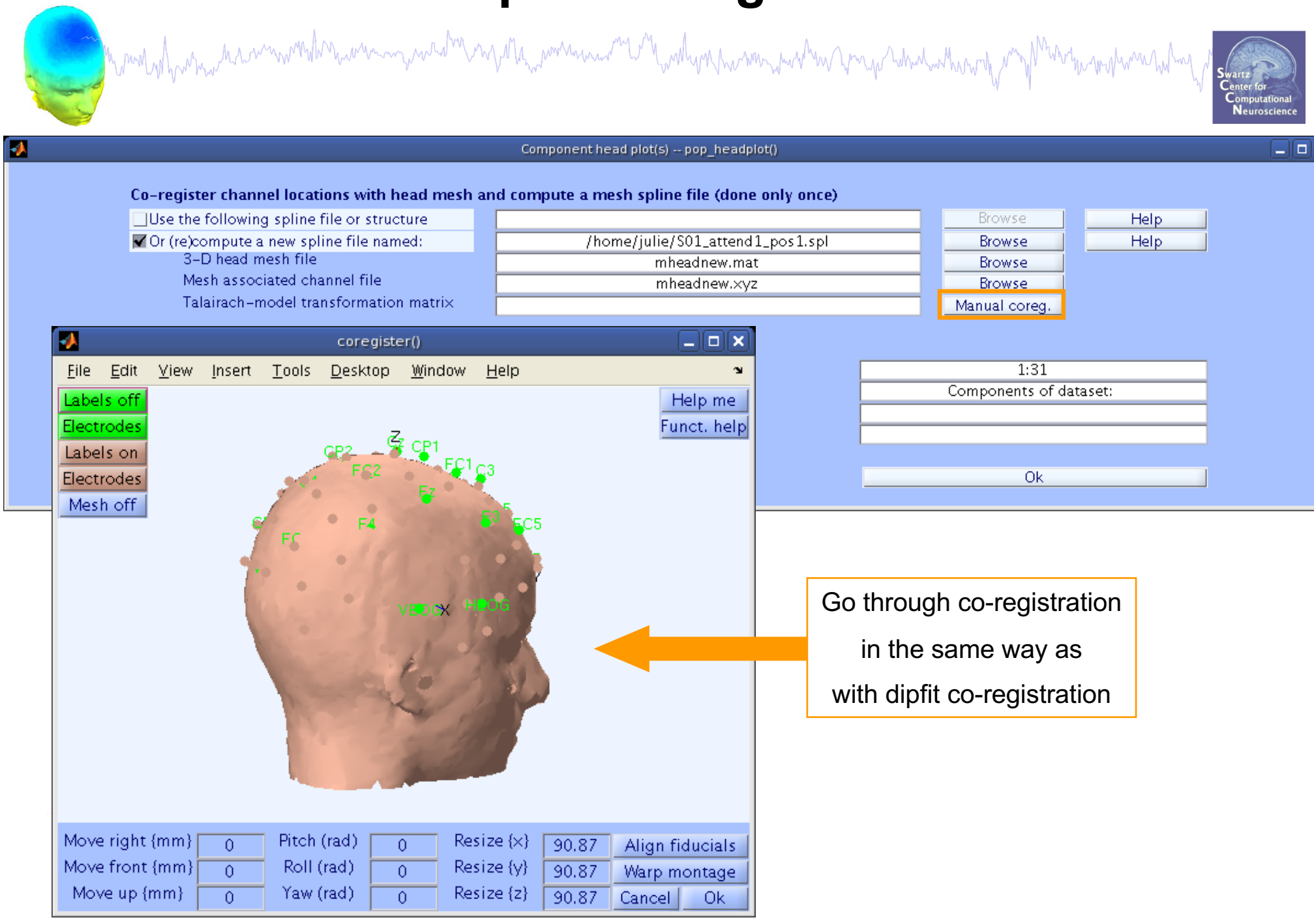
1. Co-register electrodes with model
2. Autofit, plot dipoles, fine fit
3. 3D headplot co-registration

Plot scalp maps in 3D



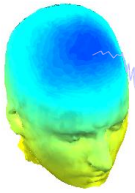


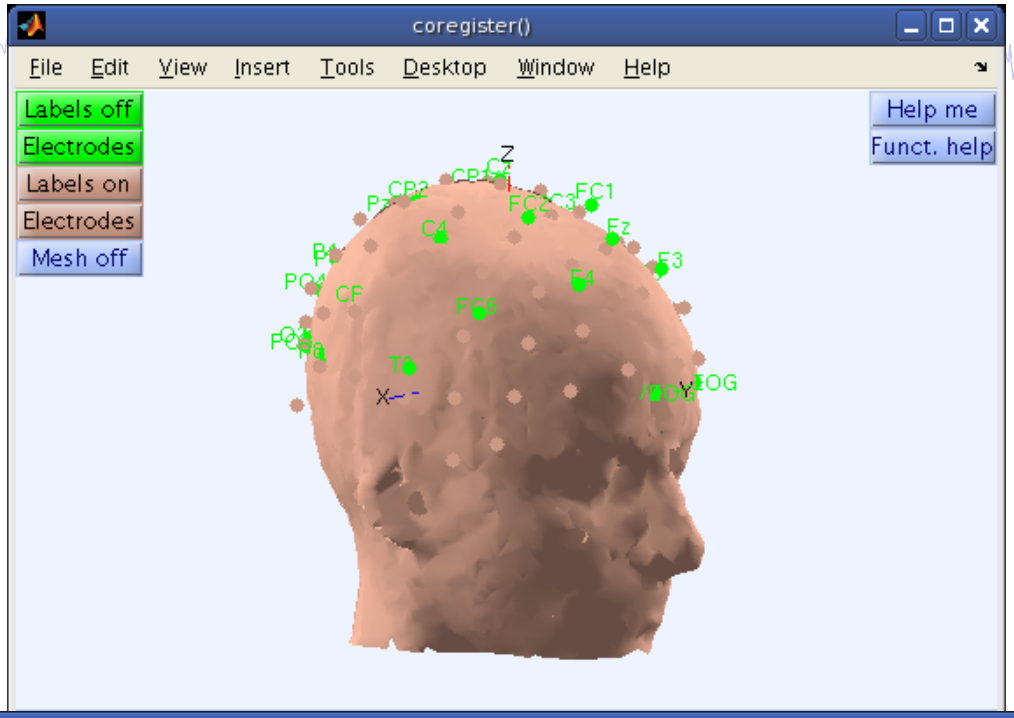
Headplot co-registration

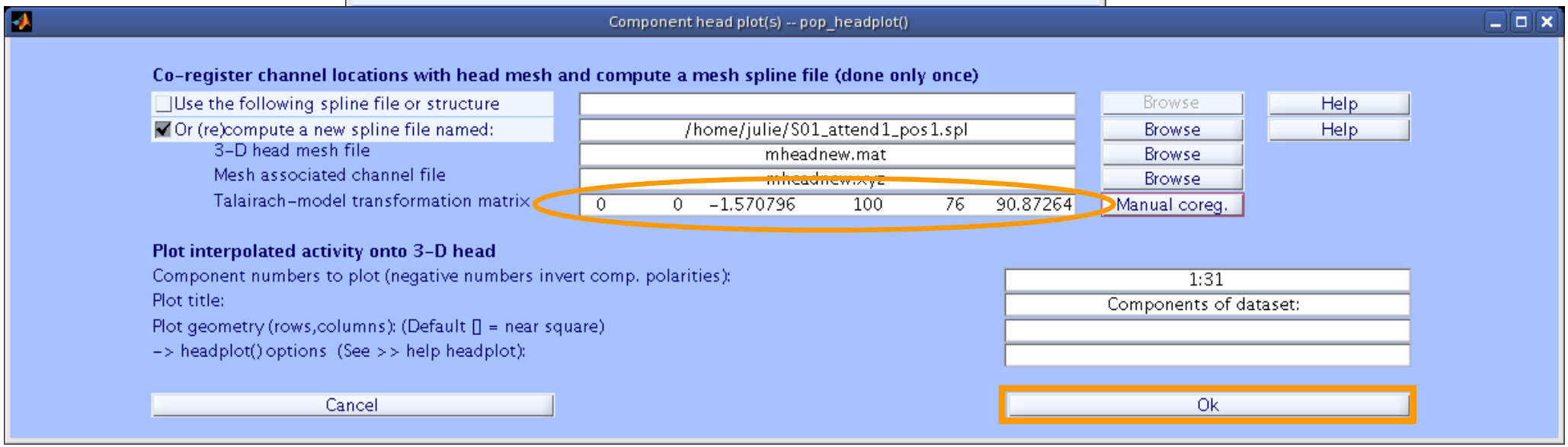


Go through co-registration in the same way as with dipfit co-registration

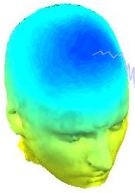
Confirm headplot co-registration

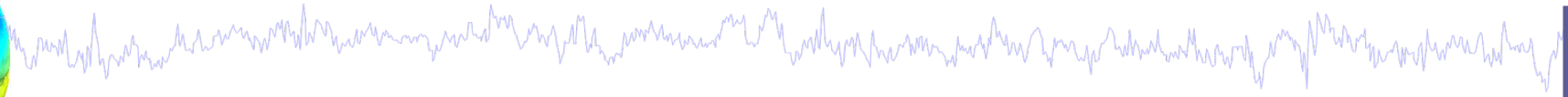






Spline file in EEG structure





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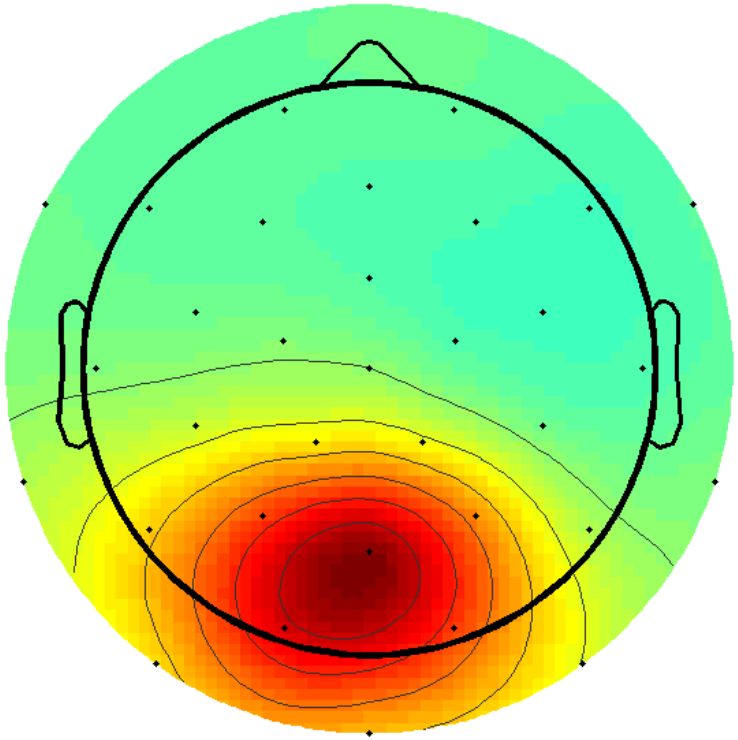
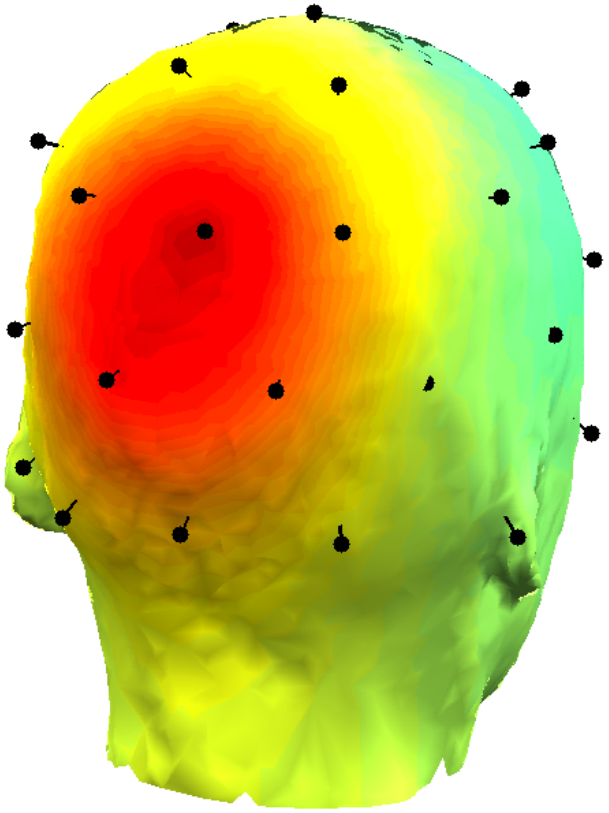
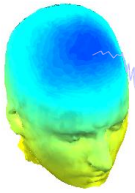
2D scalp map for IC 12



3D scalp map for IC 12



Exercise



- **Novice / Intermediate**
  - Load ‘stern_125Hz.set’ dataset
  - Practice co-registering electrodes with **BEM** model (choose 'Erase' because this dataset has co-registration done already)
  - Autofit IC dipoles
  - Fine fit dipoles
  - Plot dipoles from the GUI; scroll through components individually
  - Co-register the head model for 3D scalp map plotting. Then plot some ICs in 3D
- **Advanced**

  - In the Finefit menu, try fitting a bilateral dipole, what happens to the residual variance?

  - Try plotting a subset of dipoles in 'summary mode’