Report

# NEW APPROACH FOR REMOTE DETECTION OF HUMAN EMOTIONS

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## ABSTRACT

Various instrumental methods have been developed for observing human emotions in psychology, the neurosciences, and machine learning studies. These methods are mostly directed to detecting individual, personal emotions. The focus of this study is developing instrumental methods for remote detection of human emotions, both individual and collective. A new antenna device has been added to the Electrophotonic Imaging/Gas Discharge Visualization camera system. Examples of data are explored from a water blessing ritual, healing workshop training, musical performance, geophysical measurements during a solar eclipse, and a shamanic ceremony. These preliminary indications demonstrate a potential for mapping the effects of human emotions. We propose an international collaborative project for a Geoactive Zones Database: developing maps of energy parameters for sacral subjects and a program for study of their influence on the human psycho-physiological condition; in relation with both the environmental situation, and the health and psycho-types of people.

**KEYWORDS:** emotions, detection of emotional state, remote detection, collective emotions, collective consciousness, Electrophotonic Imaging, Gas Discharge Visualization (GDV) technique.

## INTRODUCTION

Since the early studies of human behavior, emotion has attracted the interest of researchers in many disciplines of Neurosciences and Psychology. More recently, it is a growing field of research in computer science and machine learning.[1] Interesting research in human-computer interaction has developed methods for detecting emotional states of a speaker by assessing an audio signal.[2] The apparatus and method are based on the differences in voice features between a person being in an emotional state and the same person being in a neutral state. Multiple types of emotions can be detected, and the method and apparatus are speaker-independent, i.e. no prior voice sample or information about the speaker is required. Another line of study detects emotions from facial expressions and body posture.[3] All of these methods, however, are directed to detecting individual personal emotions. For many practical applications it is important to detect collective emotions of a group of people. The aim of this study was developing instrumental methods for remote detection of human emotions, both individual and collective.

## METHOD

The method of Electrophotonic Imaging (EPI) based on the Gas Discharge Visualization (GDV) technique is well known for applications in medicine, sport, and materials testing – especially water testing.[4-6] The EPI/GDV is based on computer processing of images of the gas discharge glow around subjects under study in a high intensity, pulsed electromagnetic field. The instrument is normally calibrated using a titanium cylinder 15 mm (0.6 inch) in diameter, connected to the grounding jack of the device. (Titanium is very stable and does not oxidize in a gaseous discharge). The methods of the EPI/GDV instrument are used in this new application for an "Electrophotonic Sensor." An antenna is connected to the calibration cylinder, rather than connecting to the grounding jack of the camera. A Professional or Compact EPI/GDV camera system can be used for these measurements; or a new stand alone, more portable, battery powered "Eco-Tester" device can be used for long recording periods, with data storage directly on a memory stick. The operating principles are as shown in Figure 1.

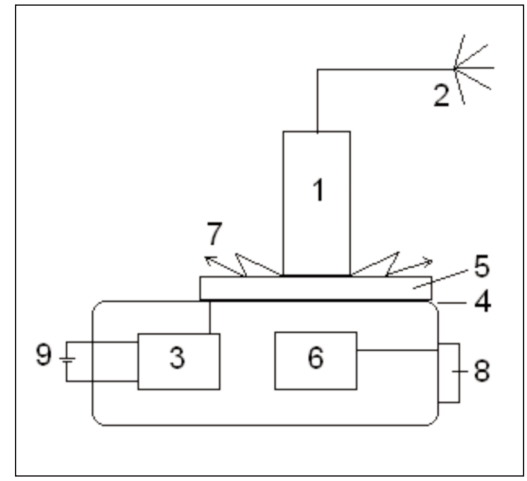
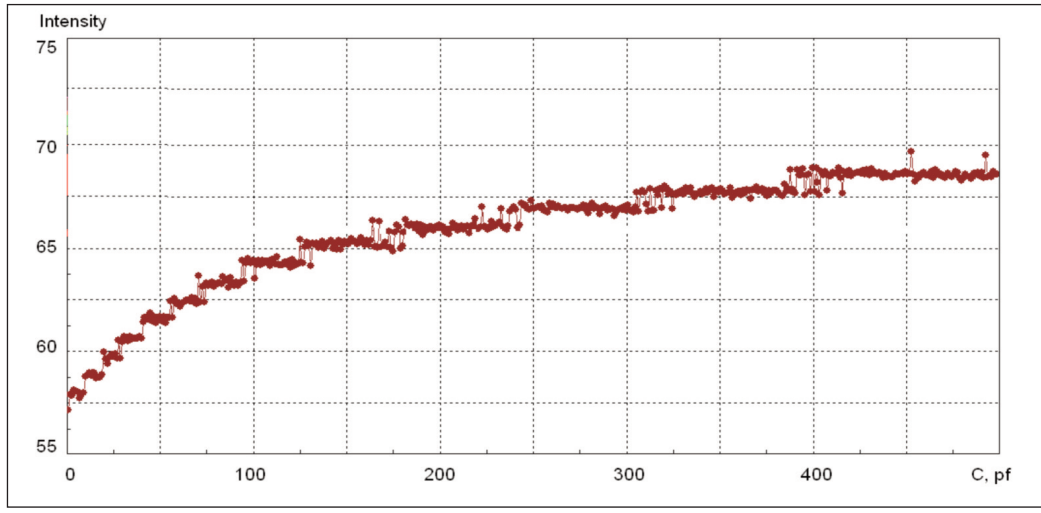



*Figure 1. The schematic design of the "Eco-Tester" Electrophotonic Sensor. 1 – titanium cylinder; 2 – special antenna; 3 – impulse generator; 4 – transparent conductive layer; 5 – quartz electrode; 6 – TV system; 7 – gaseous discharge; 8 – memory stick; 9 – 12 V rechargeable batteries.*

For detecting emotions, a titanium calibration cylinder (1) is connected to a special antenna (2) designed to create a non-homogenous electromagnetic field in space. The Generator (3) produces voltage impulses of 7 kV amplitude, 10 mcs duration, and 1 kHz frequency; arriving in 0.5 s packets every 5-10 s. Voltage is applied to the transparent conductive layer (4) on the quartz electrode (5). The bias current from the antenna (2) generates a gaseous discharge (7) between the cylinder (1) and the electrode (5). The glow of the discharge is detected by a special TV system (6) and after digitizing is recorded as a series of image files on a memory stick (8) connected to the instrument. Instrument runs on 12 V rechargeable batteries (9) for more than 100 hours in automatic mode. Files are kept in memory with time marks, which allows data processing to correlate parameters with time sequences of the events under study.

Bias current in the electrical chain depends on the capacitance of space between the antenna (2) and the environment of grounded and electro-conductive subjects. Figure 2 demonstrates experimental dependence of the glow intensity from the metal cylinder from capacitance. The oblique section of this graph correlates to the most sensitive parameters of the instrument, which may be regulated by the amplitude of the applied voltage. Emotions are related to the activity of the parasympathetic division of the autonomic nervous system, which changes blood microcirculation, perspiration, sweating, and other functions of the body, resulting in the changes of the overall conductivity of the body and the conductivity of acupuncture points in particular. So the presence in the vicinity of the instrument of emotional people may change the conductivity of space and, hence, the signal of the sensor. By contrast, from measurements in laboratory conditions at night without

*Figure 2. Experimental dependence of the glow at the metal cylinder from capacitance.*



people present, variability of data during 6 hours remained at the level of 0.5–1%. Before collecting field data, the measurement instrument should be "warmed up" by operating for 30-50 minutes with the cylinder connected to the grounding jack of the instrument, rather than being connected to the antenna.

## EXPERIMENTAL RESULTS

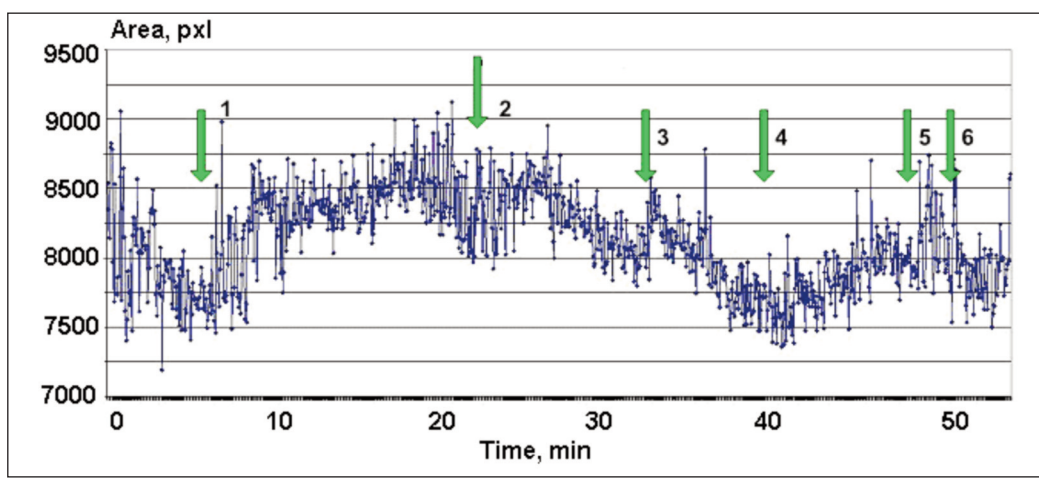
The very first testing of the "Electrophotonic Sensor" instrument demonstrated the effectiveness of this method. Measurements conducted during religious ceremonies, yoga meditations, and public lectures demonstrated that the signal of the Sensor changes with statistical significance during measurements; and these changes are correlated with the course of event. Let us examine some examples.

### WATER BLESSING AT LAKE BAIKAL

On August 3, 2008, Dr. Masaro Emoto conducted a ceremony for blessing the water at Olkhon Island, on Lake Baikal, in the South-Eastern part of Siberia. The graph in Figure 3 shows the time dynamics of signal amplitude, which characterizes the power of a signal. Arrows mark different stages of the ceremony. Glow area is expressed in numbers of pixels.

As we see from the graph, all significant moments in the ceremony were followed by peaks of the Area. The gradual decrease between points 2 and 4 might be explained by people's gradual loss of their intense concentration.

*Figure 3. Time dynamics of the "Electrophotonic Sensor" during Dr. Emoto's ceremony. 1. Beginning of ceremony. Explanations by Dr. Yasuyuki Nemoto, Secretary-General of the Ceremony and Assistant to Dr. Masaru Emoto. A large group of people came to the shore to participate in ceremony. 2. Beginning of first meditation led by Dr. Nemoto and Irina Pantaeva. 3. Presentation by Dr. Masaru Emoto. 4. Dr. Emoto begins blessing of the waters with collective meditation. 5. Dr. Emoto sings a song and offers all the people to join him. 6. The End of the event.*



## Reconnection Healing Workshop

On September 12 & 13, 2008, in Los Angeles, a series of measurements were recorded during a Reconnection Healing workshop, led by Erick Pearl and Doug DeVito. All devices were warmed up for 1 hour before the arriving of the participants, and measurements were conducted half an hour before the workshop and all through the period of the workshop sessions.

Figures 4 and 5 demonstrate time dynamics of the Antenna sensor parameters for the first and the second day of the workshop, with marked moments of interest.

The most interesting moments of the presentations on September 12 were as follows:

7.31 - Doug DeVito on podium "Essence Lecture" and then introduces practitioners – jumps in Intensity, strong variations in Area (sector 2).

8.35 - Eric Pearl arrives – increase begins in Area, which lasts until the end of Eric's presentation (~10.10) (sector 6).

10.10 – 10.31 Eric recaps, summarizes & conveys practical processes for the day…. frequent laughter, and then concludes (sector 7).

During the second day, on September 13, Area decreased through the first half of the day, and increased through the second half of the day.

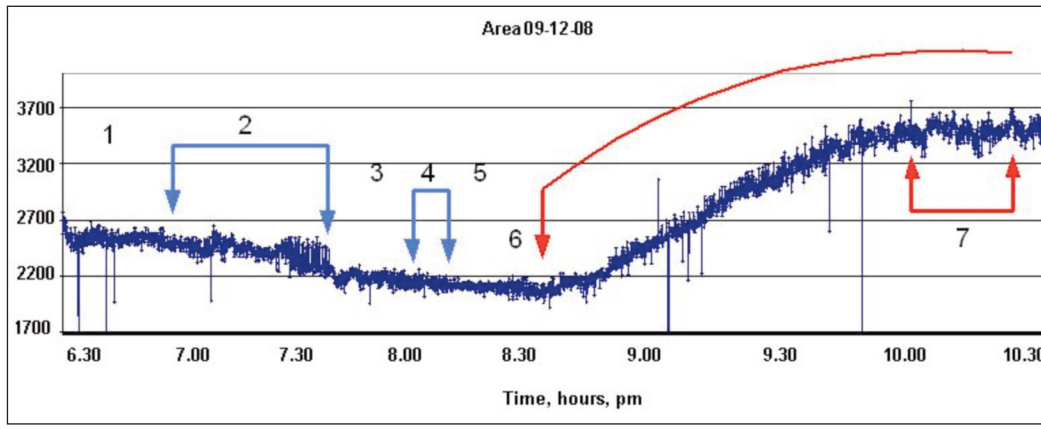
The most interesting moments for September 13 were as follows:

15.04 – 15.43 - Doug with participant demonstrating practical process of healing (sector 6).

17.05 – 18.02 – Doug and Eric addressing overall process (sector 9).

Parallel measurements at this workshop were conducted by the group with Professor

*Figure 4. Time dynamics of the "Electrophotonic Sensor" parameters for the first day of the workshop (September 12, 2008) with marked moments of interest.*



William Tiller using their special PH water sensor.[7] Tiller's team were able to detect significant changes in this signal during the times with speakers' on-stage presentations to the audience, which correlated with our data.[8]

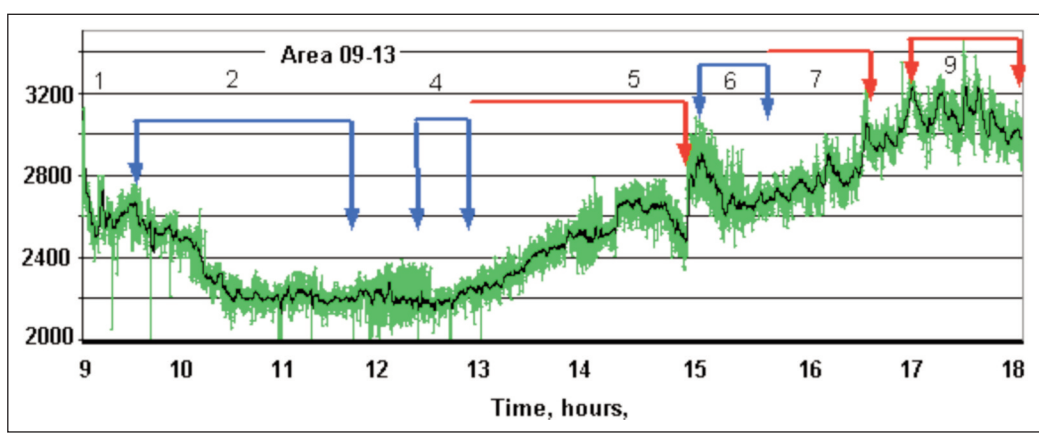
On both days of the Reconnective Healing Workshop, strong effects appeared when a speaker/trainer stepped on-stage, and drew the focused attention of the audience – correlated variations of the signal were recorded. After the beginning of a trainer presentation the signal was increasing, in most cases with strong oscillations; while in recess periods the signal dropped down. Marked effects are very well correlated with the effects recorded by Dr. William Tiller's team with their equipment operating on absolutely different principles. From the physical point of view these correlated effects may be related to the formation of areas of decreased entropy in the room, resulting from the focused attention of the participants; or, as Professor Tiller claims "associated with the buildup of a negative magnetic charge manifesting in the environment."

Without addressing specific physical explanations, it is clear that the collective effects of Reconnective Healing Workshops are strong and measurable. We may definitely explore conditioning of environmental space in the workshop room. At the individual personal experience level, changes of participants Energy Fields and Chakras assessed with the EPC/GDV before and after the workshop demonstrate strong positive effects from this process for psycho-emotional states of participants.

## Instrumental Musical Performance

A series of experiments with musical performance have been conducted. The one discussed in this paper took place at the Childrens' Music School named after N. A. Rimski-Korsakov, in St. Petersburg, on May 22, 2009. A selection of pieces from four

*Figure 5. Time dynamics of the "Electrophotonic Sensor" parameters for the second day of workshop (September 13, 2008) with marked moments of interest.*



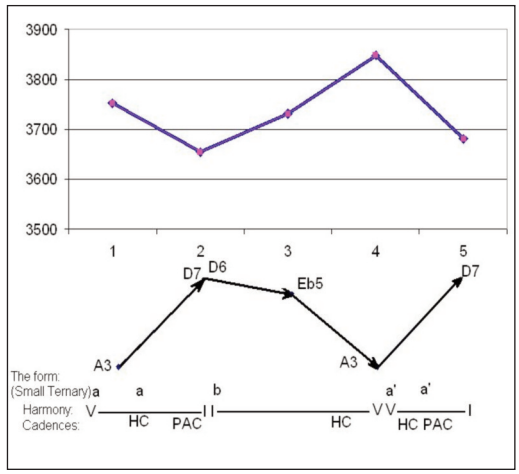



*Figure 6. Comparison of the changes of the "Electrophotonic Sensor" parameters (upper graph, Area expressed in number of pixels) with melodic direction for the opening page of Piece No. 1 in Schumann's Kreisleriana.*

stylistic periods (Baroque, Classical, Romantic, and 20th-Century) were performed by Dr. Ildar Khannanov. It was apparent from the graphs of measurements received from the "Electrophotonic Sensor" that the levels of signal distinctly vary from style to style. It was possible to compare elements of musical form with the segments of the graphs. In the example in Figure 6, a graph of glow area, expressed in number of pixels, shows a mirror reversal of the melodic directionality for the opening page of Piece No. 1 in Schumann's Kreisleriana. The higher the melody reaches, and the more intense is the musical condition, the smaller is the area of the signal.

## Operatic Vocal Music Performance

On July 13 and 15, 2009, in Saint Petersburg, Russia, TV filming of the two world-class opera singers Rene Fleming and Dmitri Chvorostovski was conducted in St. Petersburg palaces. The performances were two repetitions of the same program, with both performances recorded for TV. The July 13 filming was performed in the Ball Hall of the Great Peterhof Palace, and only technical personnel and organizers of the event were present. It was raining all the time. The July 15 filming was performed in Usupovski Palace and the public was invited to the performance. By the end of the concert a strong thunderstorm had begun. In both cases the singers were accompanied by a symphony orchestra with conductor Konstantin Orbeljan.

We were lucky to be invited to both events and record data from the "Electrophotonic Sensor." Recording was done in automatic mode with a 5 second interval. On July 13, the data was gathered from an EPC/GDV instrument running on 12 V battery with air antenna and personal computer. On July 15 the stand-alone "Eco-Tester" was used.

### Results

Figure 7 presents time dynamics of Area and Intensity recorded July 13. Shaded areas on the graphs mark the periods of the singers' performances. We pay special attention to two aspects of the graphs: the strong descending trend of the area graph and big difference between scales of data (difference between maximum and minimum values at the given interval) at the moments of performance and during the periods of intermission. An advantage of this performance was in the long intermissions necessary for

filming, which allowed calculating statistical differences of data recorded during performance and intermission.

The overall descending trend of the area graph may be connected with meteorological conditions (torrential rain), but the influence of the recorded processes can be clearly seen. Differences in the parameters during the performances and intermissions are clearly visible for both graphs.

Results for statistical comparisons of data at the particular moments of performance with the data in the subsequent intermissions are presented in Table 1.

In Table 1, each parameter shows some statistically significant differences from the subsequent intermissions for various intervals (statistical significance here is considered to be $p < 0.05$). Interesting observations may be drawn from analysis of the scales of the Area, Intensity, and Entropy parameters presented at Figure 8. As we see from the graphs, the scale of data during performances was significantly higher compared with the intermissions. A Mann-Whitney statistical test of these data demonstrates their statistically significant difference with $p< 0.05$ both for Area and Intensity. (In Table 2 – the rank for 7 events should be 37 or less for the first column.)

Processing of data recorded July 15 is presented at Figure 9 and in Tables 3. As we see from Table 3, statistically significant differences were noted for some moments of performance.

**Discussion**

As we see from the data presented above, various parameters of the sensor signal were significantly different at the moments of singing performance compared with parameters in intermissions. This may be presented as the change of entropy in the signal at the moments of performance, as compared with background. We might even say that performance of world-class singers changes the entropy of space. We can also see quite different characters for the signals between July 13 and July 15. One of the main differences in the conditions was that the July 13 performance was practically without an audience while on July 15 the performance was organized as a public concert and people from the very beginning were in a state of emotional excitement. At this juncture, we are unable to make any conclusion about how the emotional condition of either the public or of the performers influence the sensor signal.

From the July 13 performance, the Electrophotonic (GDV) parameters from the fingers of the conductor, Konstantin Orbeljan, were recorded before and after the concert. As we see from the graphs presented in Figure 10, three hours of conducting resulted in full energy depletion of the artist.

## Changes in Geophysical Conditions

In a wide range of measurements in various geographic regions, it has been demonstrated that the "Electrophotonic Sensor" reacts to changes in environmental

*Figure 7. Time dynamics of Area and Intensity recorded July 13, 2009.*

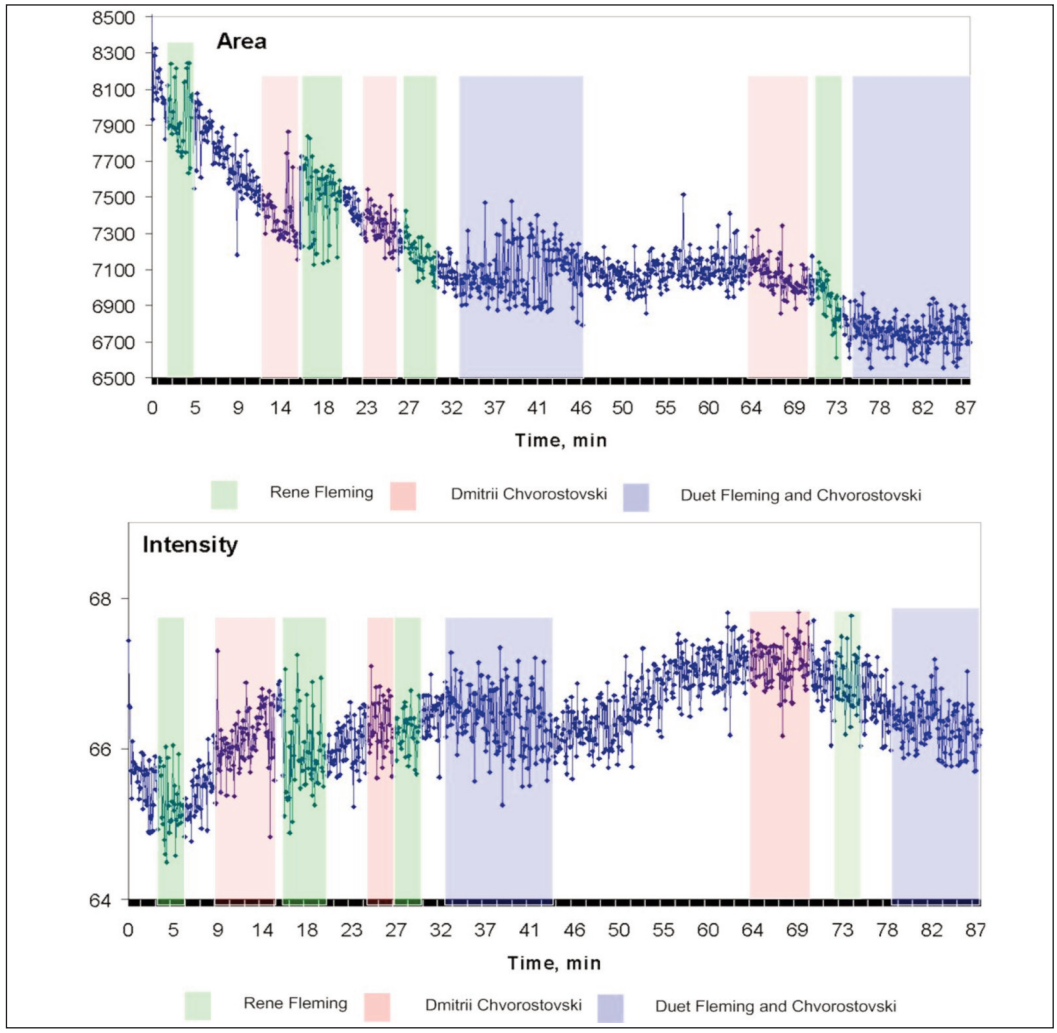



*Table 1. Results for July 13 statistical comparisons of five EPC parameters at particular moments of performance, compared with the subsequent intermission (values of probability by ANOVA t-test).*

| | Area | Intensity | Form Coeff | Entropy | Fractality |
|---|---|---|---|---|---|
| Fleming (2-4 min) | **0.0279** | 0.4949 | 0.5843 | 0.4565 | 0.9131 |
| Chvorostovski (10-14 min) | 0.0687 | 0.5668 | 0.9351 | 0.2280 | 0.6117 |
| Fleming (16-19 min) | **0.0000** | **0.0320** | 0.9621 | **0.0057** | **0.0183** |
| Duet (33-46 min) | 0.0867 | 0.1439 | **0.0027** | 0.2862 | **0.0004** |
| Chvorostovski (64-69 min) | **0.0437** | 0.0661 | 0.2399 | **0.0004** | **0.0254** |
| Fleming (70-73 min) | 0.1785 | **0.0565** | 0.2527 | **0.0412** | **0.0158** |
| Duet (75-87 min) | 0.1356 | **0.0000** | 0.1115 | 0.2895 | 0.7843 |

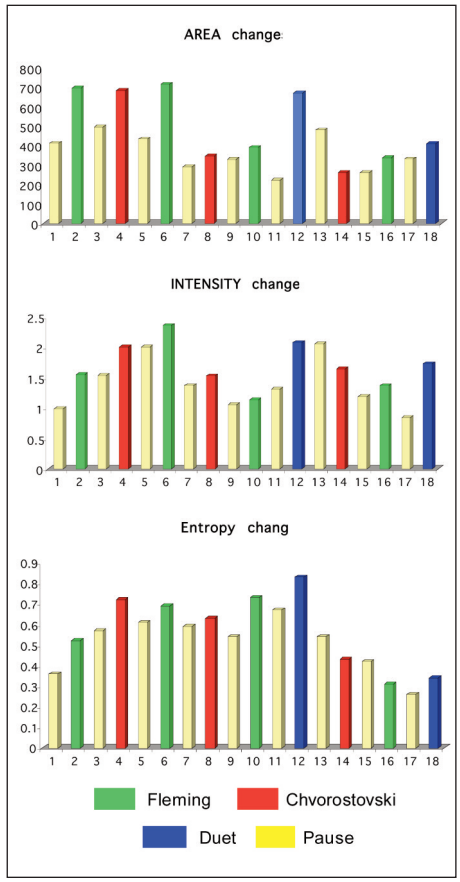



*Figure 8. Scale of data July 13, 2009.*

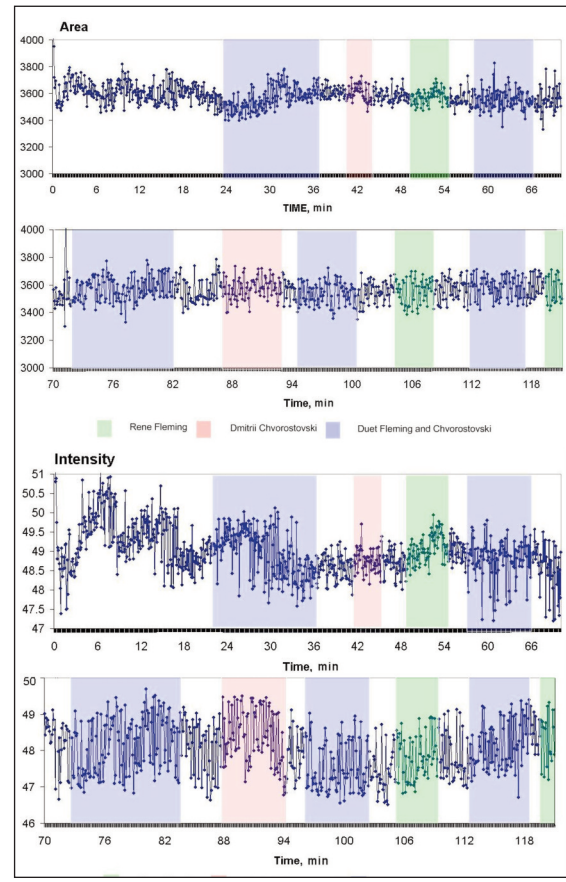



*Figure 9. Time dynamics of Area and Intensity at the performance July 15, 2009.*

*Table 3. Results of statistical comparisons of EPC parameters at the particular moments of performance on July 15 with the parameters in the subsequent intermission (values of probability by ANOVA t-test).*

| | Area | Intensity | Form Coeff | Entropy | Fractality |
|---|---|---|---|---|---|
| Duet (20-36 min) | 0.184 | 0.072 | **0.030** | 0.151 | **0.002** |
| Chvorostovski (42-45 min) | 0.477 | 0.718 | 0.758 | 0.925 | 0.808 |
| Fleming (48-54 min) | 0.126 | **0.011** | 0.559 | 0.088 | 0.501 |
| Duet (56-66 min) | 0.110 | 0.188 | 0.313 | 0.159 | 0.966 |
| Duet (72-83 min) | 0.260 | **0.033** | 0.614 | 0.450 | **0.039** |
| Chvorostovski (88-94 min) | 0.127 | 0.405 | 0.897 | 0.187 | 0.669 |
| Duet (96-102 min) | 0.213 | 0.510 | 0.807 | 0.180 | 0.728 |
| Fleming (106-110) | 0.582 | **0.020** | **0.000** | 0.715 | 0.707 |
| Duet (112-118) | 0.452 | **0.034** | 0.311 | 0.853 | 0.381 |

*Table 2. Mann-Whitney statistical analysis of EPC parameters at the particular moments of performance on July 13 compared with the parameters in the intermission.*

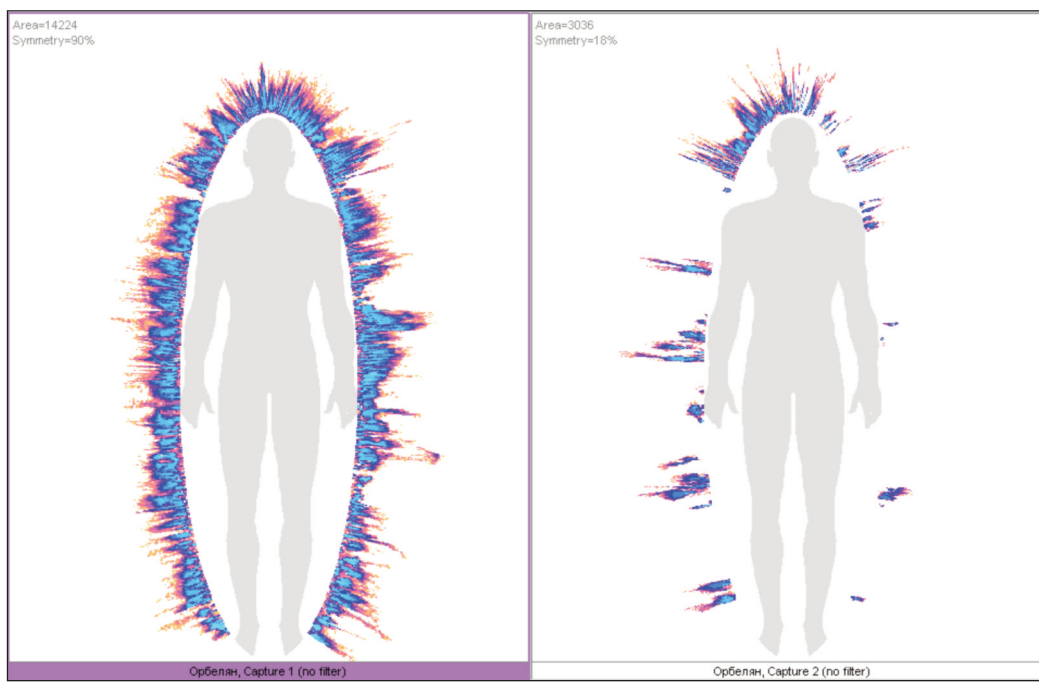
Mann-Whitney test Area

| | Performance | Rank | Intermission | Rank |
|---|---|---|---|---|
| Fleming (2-4 min) | 696 | 3 | 413 | 7 |
| Chvorostovski (10-14 min) | 684 | 2 | 496 | 5 |
| Fleming (16-19 min) | 716 | 1 | 434 | 6 |
| Duet (33-46 min) | 672 | 4 | 291 | 12 |
| Chvorostovski (64-69 min) | 346 | 9 | 328 | 11 |
| Fleming (70-73 min) | 338 | 10 | 222 | 14 |
| Duet (75-87 min) | 410 | 8 | 261 | 13 |
| | | **37** | | **68** |

Mann-Whitney test Intensity

| | Performance | Rank | Intermission | Rank |
|---|---|---|---|---|
| Fleming (2-4 min) | 1.55 | 7 | 0.99 | 14 |
| Chvorostovski (10-14 min) | 2 | 3.5 | 1.54 | 8 |
| Fleming (16-19 min) | 2.36 | 1 | 2 | 3.5 |
| Duet (33-46 min) | 2.08 | 2 | 1.37 | 9.5 |
| Chvorostovski (64-69 min) | 1.64 | 6 | 1.06 | 13 |
| Fleming (70-73 min) | 1.37 | 9.5 | 1.31 | 11 |
| Duet (75-87 min) | 1.73 | 5 | 1.19 | 12 |
| | | **34** | | **71** |

*Figure 10. Energy Field of the conductor Konstantin Orbeljan before and after the performance.*



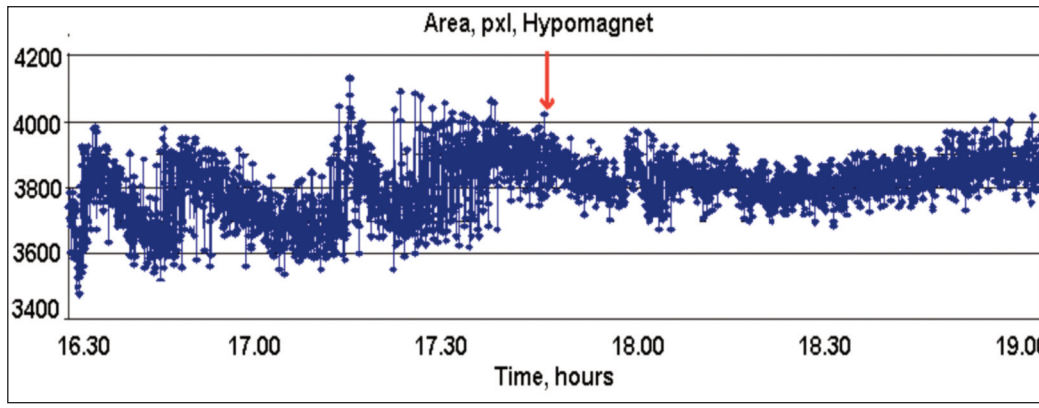



*Figure 11. Time dynamics of the "Electrophotonic Sensor" parameters before and after Sun Eclipse in Novosibirsk, August 1, 2008.*

geophysical conditions. Field testing at the Far North of Russia, in Venezuela, Colombia, and England demonstrated that the instrument is sensitive to changes of environmental parameters.

For example, in Novosibirsk, Russia, during a Solar eclipse on August 1, 2008, six "Electrophotonic Sensor" instruments positioned in different locations of the area recorded statistically significant differences in signals at specific phases of the eclipse. Statistically significant correlations in the instruments' readings for variation in both Area and Intensity were found in measurements before and after the progress of the eclipse, with probabilities of 99.9 ($p < 0.00001$). Figure 11 demonstrates time dynamics of the signal from one of the instruments. The arrow signifies the moment of total sun eclipse.

In August, 2007, we participated in a trip to Peru. Two shamanic ceremonies were held during the trip. One was held at Amante Island of Titikaka Lake in the morning, on the top of the hill. When we tried to turn on the equipment, all the batteries were found to be drained. The batteries had been replaced with fresh ones the previous night, but at the top of the hill the charge was totally gone. A second shamanic ceremony was held on the banks of the Urubamba River, nearby to the city of Cusco. Figure 12 demonstrates the graph of parameters recorded during the ceremony.

In the process of ceremony the parameters in the graph changed dramatically. It is difficult to attribute these changes either to the emotions of the people or to the environmental conditions. The ceremony was held about 50 meters from the river, the weather was mild, with a slight wind blowing, and people were standing at some distance from the sensor. The unique character of this experience did not allow repeating it.

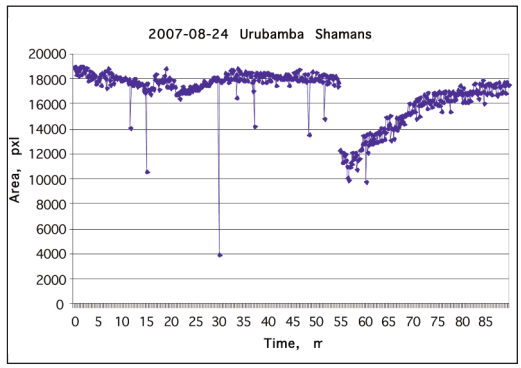



*Figure 12. Time dynamics of the "Electrophotonic Sensor" parameters during shamanic ceremony in Peru, August 24, 2007.*

## DISCUSSION

As we see from the data examples presented here, experiments allowed recording both the individual and collective emotional excitations. A lot of experimental data should be collected to make results presentable and publishable. Measurements may be done in a theater, concert hall, church, lecture auditorium. It is interesting to take measurements during sports events. But for one lone research group it is difficult having many different experiments. We need collective efforts of researches from different countries. The advantage of this approach is that any researcher operating with an EPI/GDV Camera may take part in this research.

We may construct several models explaining observed effects – from chemical and physical ones, to quantum electrodynamics and esoteric explanations. From our point of view settling on explanations is not important at the moment. First of all we need to collect a database of observations in different situations by several research groups.

We should especially take into consideration the following ideas of Professor William Tiller, reflecting on the concurrent conditioned space measurements projects during the Eric Pearl workshop:

"The periods of audience-focused attention upon the on-stage speaker signals that group entrainment leading to significant growth of group coherence is occurring. This leads to high information production rate events.

Macroscopic spatial information entanglement, due to simultaneous use of multiple measuring instruments, appear to be generating reduced contrast in the magnitudes of various event signatures. This probably occurs via the addition of out-of-phase vector components (a type of data randomization)

As a closing remark, if all the subsystems of the experiment are included in the analysis, it certainly strengthens the statement regarding "only trends" from our experimental measurements can be expected to be meaningful at this time. Further, with Dr. Korotkov's team making experimental measurements in the same room as us, one should expect information entanglement to occur between their measurement system and ours!"[8]

To prove or disapprove these ideas we need to have a series of further experiments with different modalities of healing.

At any rate, without being concerned for the moment about physical explanations, it is clear that the effects of human emotions are strong and measurable. We may describe possible conditioning of environmental space in a workshop room. In further stages of these experiments we need to study the following topics:

1) Correlation between several similar instruments installed in the same room of the workshop and in different rooms. An instrument array may help us to answer questions of space conditioning and the area of the influence.
2) Comparison with effects of a group of people at music concerts, or political gatherings.
3) Effects of age and gender of participants.
4) Influence of geophysical conditions.
5) Dependence of effects on the experience, training and other qualities of practitioners.

Correlation of results between Dr. Tiller and Dr. Korotkov's teams makes them especially interesting and opens perspectives for further understanding of the enigmas of consciousness.

These results have also allowed beginning a new scientific line of instrumental investigation into geo-active zones. In this field, cultural aspects of the puzzles are of particular interest. The idea that from ancient times historically significant monuments have been located in "places of power," having some specific geophysical properties, with specific influences on the human condition, has been approached experimentally.

The perspectives of these studies are exciting for everybody interested in the spiritual history of humankind. We may define a whole new international research line: development of the maps of energy parameters of sacral subjects and a program for study of their influence on the human psycho-physiological condition; in relation with both the environmental situation, and the health and psycho-types of people. This type of research may be carried out in a public domain. In contrast with archeological excavations, these energetic space measurements do not need any official permissions, and the results may be exchanged and published through the Internet.

This approach opens up a broad field of activity. Not just sun-bathing at the beach or wandering around with a photo camera, but participating in an international project on the development of a Geoactive Zones Database. The only prerequisite for this participation is an ability to operate with an EPI/GDV Camera.

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**REFERENCES & NOTES**

1. S. Kim, P. Georgiou, S. Lee, S. Narayanan, Real-time emotion detection system using speech: Multi-modal fusion of different timescale features, *Proceedings of IEEE Multimedia Signal Processing Workshop* (Chania, Greece, 2007).
2. S. Abrilian, L. Devillers, S. Buisine, & J.-C Martin, EmoTV1: Annotation of Real-life Emotions for the Specification of Multimodal Affective Interfaces, *Proceedings of Human-*

*Computer Interaction International,* (Las Vegas, July 2005).
3. M. Coulson, Attributing Emotion to Static Body Postures: Recognition Accuracy, Confusions, and Viewpoint Dependence, *Journal of Nonverbal Behavior* **28** (2004), pp. 117-139.
4. Measuring Energy Fields: State of the Art, *GDV Bioelectrography series. Vol. I.* Konstantin Korotkov (Ed.), (Backbone Publishing Co. Fair Lawn, 2004), p. 270.
5. S. Gibson, B. Williams, The effect of music and focused meditation on the human energy field as measured by the gas discharge visualization (GDV) technique and profile of mood states *Subtle Energies and Energy Medicine* **16**, 2 (2005), pp. 57-60.
6. A. L. Vainshelboim, M. T. Hayes, K. S. Momoh, Bioelectrographic Testing of Mineral Samples: A Comparison of Techniques *Journal of Alternative and Complementary Medicine* **11** (2005), pp. 299-304.
7. W. A. Tiller, *Psychoenergetic Science: A Second Copernican-Scale Revolution* (Pavior Publishing, Walnut Creek, CA, 2007).
8. Tiller, W. A., and Dibble, W. E., An Experimental Investigation of Some Reconnective Healing Workshops via a Unique Subtle Energy Detector, *Consciousness and Physical Reality Journal* **8** *(*2009), pp. 27-32.

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