

Checklist for personalized NIBS for L2 learning - Electrodes placement

- **Montage**

- ☐ TP7: Anode (Red) & TP8: Cathode (Blue)

- **Preparation tACS Electrodes**

- ☐ Measure brain size (circumference) \Rightarrow Choose and put on EEG cap \Rightarrow Adjust position (10-20 system) \Rightarrow Fasten the chin strap
- ☐ Mark the position of tACS electrodes, i.e., TP7/8
- ☐ Confirm the marked area and remove the caps
- ☐ Mark the circle area with some arc of diameter 36mm
- ☐ Remove the hair in that area as much as possible
- ☐ Connect the wire but DO NOT turn the stimulator on.
- ☐ Apply a thin layer of Ten20 gel on the tACS electrodes (a sparse application is recommended) and place it in the correct location as marked area indicate.
- ☐ Turn on stimulator and monitor the impedance. In the meantime, carefully putting some pressure on the tACS electrodes while paying close attention to the location of tACS electrodes
- ☐ Add more paste if necessary, but still, as less as possible. And make sure the electrodes are within the marked area.
- ☐ Continue putting pressure until the impedance is under $10k\Omega$
- ☐ Remove the excess gel with a cotton swab
- ☐ Make sure the electrodes are firmly located on the scalp
- ☐ Double-check the impedance under $10k\Omega$
- ☐ Turn off the stimulator

- **Mounting the EEG cap**

- ☐ Carefully and gently put on the cap and MAKE SURE the tACS electrodes are not shifted and no Ten20 gel leaked out
- ☐ Fasten the strap of the EEG cap

- **Preparation for EEG electrodes**

- ☐ Gel the ground and reference EEG electrodes first.
- ☐ Proceed with the EEG electrodes located in the vicinity of the tACS electrodes: Inject the gel with the needle tip pointing in a direction away from the tACS electrode and apply as LESS GEL as possible.
- ☐ Apply gel to the rest EEG electrodes (First round)
- ☐ In the second round, for the electrodes at the vicinity of tACS electrodes, use the cotton swab to increase contact between scalp and electrodes. DO NOT USE SYRINGE to do the second round for these electrodes.
- ☐ Use syringe do the second round gelling for all rest electrodes
- ☐ Check the impedance and thrifty gel the electrodes which do not show a green/yellow impedance.
- ☐ Test any bridging effect exist between tACS and EEG electrodes, i.e., apply 1mA sinusoidal signal and observe any saturation of EEG electrodes from recording signal.
- ☐ Check impedance again and start recording.