

more frequent water changes in the calorimeter.

In such conditions, from 63 independent sessions conducted during three months in the phase 2, 57 attempts are positive, thus the success rate is about 90.4%. From 67 control attempts, performed as 'empty sessions' (meditators were present but no sessions were conducted, see Figs. 10(a), 10(b)) and in parallel to experimental sessions (as non-targeted sensors, see Fig. 10(c)), we recorded 11 positive responses mostly from non-targeted sensors running in parallel to experiments, which represent 16.4%. The non-parametric Chi-square and Mann-Whitney U tests are used for statistical analysis against two different null-hypotheses, see also [38]. For Chi-square test the positive/negative results in experimental attempts are represented by '1'/'0' and we consider the null hypothesis about a random character of obtained data (50% of success under the experimental channel). The Mann-Whitney U test analyzes two groups of reactions from experimental and control attempts, where the null hypothesis is an identical distribution function of these groups. Results are shown in Table I; based on obtained values we reject the null hypotheses for Chi-square and Mann-Whitney U tests (significance level  $\alpha = 0.005$ , two tailed).

#### IV. DISCUSSIONS

**1. Explanation of results.** Main discussion is related to explanation of long-term sustained temperature variations. While heating or cooling of body regions during experiments are primarily generated by somatic factors (e.g. the blood circulation intensively impacts the heat distribution in the body), it is doubtful that prolonged continued heating or cooling in post-experimental period can also be explained by these factors. Experiments with external calorimetric measurements clearly demonstrate the same long-term sustained temperature variations where somatic factors are fully excluded.

Publications with spin isomers of water suggest that temperature variations in aqueous solutions can be explained by different heat capacity of para- and ortho- isomers [25]. The spin conversion changes the equilibrium 3:1 rate of spin isomers and thus changes the heat capacity. This in turn results in a symmetry breaking dynamics of temperature in differential calorimeters. The spin conversion can be triggered by different weak interactions (with minimal energy about  $10^{-27}$  J), e.g. by long-range spin-spin interactions [39], [40] or environmental factors [41]. Taking into account recent publications on non-classical brain functions, in particular on entanglement-mediated consciousness [28], as a hypothesis, it is assumed that such a spin conversion induced through ASC, can cause the observed thermal effects.

We note that meditative visualization exhibits different phenomena (not only thermal effects), as shown in Fig. 7. We see electrochemical changes (variable electrochemical reactivity caused by spin conversion [20]) indicating begin and end of sessions, where thermal changes from body heat follow 20 minutes after electrochemical responses. It is also related to different reaction patterns in the begin (only targeted sensors) and end of experiments (several sensors at the same time). It seems that non-classical functions of the brain have different appearances, some of them are still not fully explored. For instance, positive

reactions from non-targeted control experiments are described in the community [42]; various authors have linked them to entanglement phenomena in macroscopic systems [43]–[45].

Involvement of spin phenomena in quantum biology [46], [47] is intensively discussed in the community; they are proposed as possible candidates for consciousness-based mechanisms. Spin effects were found in biochemical reactions and cognitive processes of the brain involving phosphorus and xenon [27], [48], in various processes of animate and inanimate nature [49], [50]. Natural materials (e.g., molecules) are capable of performing certain calculations at the molecular or spin levels, which is studied in natural computing [51]–[53]. Due to long-range spin-spin interactions [39], [40], internal and external thermal phenomena can be considered as manifestations of one common process. This new understanding allows for comprehensive exploration of ASC with modern neurocognitive and spin-based instrumentation.

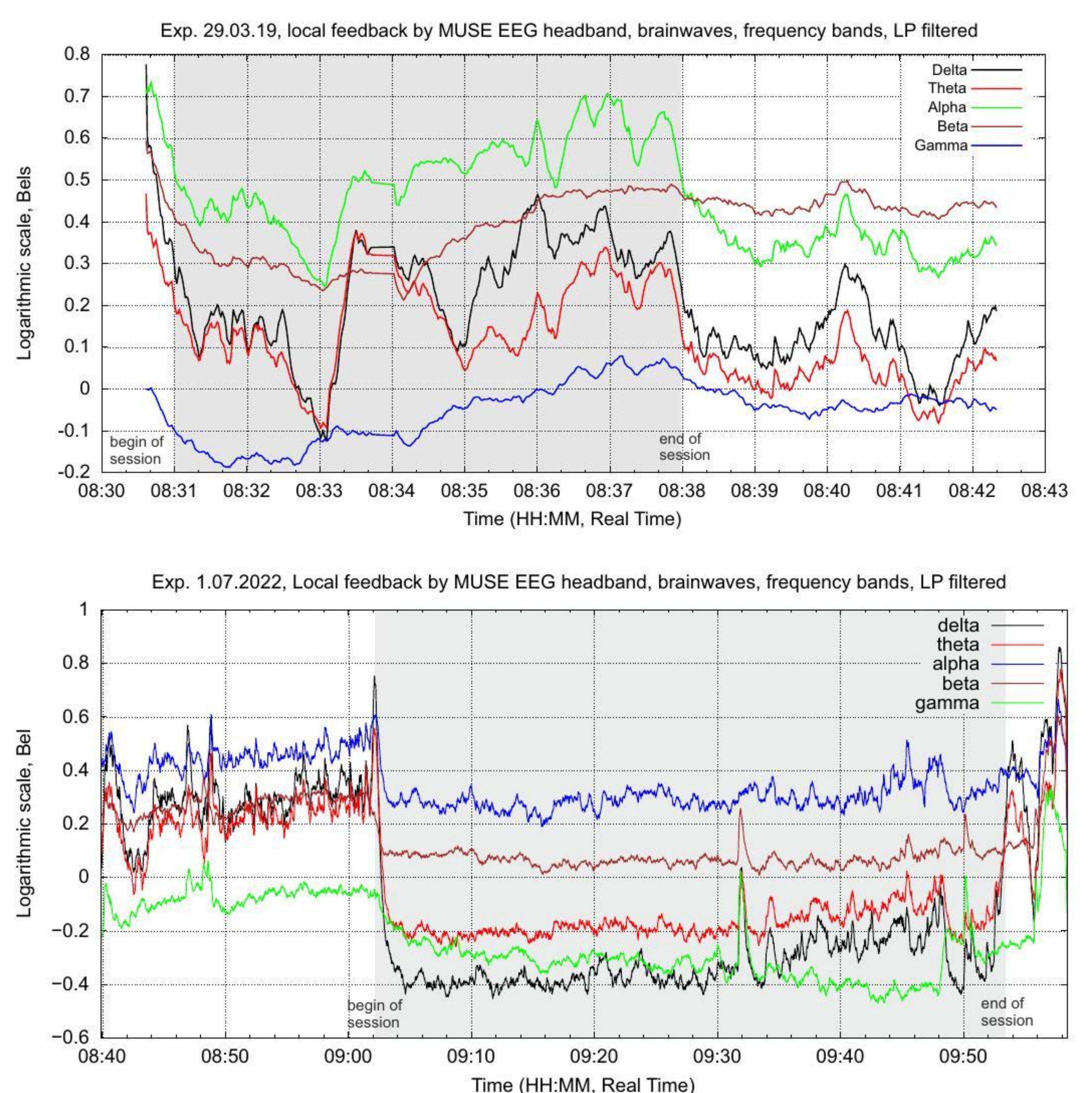


Figure 11. Training of meditative visualization: EEG dynamics of a meditator from 2019 and 2022 with the same exercise.

**2. Training of operators** is already discussed in [29]. For instance, Fig. 11 compares EEG of the same meditator from 2019 and 2022 during a similar active meditation exercise. It confirms the already expressed idea that periodical EEG and EIS feedback-based training positively influences the depth and duration of ASC as well as effects of related 'internal' and 'external' techniques.

#### V. CONCLUSION

These attempts confirm the persistent effects reported in [5]. The observed variations of core and skin temperature can be interpreted as a combination of psychosomatic or biophysical mechanisms. Long-term sustained temperature effects point to biophysical processes in aqueous solutions, since they have the same appearance in water systems outside the body, such as