# A case of voluntary pain control revealed using EEG and sLORETA Imaging

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# Description

- This oral presentation will include a video summary of the reported work, as well as graphic data showing results in an unusual experiment. An experience Sufi practitioner was observed during the 2012 AAPB meeting in Portland, during which time he pierced himself with skewers, and did not experience significant pain or bleeding. As a scientific experiment, his EEG was recorded with 19 channels, and a continuous sLORETA reconstruction of his brain activity was performed. Using a normative database (John et al.), it was possible to create images of unusual brain activation and de-activation in specific locations related to pain perception. The results will be show and discussed, providing evidence that this individual effectively self-regulated his brain activity in specific locations, leading to the ability to endure an otherwise painful experience, remaining evidently comfortable and healthy.

# Soefi Piercing

## Een andere kijk op pijnervaring en pijnmanagement

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[c] Kasnazani Sufi Order, Köln, Germany
[e] University Hospitals Case Medical Center, Cleveland, OH

# Objectives

- Describe the experiment in which a Sufi practitioner entered a targeted mental state, and proceeded to pierce himself with a skewer.
- Explain why it is relevant to study an individual who can voluntarily endure significant pain without discomfort.
- Describe the specific brain locations and frequencies in which EEG deviations were observed using sLORETA in the Sufi experiment.
- Relate the Sufi's specific EEG characteristics with a proposed model of how he is able to perform this discipline.
- Describe the idea of brain functional hubs, and how it is demonstrated by this experiment.

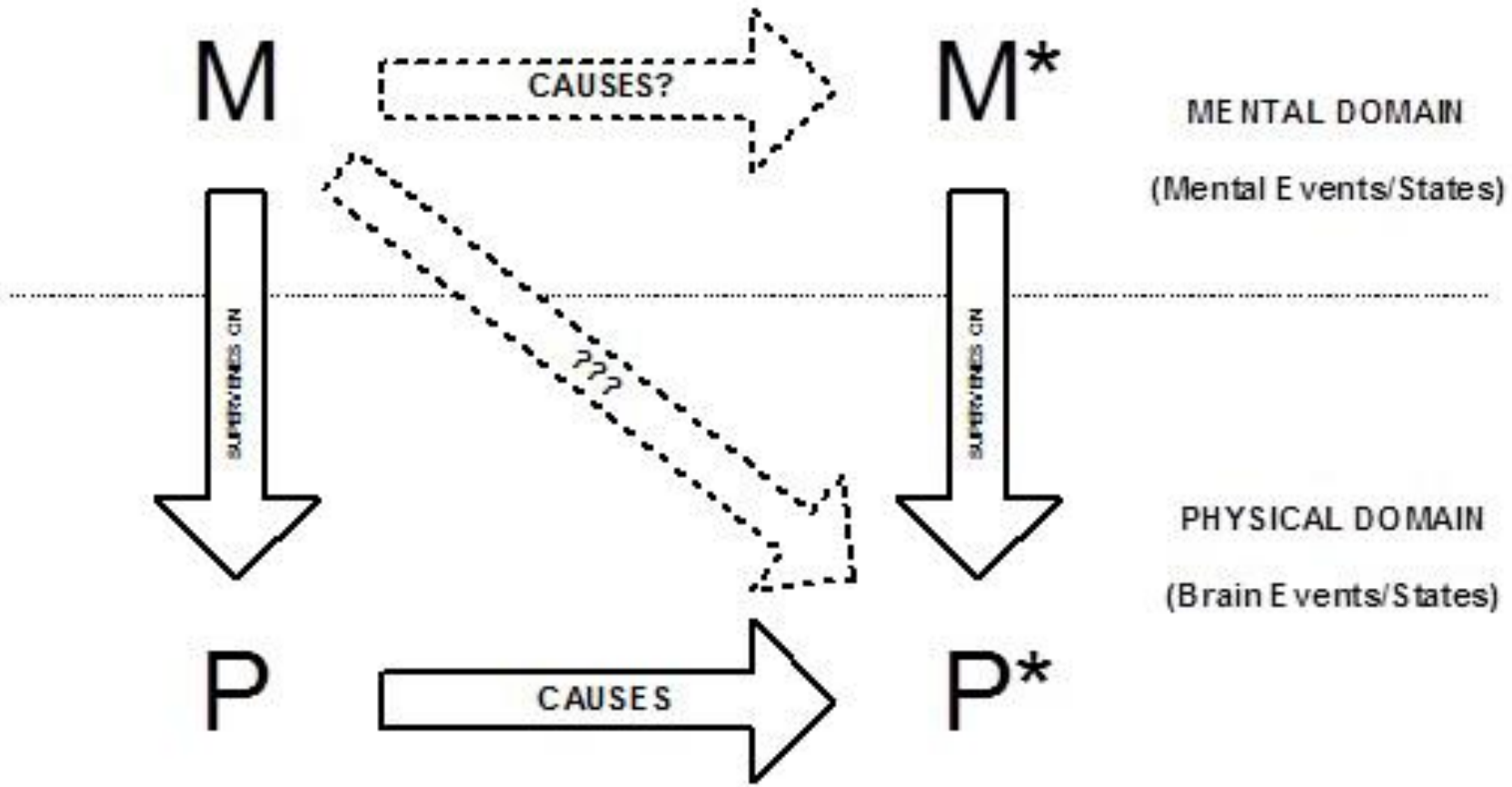
# Key Questions

- What is the nature of pain?
- Can pain be separated from pain perception?
- Can an individual control his/her own perception of pain?
- What brain locations, systems, and processes are involved with the perception of pain?
- What can be learned from this demonstration, re. pharmaceutical use for pain relief?

# Background

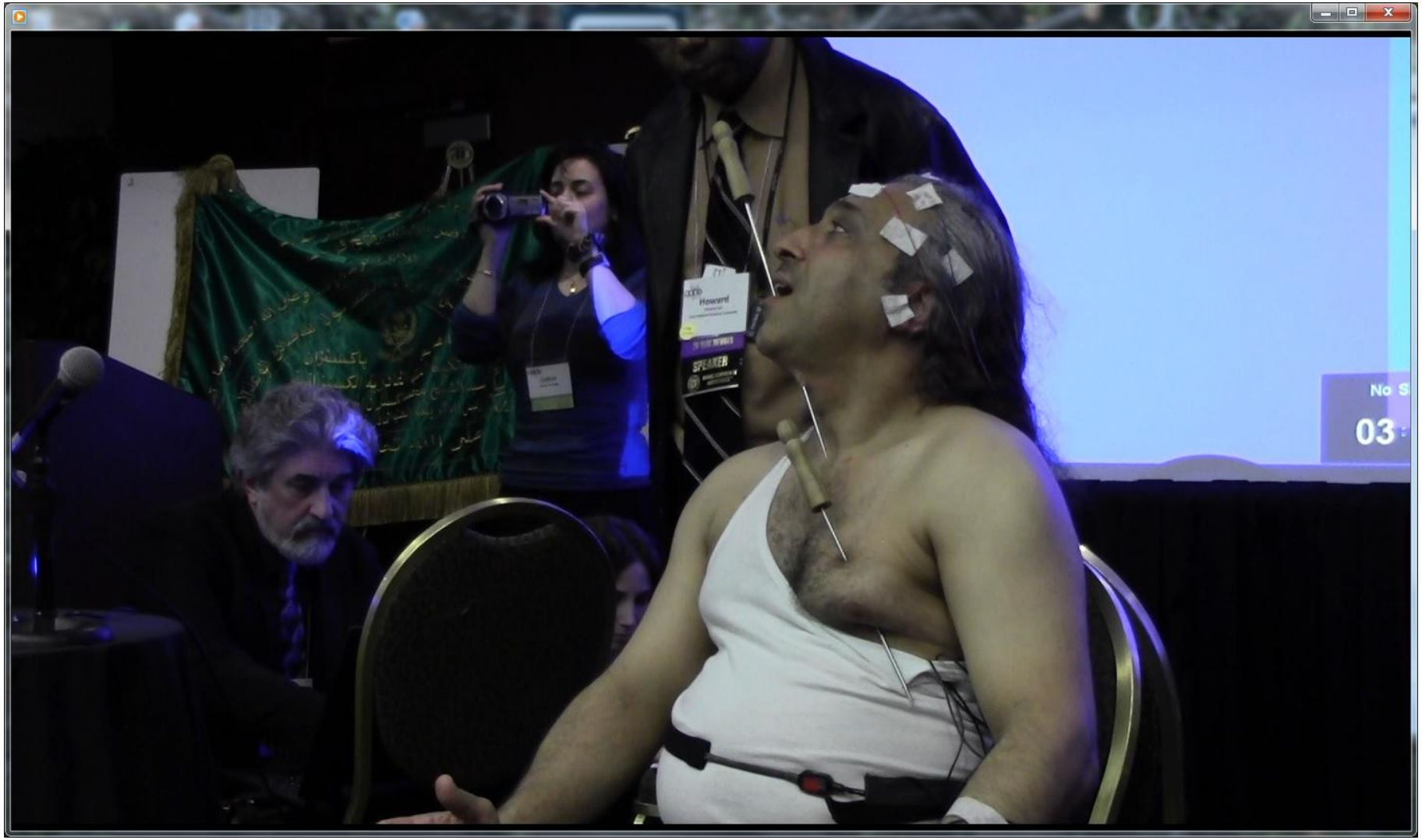
- Sufi practitioner
- Monitored with EEG and peripheral biofeedback
- Performed ritual self-piercing
- Recovered immediately, little to no bleeding
- States that “anyone can do this.”

# Brain/Mind Supervenience and Causation

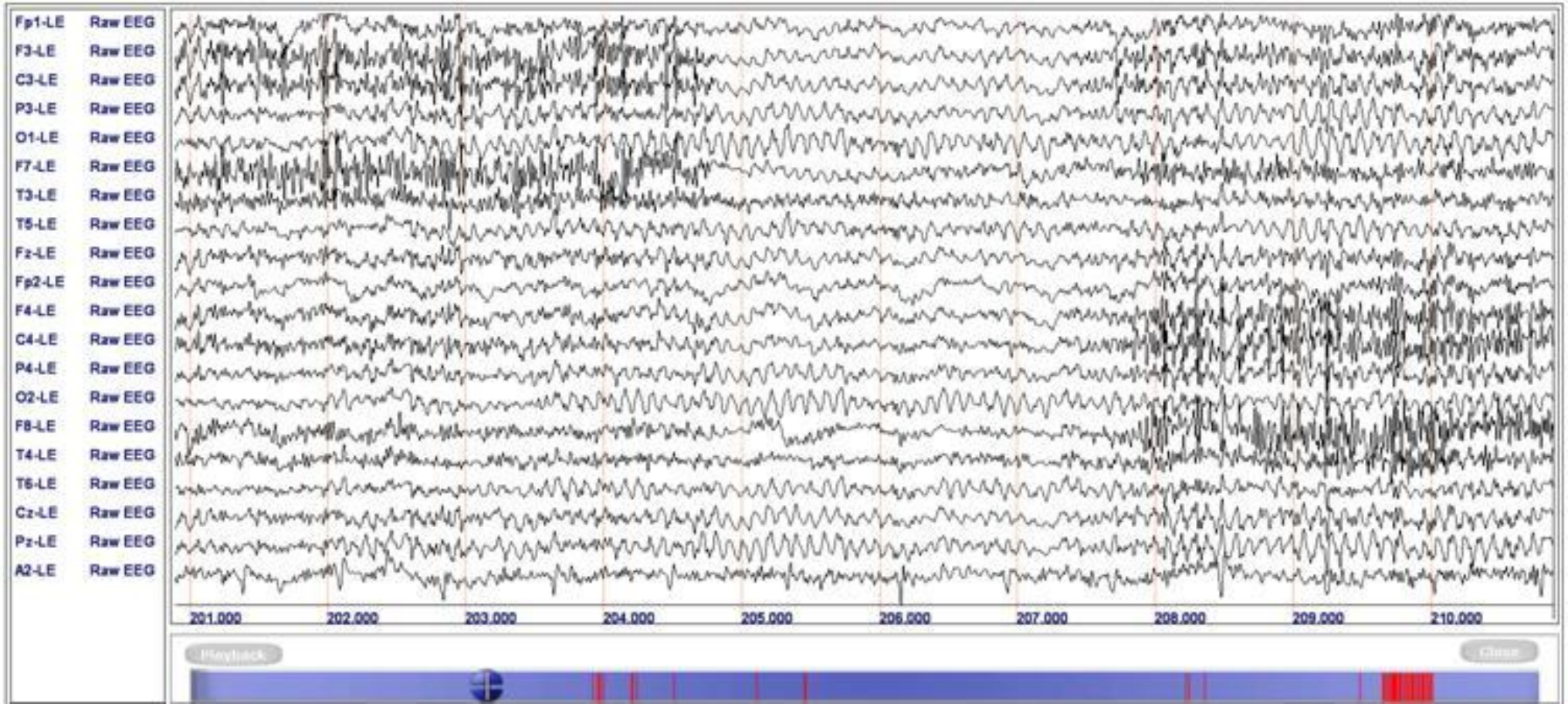


# Before piercing

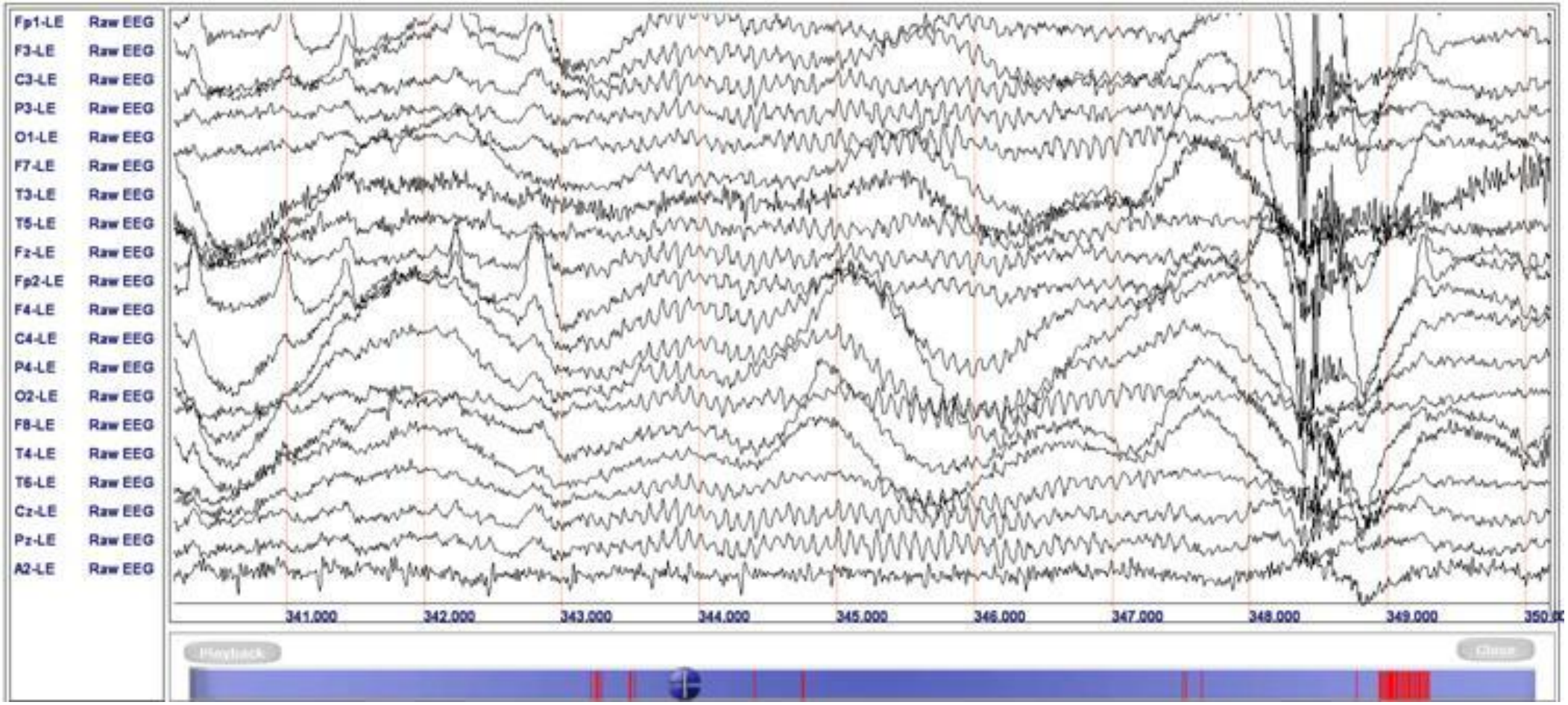
# During piercing



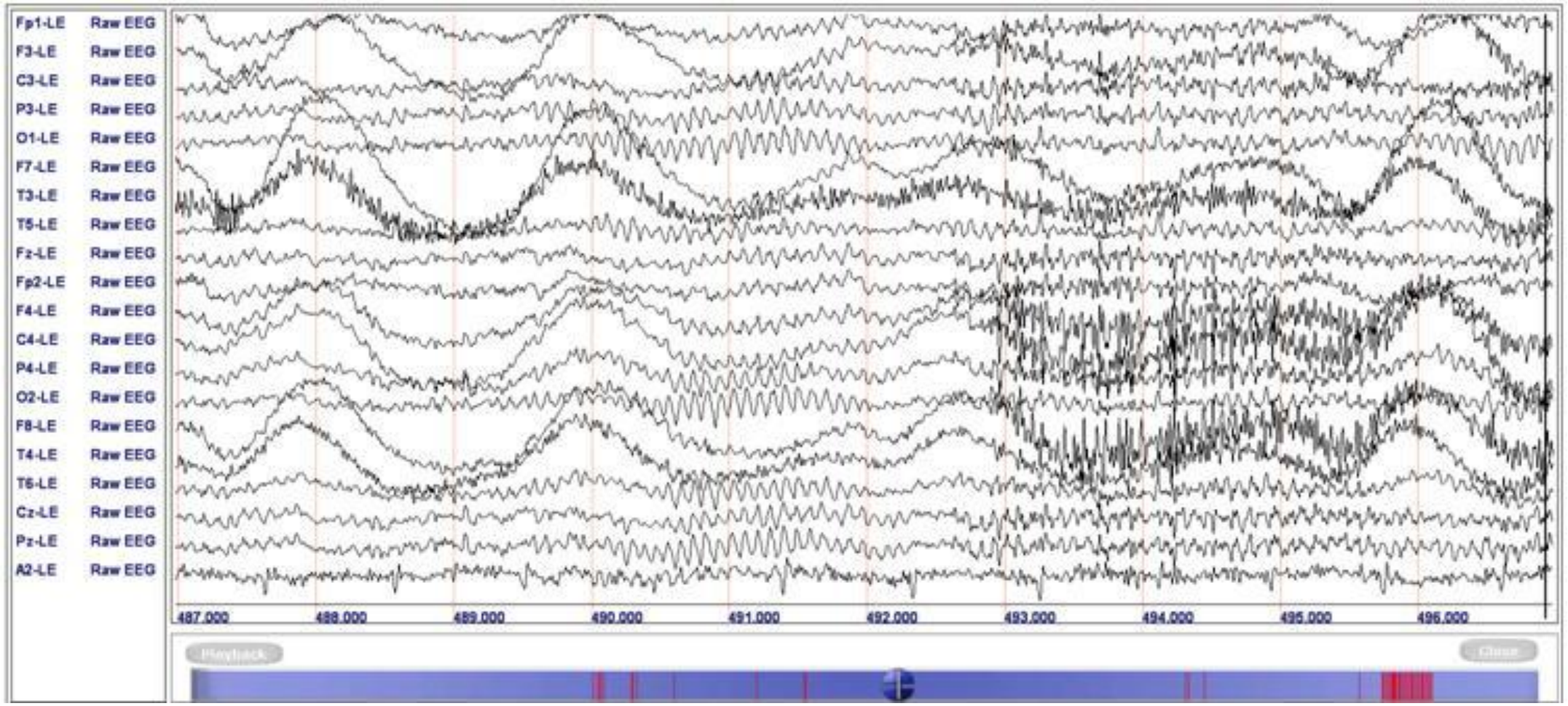
# EEG beginning of piercing



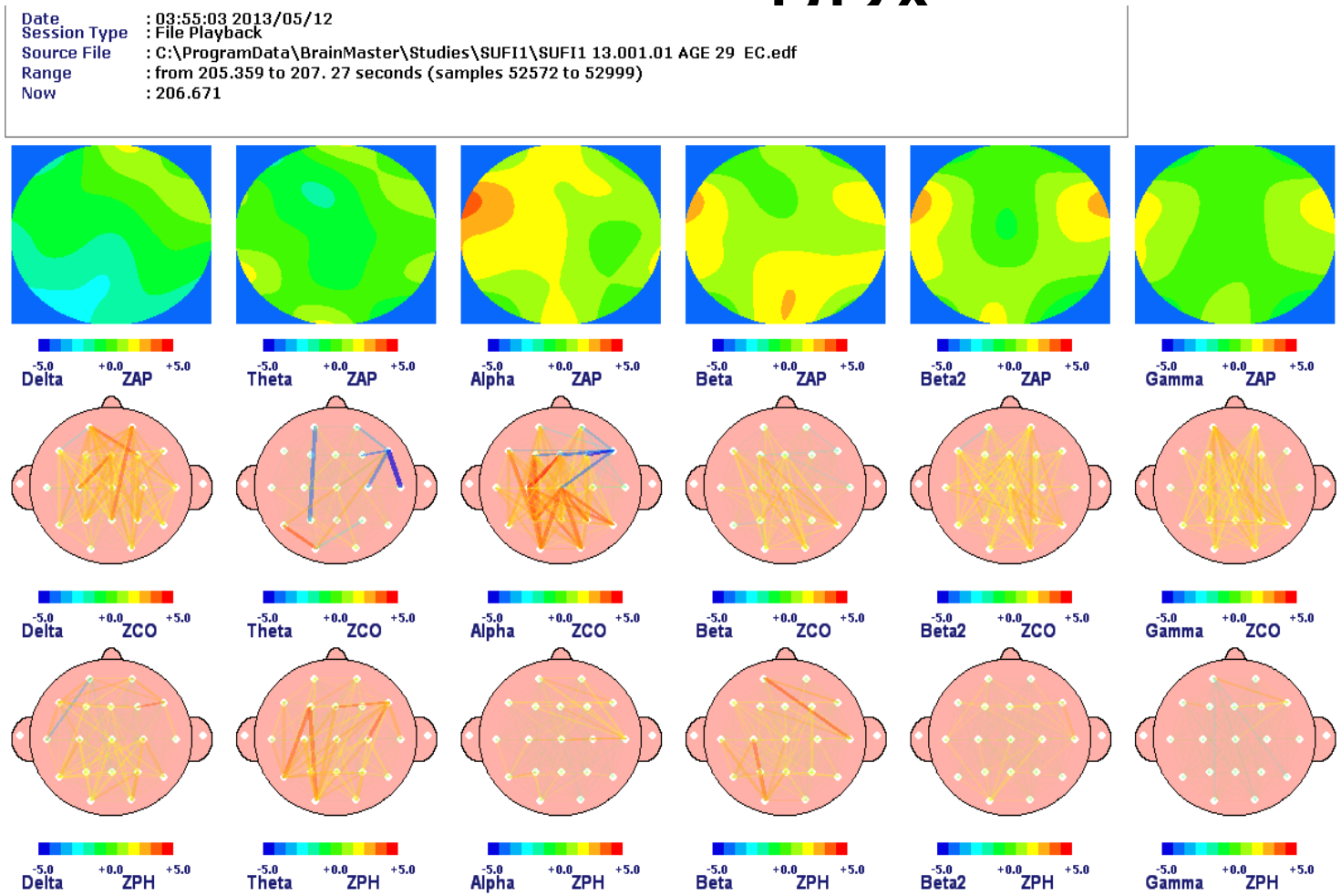
# EEG during piercing



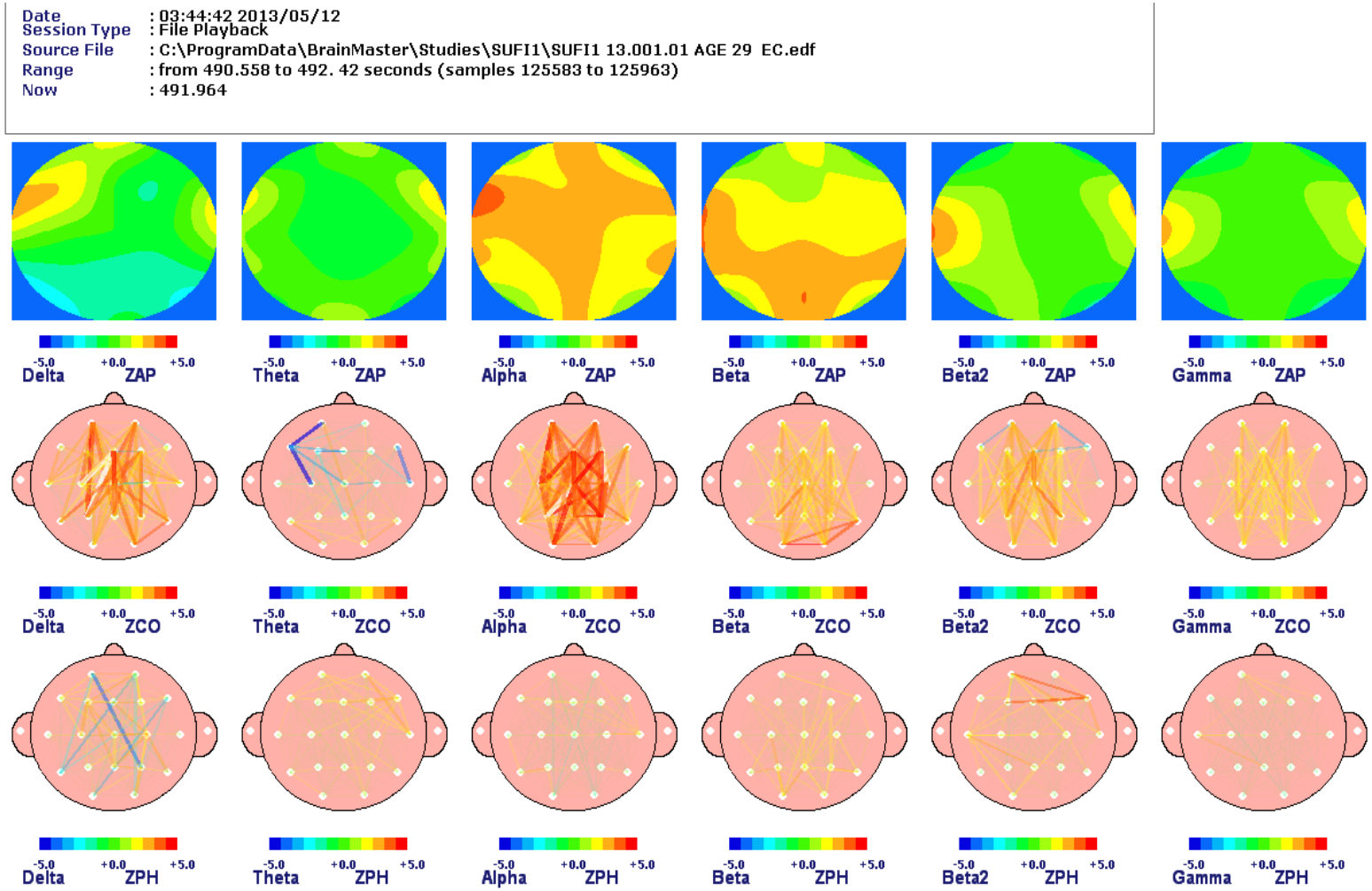
# EEG during Piercing



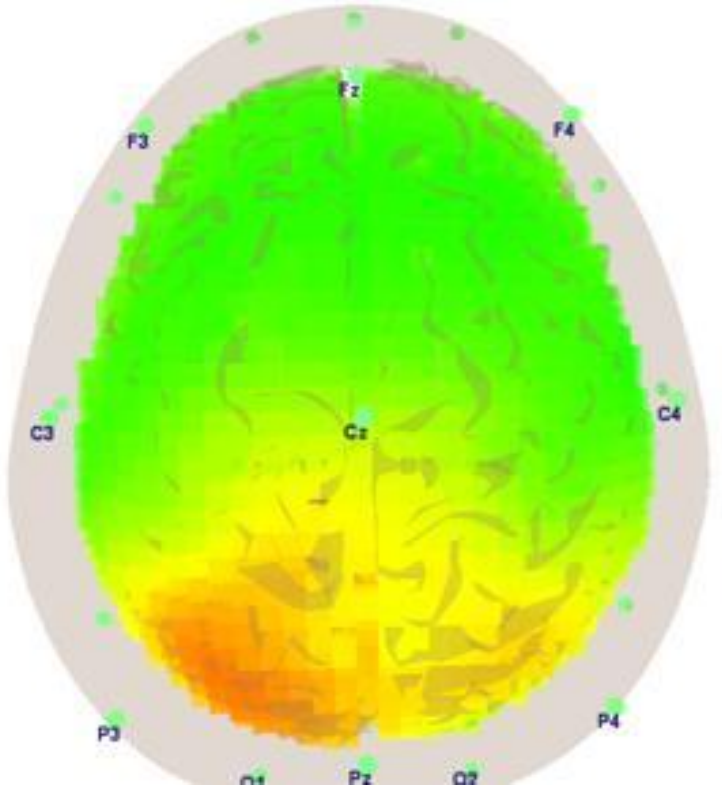
# Surface z-score maps beginning piercing - BDx



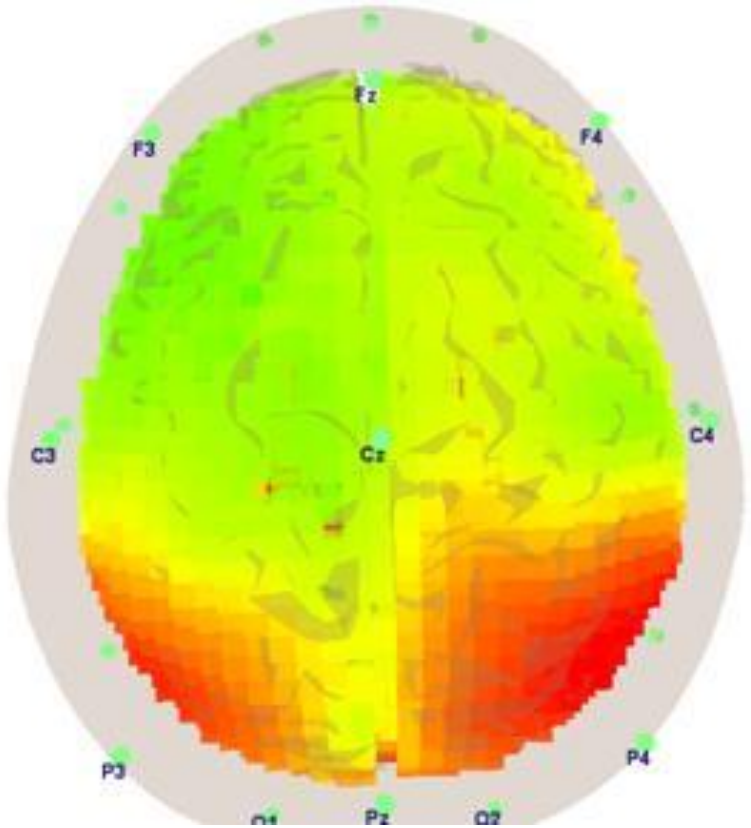
# Surface z-score maps during piercing - BDx



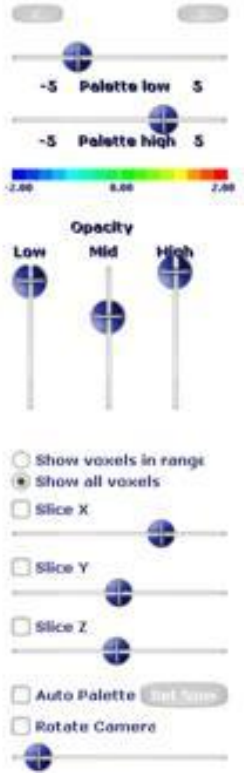
# Alpha increase

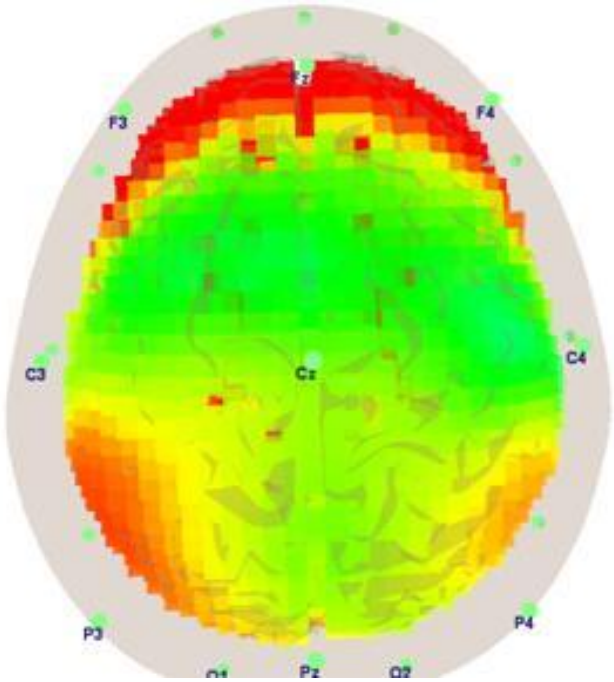




# Posterior Alpha Activity during piercing

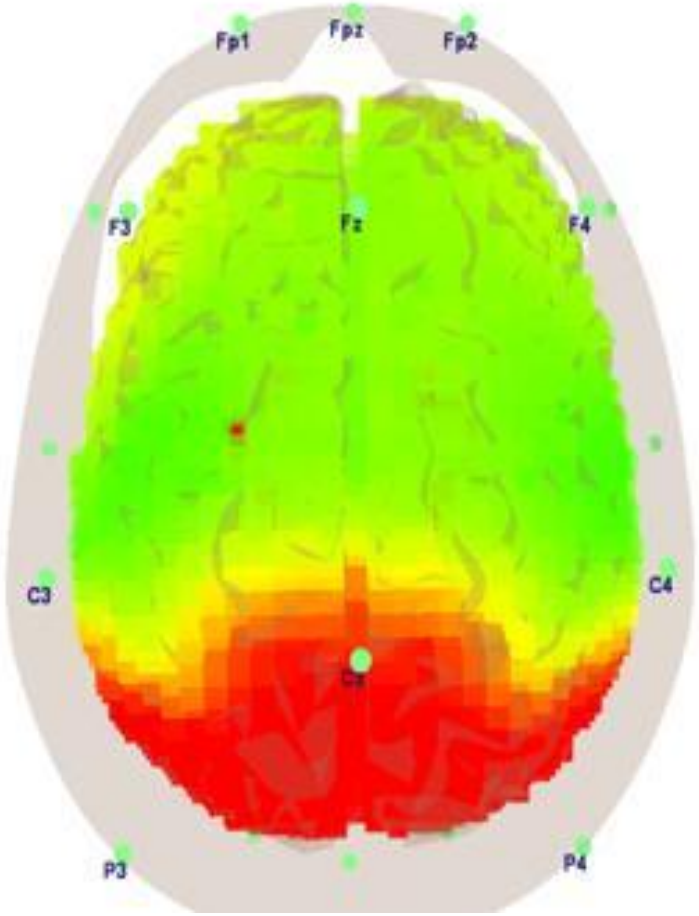




# Anterior & Posterior Alpha Abundance

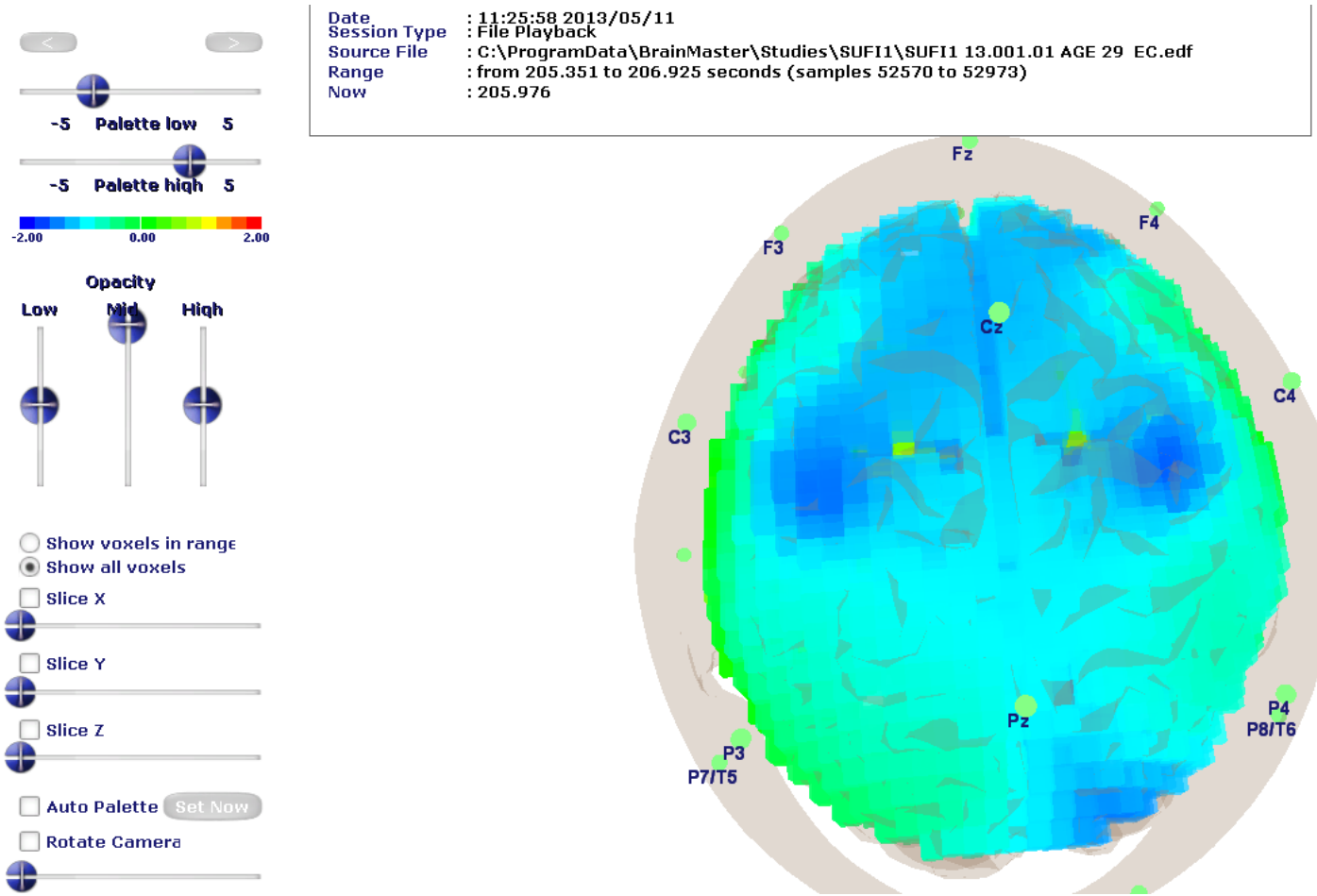



# Posterior Alpha Abundance


# Gamma Deficit – Awareness Network - BDx



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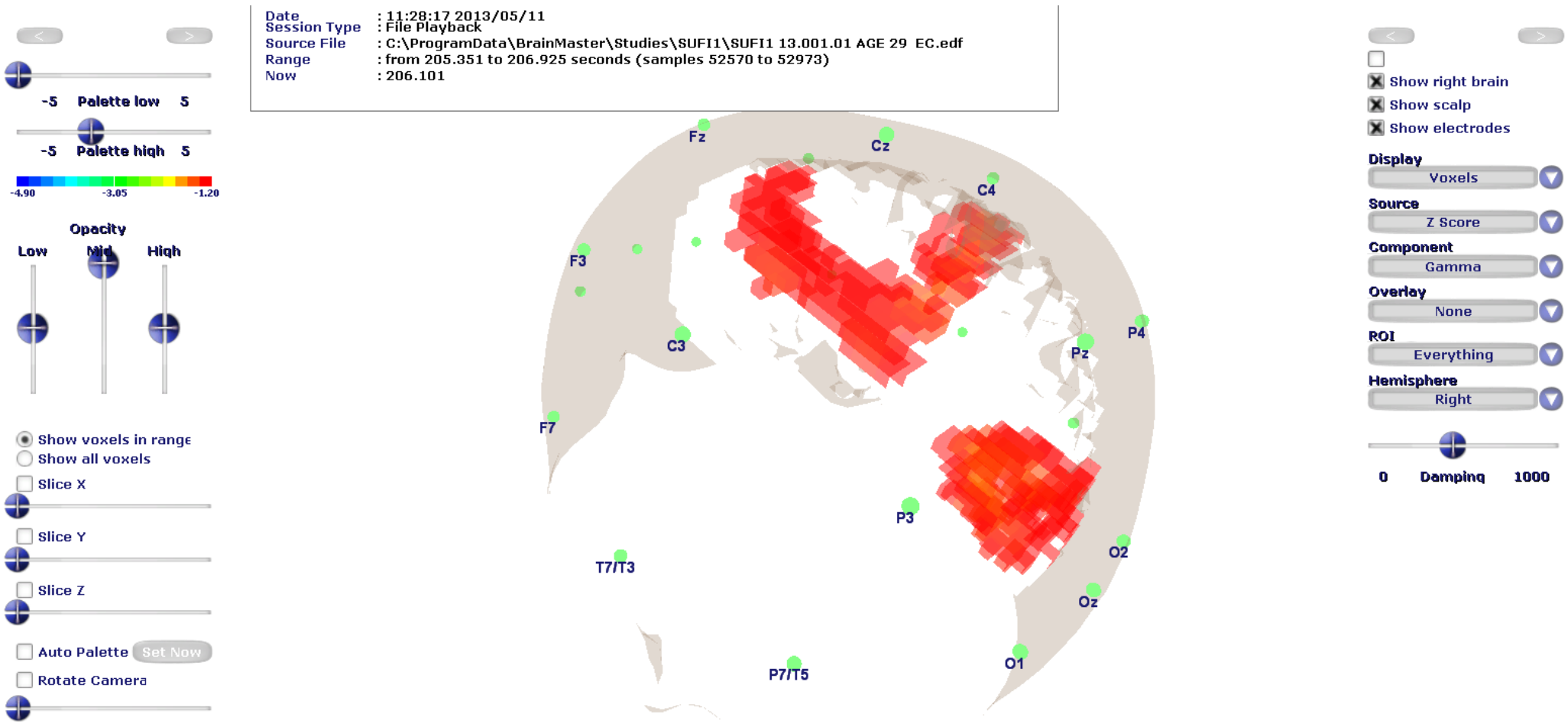
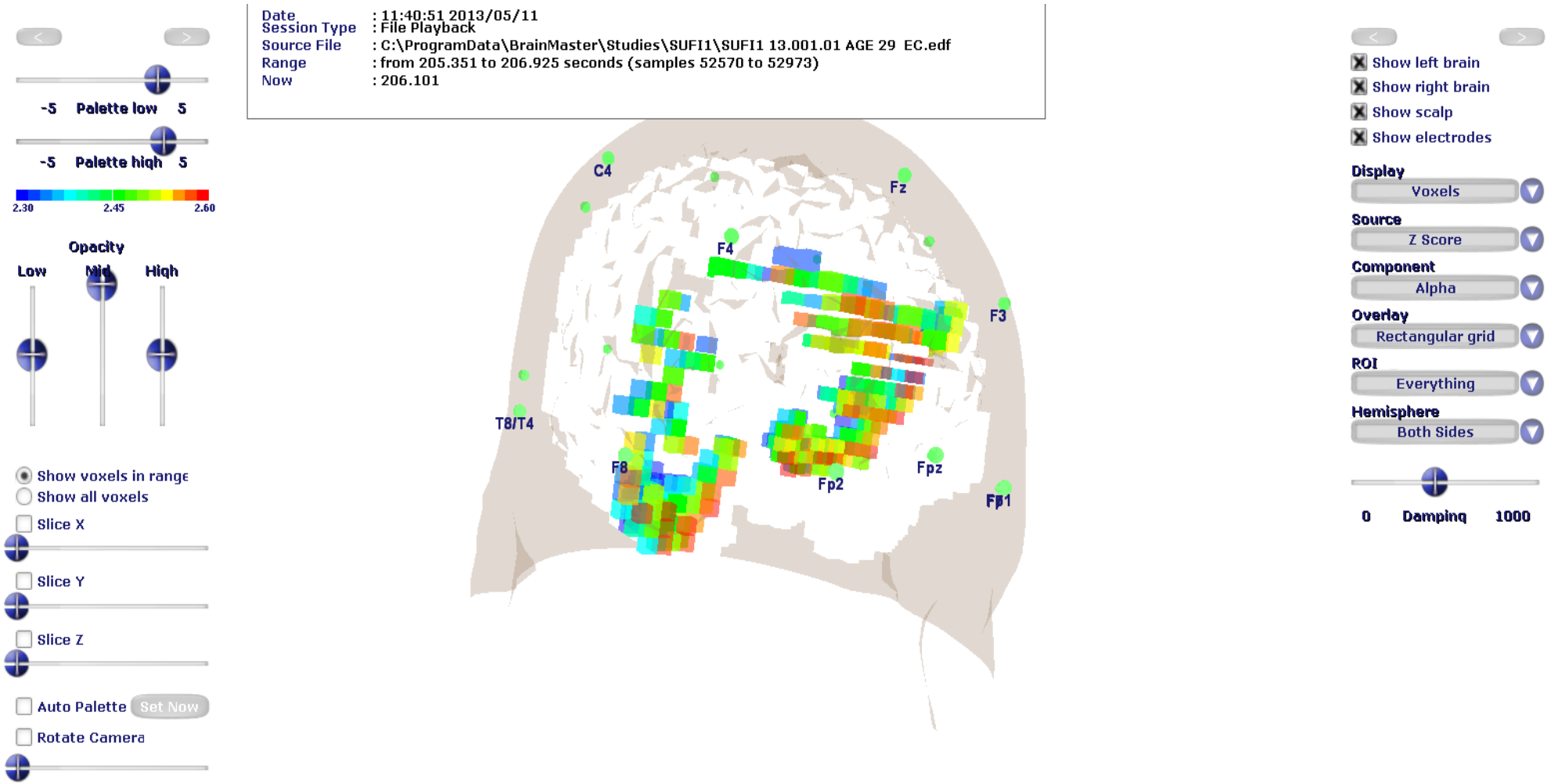
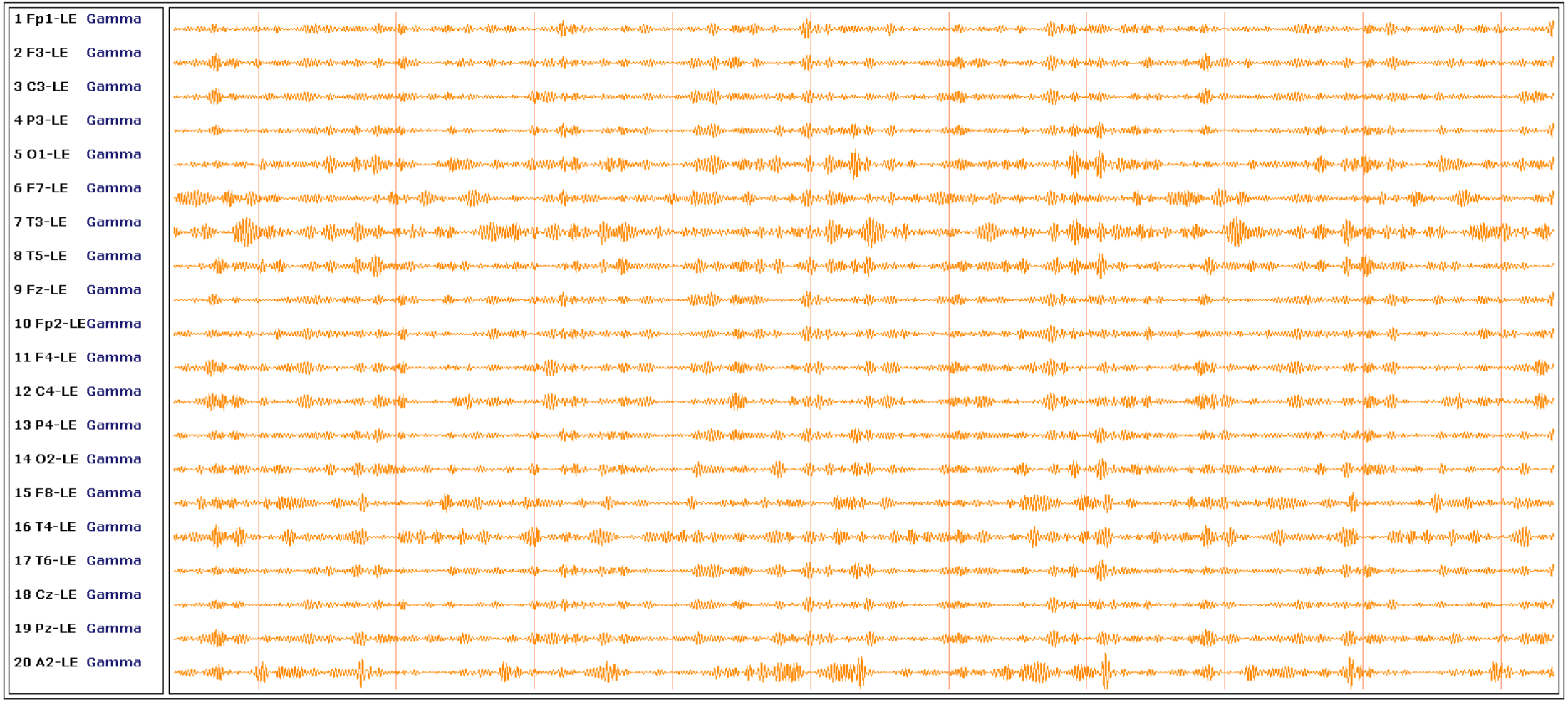


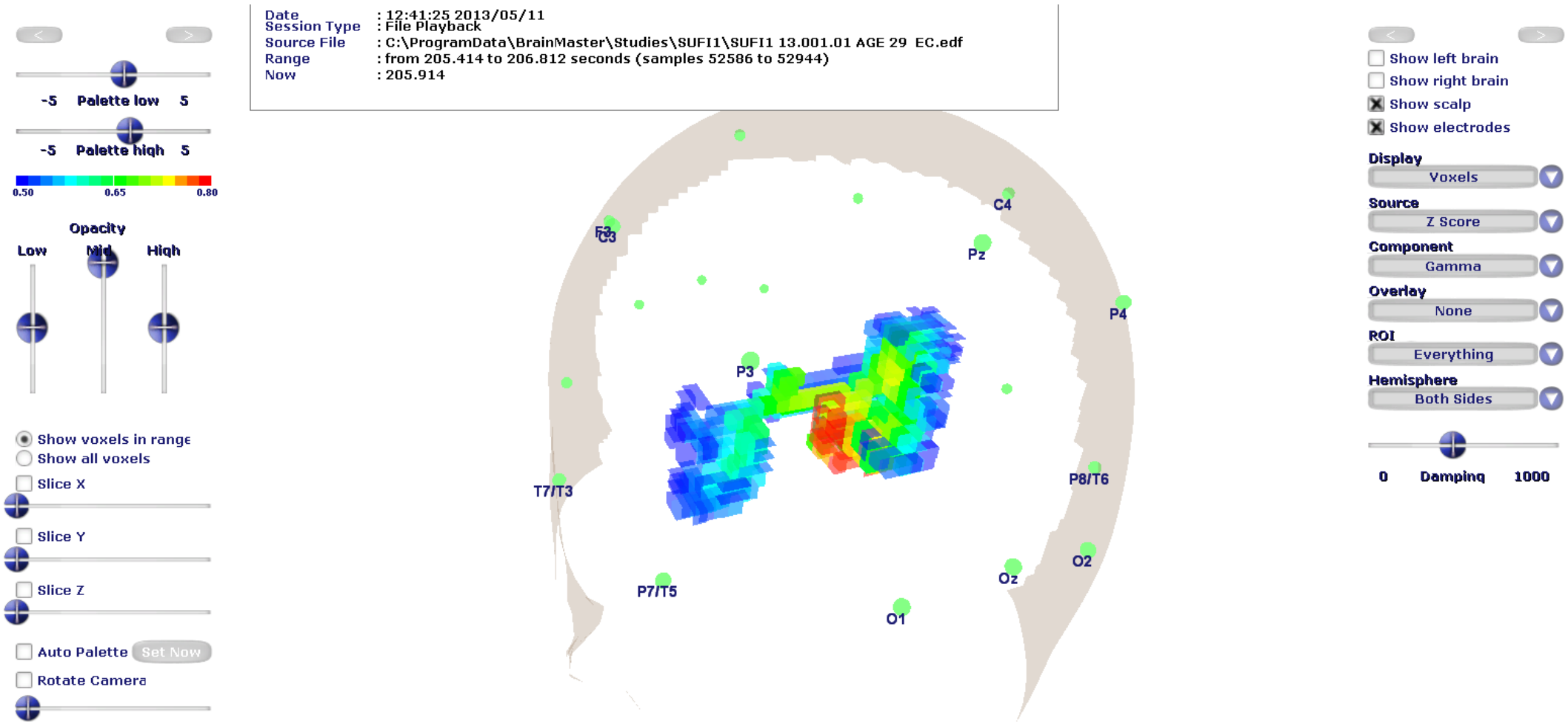
# Alpha Abundance SM strip & temporal - BDx



# gamma abundance Centrotemporal



# Gamma abundance mesiotemporal - BDx



# Summary

- Demonstrated ability to tolerate pain
- Preceded by unique state of brain/mind conditioning
- EEG data revealed selective gamma de-activation of network
- EEG data revealed increase of gamma activity in mesial temporal regions
- EEG data revealed selective alpha production across sensorimotor strip and associated temporal lobes

# Interpretation

- Consistent with scenario that:

- Practitioner is able to selectively turn off the brain network that produces conscious awareness, including pain awareness
- Practitioner is re-orienting his awareness to an internalized state by activating deeper brain locations
- Practitioner is able to introduce a state of relaxation that encompasses the sensory areas as well as memory and association areas.

# Questions

- Impact for pain control
- Impact for possible neurofeedback intervention