



CLOUDTMS™

TMS-101 HOW TO START
AND BUILD A SUCCESSFUL
TMS PRACTICE



Neurosoft

NIKOLAY SMIRNOV

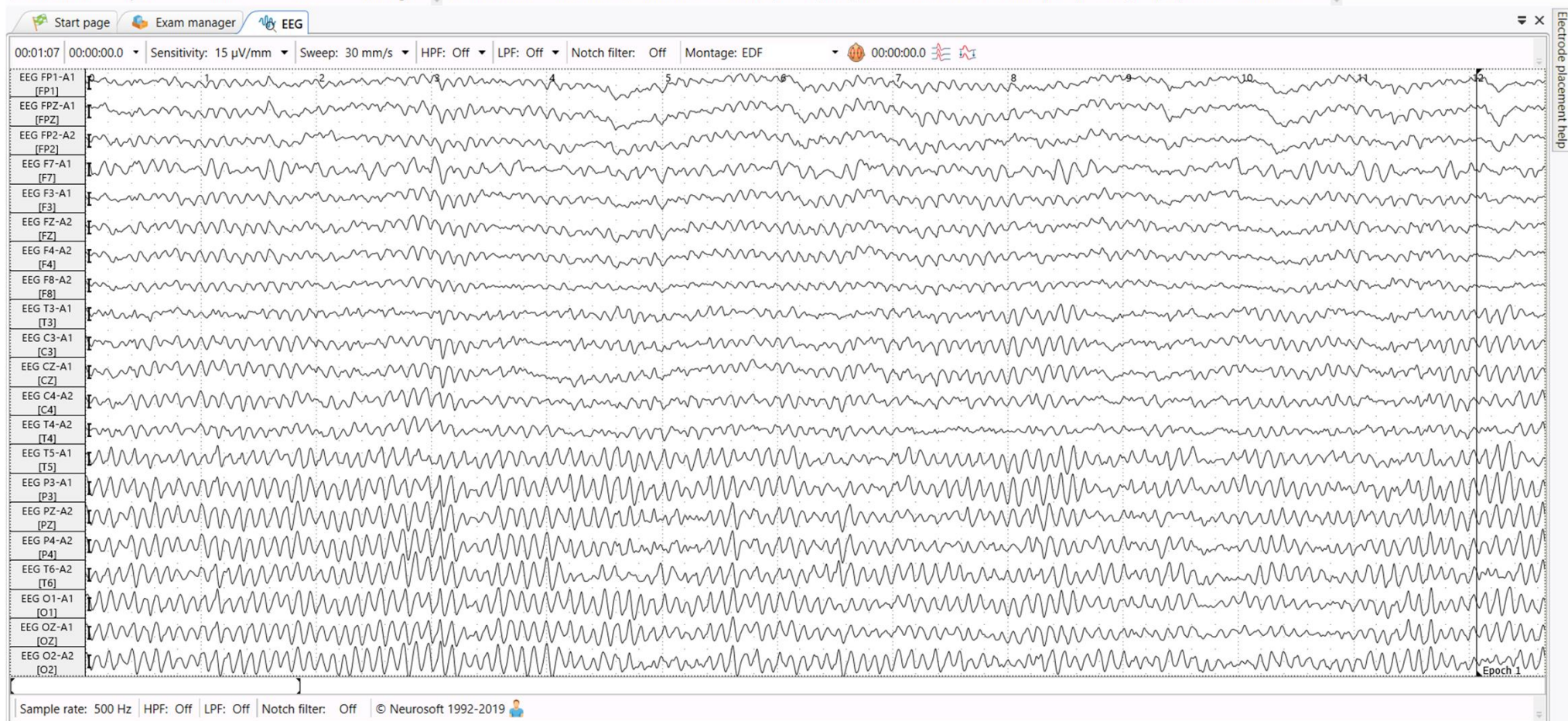
PhD, CCO, Neurosoft, LTD

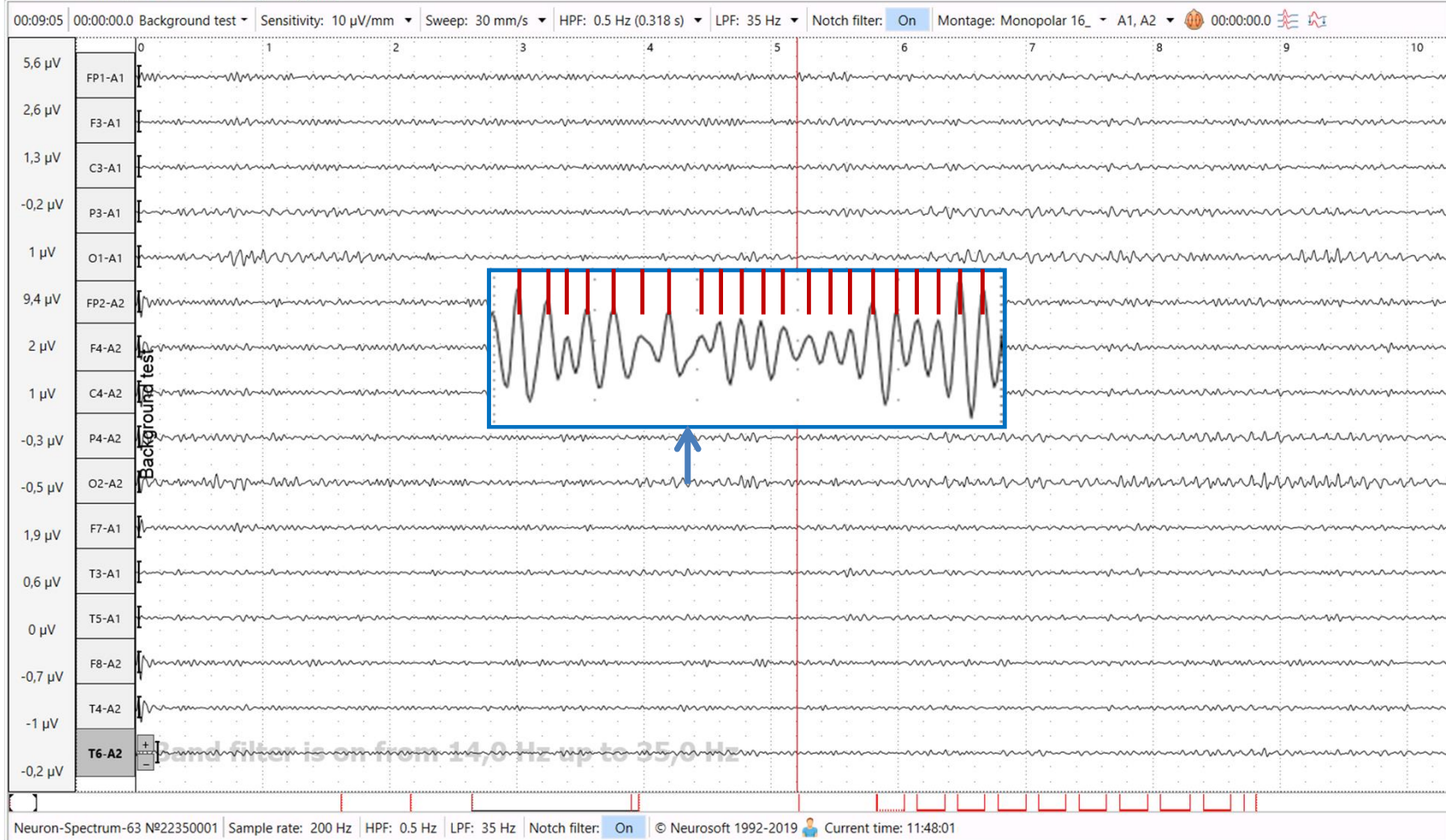
«PrTMS - Personalizing your TMS treatment»

Adding EEG and Peak Alpha frequency
to your treatment protocol









Bandpass filter

Filter type: Beta rhythm

Filter order: 4

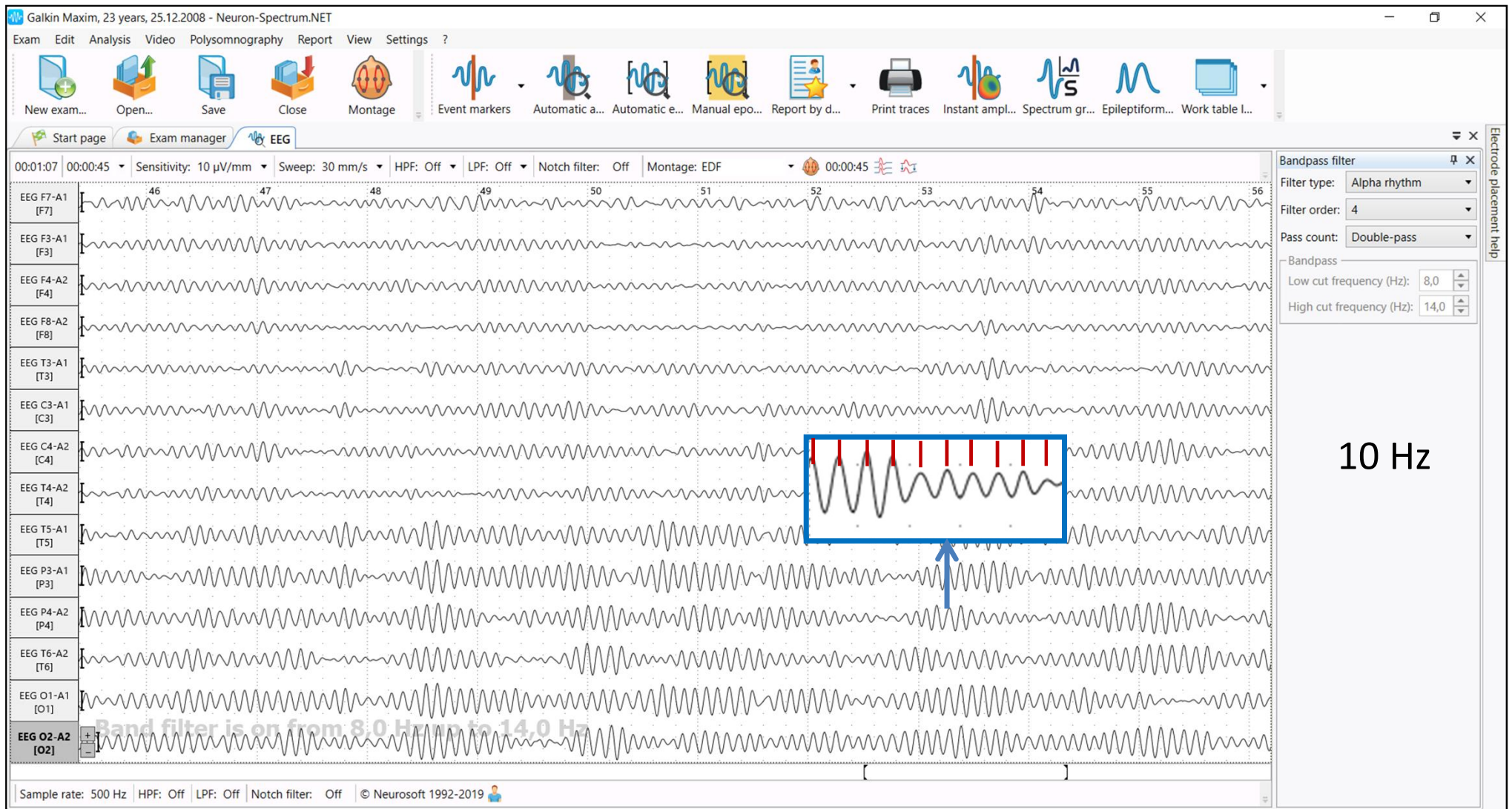
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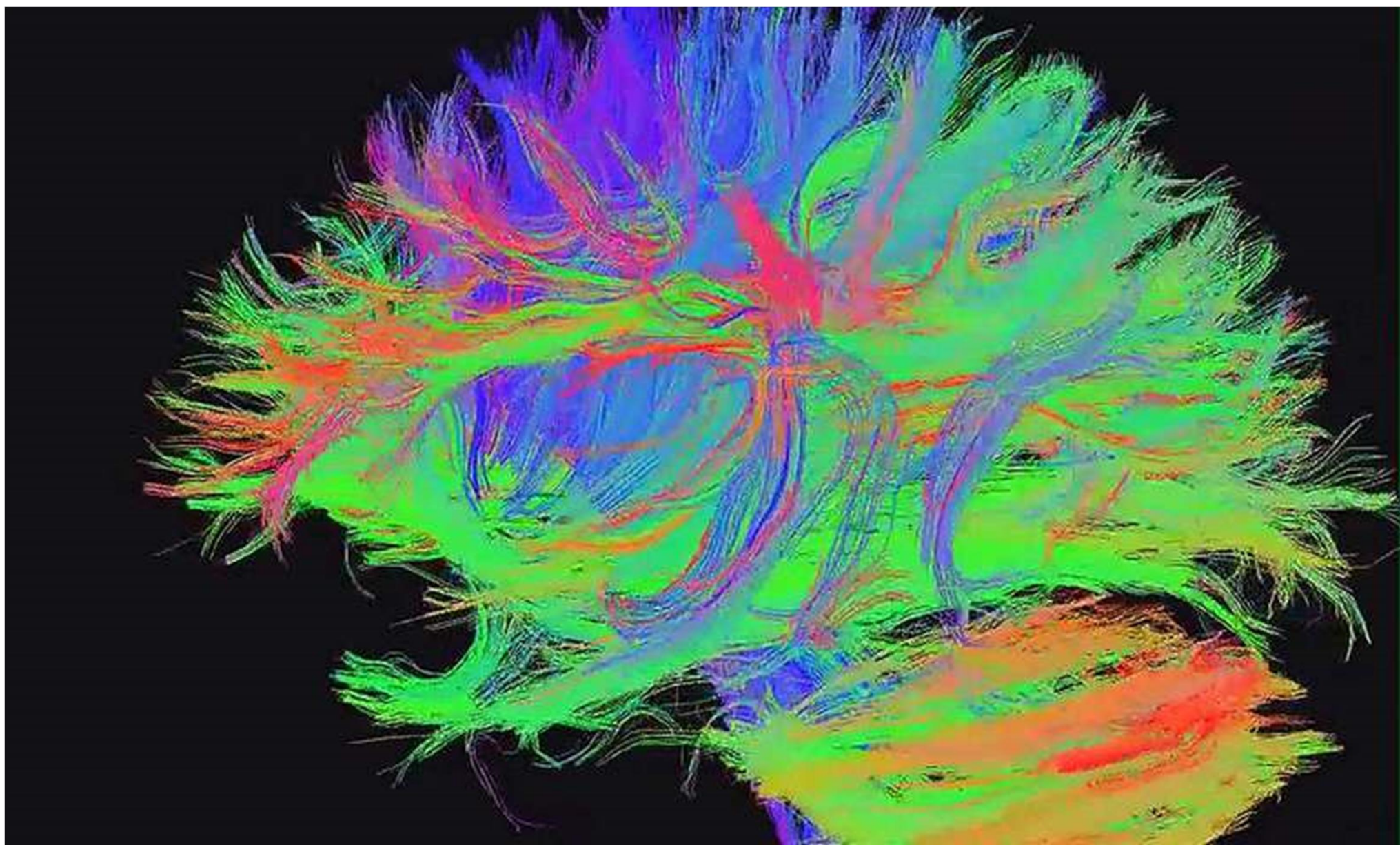
Bandpass

Low cut frequency (Hz): 14,0

High cut frequency (Hz): 35,0

21 Hz





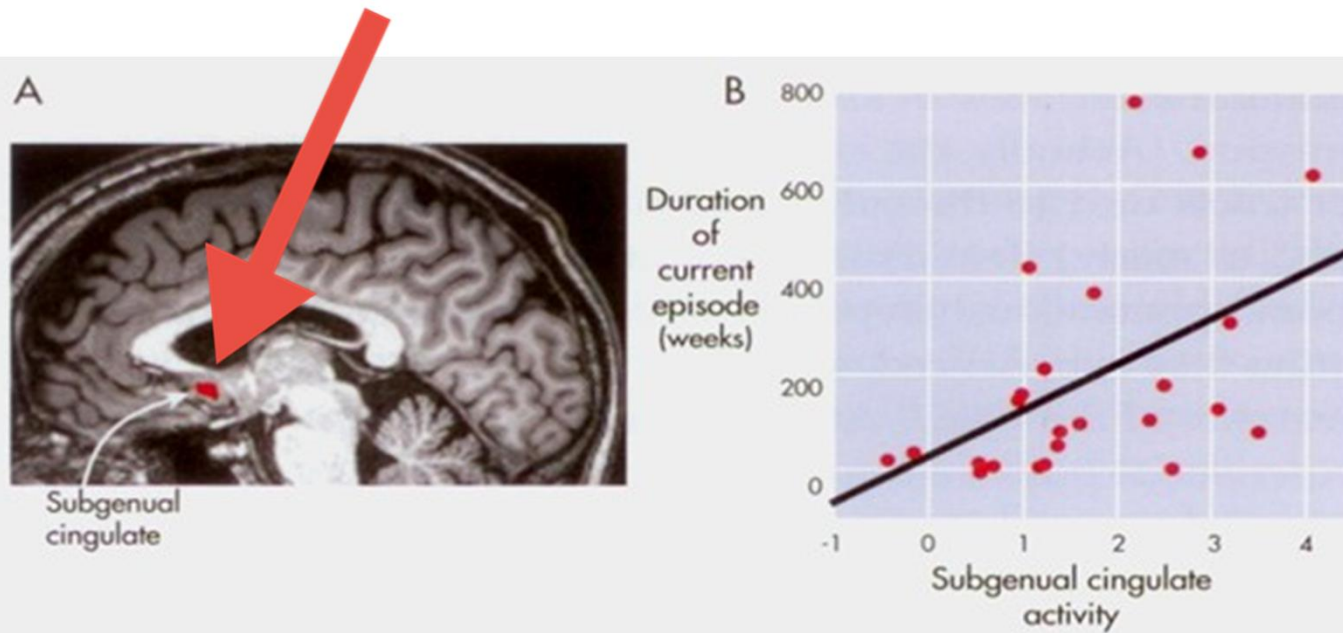
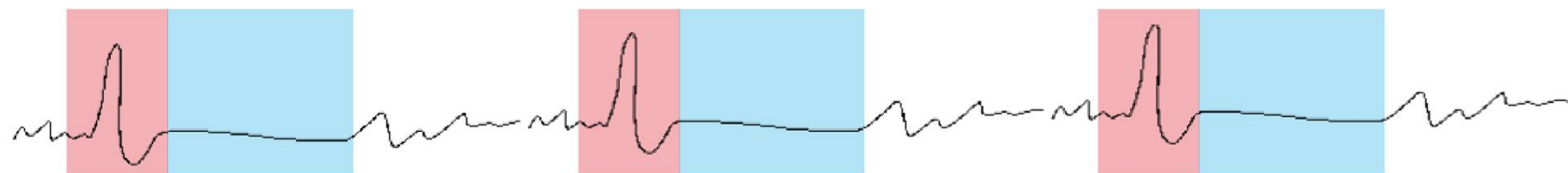


FIGURE 7-9. Subgenual cingulate activity and depression.

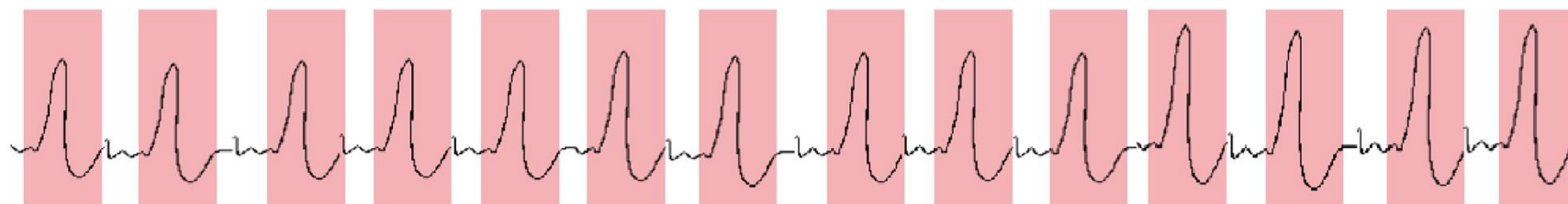
Activity in the subgenual cingulate (A) correlates with duration of the current episode of depression (B).

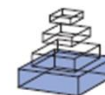
Source. Adapted from Greicius et al. 2007.

LF



HF





The relationship between brain oscillatory activity and therapeutic effectiveness of transcranial magnetic stimulation in the treatment of major depressive disorder

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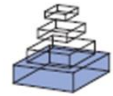
² NeoSync, Inc., Waltham, MA, USA

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SYNCHRONIZATION OF rTMS TO THE INDIVIDUAL ALPHA FREQUENCY

Although a wide range of stimulation frequencies has been shown to modulate brain function (Thut and Pascual-Leone, 2010), therapeutic application of rTMS commonly has focused on stimulation in the alpha frequency band (Thut et al., 2011; Veniero et al., 2011). This is consistent with current understanding of the role of alpha oscillatory activity, which now is conceptualized as playing a key role in maintaining coordinated activity among cortical areas and between the cortex and subcortical gray matter





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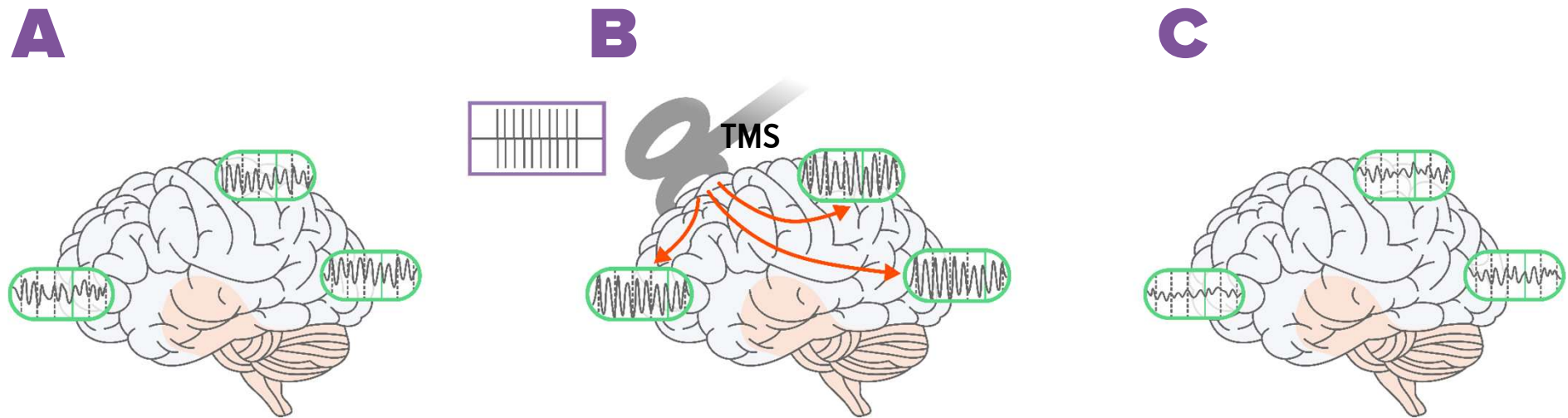
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and increased coherence across the frequency spectrum on qEEG (Leuchter et al., 2012).

Increased oscillatory synchrony in MDD has been reported in multiple frequency bands across brain regions (Fingelkurts et al., 2006, 2007; Leuchter et al., 2012); most reports, however, have highlighted increased alpha band synchrony (Henriques and Davidson, 1991; Bruder et al., 1997; Debener et al., 2000; Knott et al., 2001; Pizzagalli et al., 2005; Seagrave et al., 2010). The most consistent findings have been local increases in power, and therefore local synchrony, although the literature is mixed as





Effects of rTMS stimulation on brain function.

On average, patients with MDD exhibit a broad pattern of highly synchronous theta and alpha activity over most brain regions **(A)**. rTMS administered as a train of high amplitude pulses at a frequency of 10Hz entrains brain oscillatory activity to the frequency of stimulation,

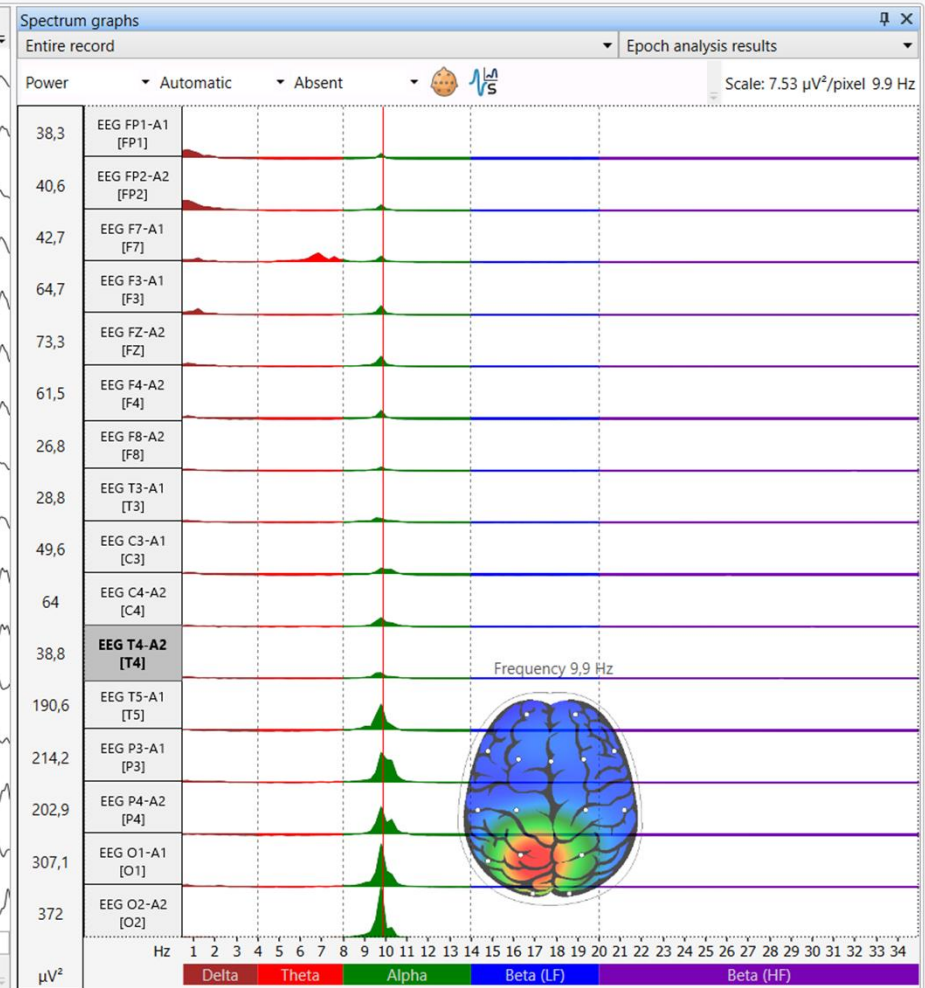
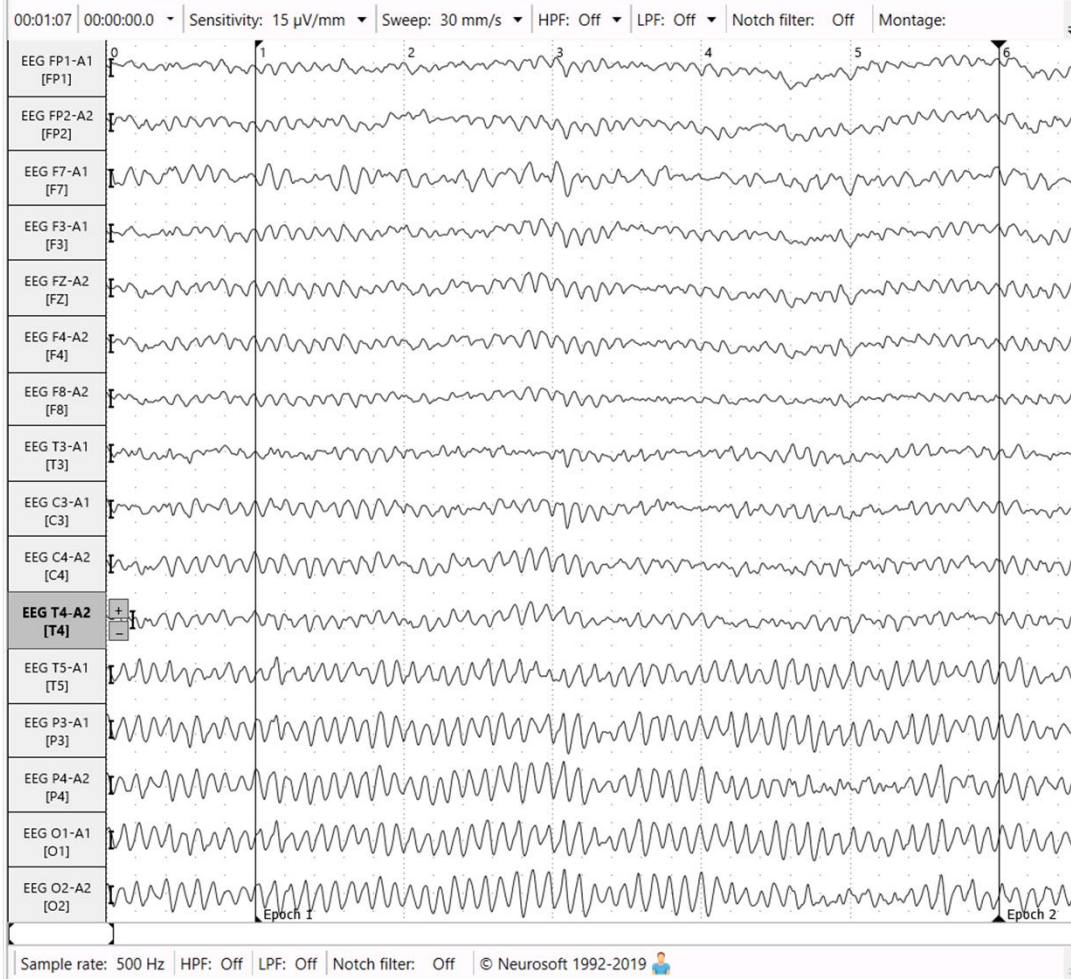
for the duration of the stimulation period **(B)**. Multiple treatments over time may have the effect of resetting cortical oscillators. Once oscillators are reset, regionally-specific endogenous rhythms of the brain may reemerge. These consist of beta and gamma activity in the frontal cortex, beta in the parietal cortex, and alpha in the occipital cortex **(C)**.

Summary

- Alpha oscillations appear to be well suited to coordinate activities in the brain in particular between areas responsible for mood regulations
- In normal people Alpha is prevalent in the occipital areas
- In depression increased alpha band synchrony is seen across distant brain regions
- Classical rTMS in depression is repetitive activation of the brain with 10Hz frequency (close to Alpha) which returns abnormal brain oscillations back to normal
- PrTMS uses the patient's own Alpha frequency to improve the treatment response

How do we record IAPF

- Put electrodes on the patient
- Connect electrodes to the amplifier
- Record EEG for 1 minute with closed eyes
- Run artifact detection and remove artifacts
- Run spectral analysis and build spectral graph
- Read IAPF on the graph as a highest peak in Alpha range



THANK YOU

