Concurrent EEG-fMRI setting

EEG system setup

1. Connect the battery to the pre-amp through its power wire.
2. Connect the pre-amp to the adapter through an optical fiber.
3. Connect the adapter to laptop with the Brain Product recorder through an USB wire.
4. Connect the EEG cap to the pre-amp (can do it *after* the participant preparation).

Participant preparation

1. Explain the written info consent to participant.
2. Ask participant to wash the hair (and scalp), and dry it totally.
3. Let participant sit comfortably, and make participant puts on the EEG cap with 10-20 standarda.
4. Part the hair away from the electrodes and then using the cotton swabs with alcohol to clean the scalp under each EEG electrode.
5. Open the “Brain Product recorder”, and switch to the impedance check page.
6. Eject the impedance-matching paste through every electrode to low the impedance under 10 kΩ.
7. Check the real-time EEG signal across all electrodes to see if there is an abnormal fluctuation.

EEG-MRI system setup

Inside MR scanner

1. Connect the battery to the pre-amp through its power wire inside MR scanner.
2. Connect the pre-amp inside MR scanner to the adapter outside MR scanner through an optical fiber.
3. Leave the 1. and 2. at the end of the MR bore, superiorly to the participant.
4. Connect the EEG cap to the pre-amp.
5. Straighten all the wires along the Z-direction magnetic field (if possible), and immobilize all the wires/devices with sand bags.

Outside MR scanner

1. Connect the 10 MHz clock from the MR cabinet to the synchronize box through BNC.
2. Connect the synchronize box to the adapter through BNC, and also the to the laptop with Brain Product recorder through USB.
3. Connect MR trigger to the stimulus box through an optical fiber (or BNC).
4. Connect the stimulus box to the laptop through USB.
5. If necessary, connect the stimulus PC to the stimulus box through parallel port/BNC/USB.
6. Open “Check IO” on the laptop to check the connection between stimulus box and the laptop.
7. Open “Brain Product recorder”, and check the synchronization between the EEG signal sampling and the 10 MHz MR clock in the recorder.

EEG-MRI acquisition in general

* Basically, the EEG sampling period should cover the entire MR scan. In that way, one should start to record the EEG signal *before* the MRI scan, and stop recording EEG signal *after* the MRI scan is finished.
* Keep an eye on the real-time EEG marker to make sure the synchronization between the EEG signal sampling and the 10 MHz MR clock by checking if there is “sync on” marker appears periodically.
* There are always three files (.eeg, .vhdr, and .vmrk) been saved with the same file name, where the .eeg contains the raw EEG signals, .vhdr is the header file, and .vmrk is the marker files with the external maker and corresponding timing.