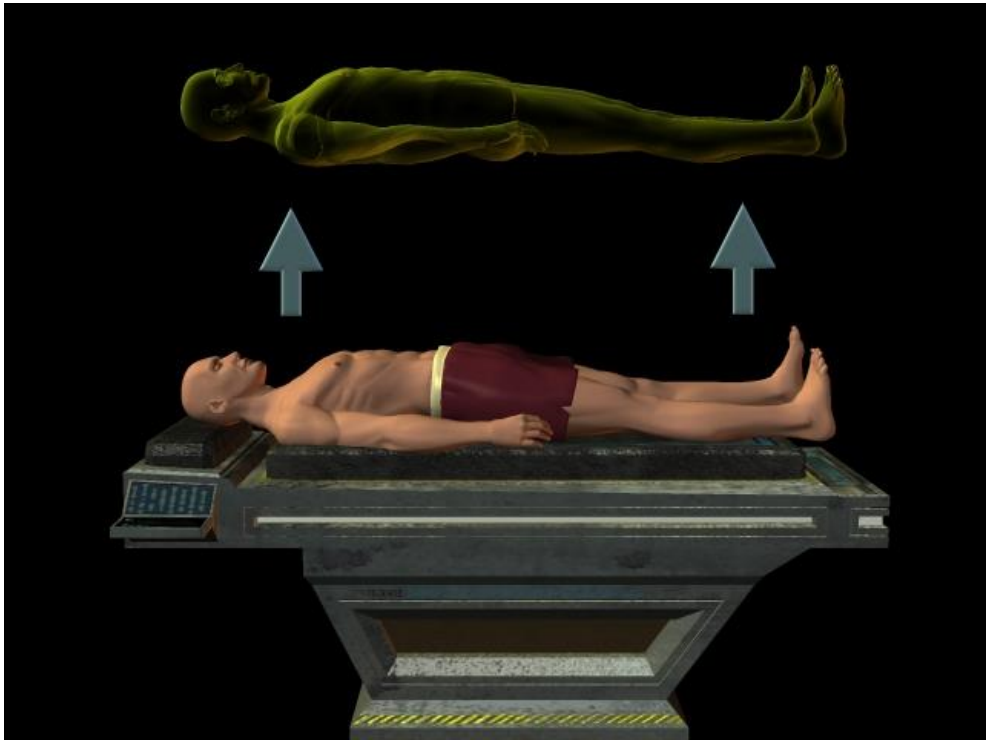
EEG during out-of-body experience

Michal Teplan

Stefano Siccardi

Definition of out-of-body experience

- Out-of-body Experience (OBE) = people seem to be awake, and feel that their “self”, or centre of experience, is located outside the physical body
- Both in clinical and normal subjects (e.g. Blackmore's survey 1982)
- It is a subjective state
- In shamanism and magics OBEs are related to exceptional tasks, thus one can ask:
  - Can an OBE also be an objective state?
- OBE phenomenon belongs among potentially one of the most direct evidence serving fans of the nonmaterial essence of humans and believers in the afterlife.



wikipedia

- In the fields of cognitive science and psychology, OBEs are considered dissociative experiences arising from different psychological and neurological factors
- OBE can be considered as an experience from a mental state, like a dream or an altered state of consciousness without recourse to the paranormal

Previous research

- Tart (1967, 1968, 1969):
  - 2 gifted subjects
  - Physiological measurements – about 20 experiments in several sessions
  - Subjects tried to get information about a remote target (5 digits number)

- Morris et al. (1978):
  - 1 gifted subject
  - Physiological measurements
  - Tried to detect the remote “presence” of the subject (animals’ behaviour, enviromental measures)

- A problem: to replicate OBEs at will, to control duration, intensity, etc.

Previous findings about EEG during OBEs

- Tart, Morris:
  - "Alphoid" waves: 1-2 Hz lower than subject's normal alpha (about 9-13 Hz in general)
  - Theta waves (4 to 8 Hz) abundance or high amplitude
  - A bordeline condition between sleep and wakefulness

- McCreery and Claridge (1996):
  - Association / disassociation between cerebral hemispheres

Our research

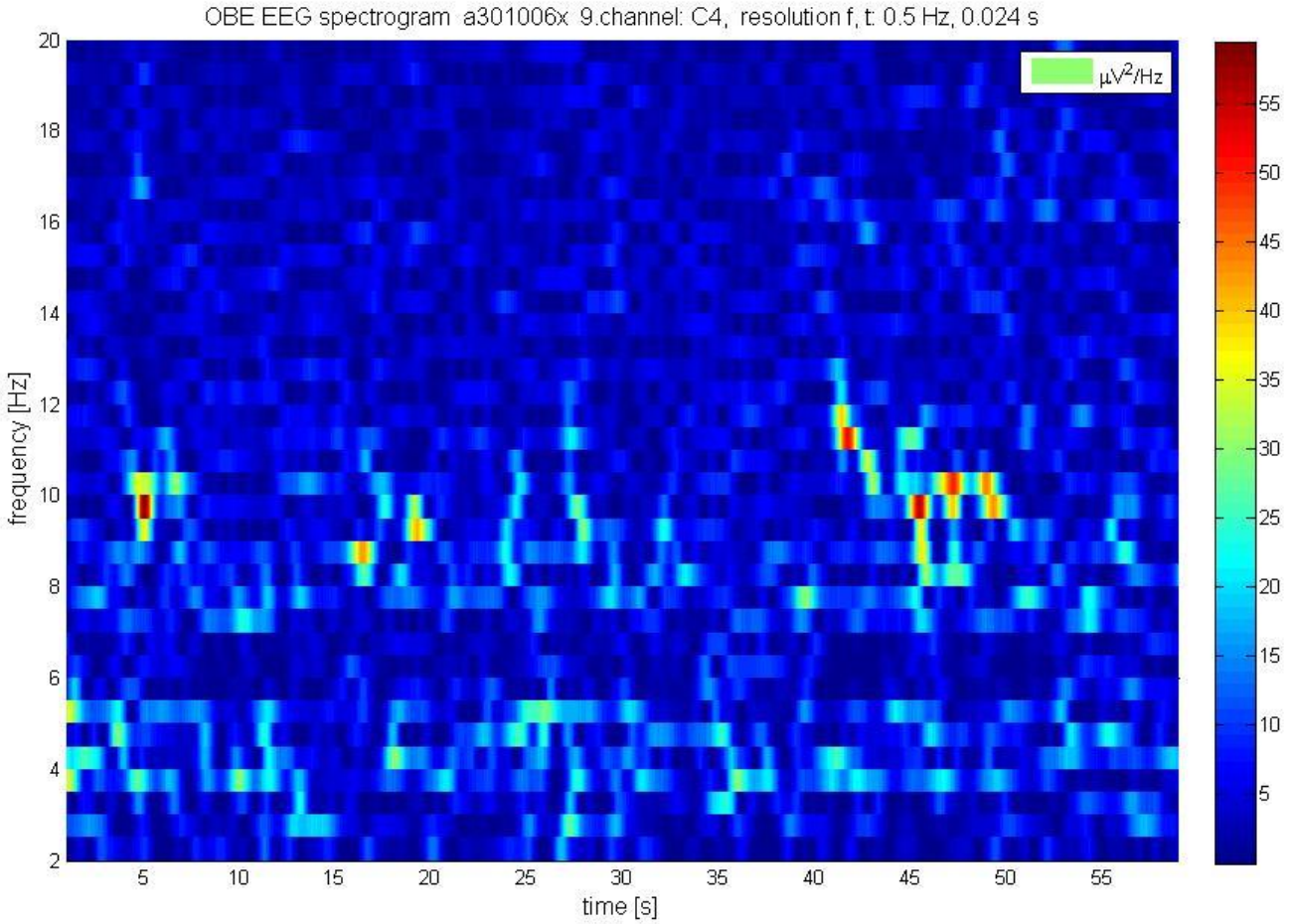
Data

- Origin: cooperation with an Italian group led by Stefano Siccardi
- Single trial of a subject capable of inducing OBE was chosen
- Session duration: 31 min
- Successful short OBE was reported by the subject at the end of the session

Data analysis

- Focus on data from 30’ to 31’
- Time-frequency analysis in the form of spectrogram

Results



- Possible physiological event detection: Cortex location C4, time 42-50 s increased alpha power + transition from 12 Hz down to 10 Hz during 3 s
- Alpha formation continued for another 5 s
- The event represents increased activity in the right “irrational” hemisphere
- C4: sensory and motor centres
- Reflections of this process were observed also in T4 location and partly spread to P4, T6, and O2, as well as to the parieto-occipital region of the left hemisphere

First hand phenomenological investigation (MT)

- Occurrence of occasional experiences
- Identification of the onset features (dizziness)
- Sudden sharp wakefulness after the process of falling asleep
- Correlation with reading OBE literature (Monroe: Journies out of the body)
- Enhancement by meditation; possibility to train OBE induction
- Seemingly objective according to the configuration and conditions in the interior and exterior, later discrepancies found
- Immersive and convincing state, however with the presence of a role of an observer
- During transition: switching between in-body and out-of-body (dissociative) perspective
- Special state with fabricated super illusion, worth for study and exploitation

Conclusion

- Subjectively reported OBE episode was possibly correlated with the event in the EEG signal
- A single event does not allow us to draw any firm conclusion
- Limitations: Physiological correlates are not able to support the objective existence of OBE, i.e. interpretation of the literal existence of consciousness outside of the human body, however, they can characterize this extraordinary state

Conclusion

- Suggestions for future research:
  - data from more subjects and with more OBE events
  - multimodal electrophysiological measurements may support findings in EEG
  - simple communication channel for marking of OBE onset by the subject

- **Final verdict:** OBE seems to be a perfect illusion – the ability of our brain to fabricate its own subjective reality. However, altered states of consciousness deserve further attention for their transformative potential in society.