**Plan: Hybrid Closed Loop Validation & Working Memory Modulation study**

**Closed-Loop Validation:**

* 10 min No Stimulation for Covariance computation
* 10 min Stimulation with dt = 0
* Outcome measures: Phase locking of the computed stimulation envelope to the visual flicker (t 10 Hz), comparison of no stimulation, stimulation without SASS, stimulation with SASS
* Time needed: 25 min

**Working Memory Modulation study:**

* Task: Change detection task
* 5-10 min to calibrate the system – same task without stimulation
  + Find the true phase of the brain (How is this done? I guess making use of spatial properties)
  + Find the dominant frequency during the delay period of the task
* 35 min task with stimulation: The phase shift of the stimulation relative to the ongoing brain oscillation is randomized between trials
  + Phase shifts: 0, 90, 180 ,270 degree (Do we really need both 90 and 270?)
  + One condition should be without stimulation 🡪 5 conditions (7 min each)
  + What about 0, 180, no stim? 10 min each
  + Can we start and stop the stimulation? I guess that would be uncomfortable, maybe better to do these 4 or three (0,90,180) conditions
  + Regarding this, can even only stimulate during the delay, maybe that is too uncomfortable, maybe we have to stimulate trial-vice
  + What does the literature say regarding alpha during WM? De/Synchronization in Encoding, Delay, Retrieval? Different Frequencies?
* Time needed: Should not be more than 40 min
* To-do:
  + Understand how correct phase can be found
  + Find script for determination of dominant alpha frequency
  + Test if new task works-with triggers
  + Implement the system in Simulink: Closed-Loop Stimulation and trigger changes dt in each trial, save filtered EEG data (or filter later?)
* Plan:
  + Change Closed-Loop System to Frequency Variable state – stimulate with phase and frequency of dominant frequency 🡪 Change phase prediction and calculation of stimulation (envelope)
  + Use that to try Working memory: 3 condition (no stim, in and antiphase) 🡪 30 min with calibration beforehand to determine what in and anti-phase is, stimulate with phase of strongest frequency (really??!)