

Research

Human Bio-Photons Emission: an observational Case Study of Emission of Energy Using a Tibetan Meditative Practice on an Individual

Pagliari G1*, Mandolesi N2, Parenti G3, Marconi L4, Galli M5, Sireci F6 and Agostini E7

1Psychotherapist, Director of the Operative Unit of Hospital Psychology, Bellaria Hospital, Bologna, Italy

2Department of Physics and Earth Sciences, University of Ferrara, Italy

3Psychology, Operative Unit of Hospital Psychology, Bellaria Hospital, Bologna, Italy

4ClinicalPsychologist, Bologna, Italy

5Psychotherapist, LotoOnlus, Bologna, Italy

6Psychotherapist, Hospital of Santa Maria, Reggio Emilia, Italy

7School Psychologist, Public School of Pistoia, Italy

Abstract

Reason

Several studies have highlighted how bio-photons emission can be considered a reliable indicator of the status of health or illness of a living being. Further evidence show that this emission can be regulated through meditative practices. The current paper reports a first observational case study which intends to demonstrate the possibility of intentionally transfer energy from an individual to another and that the process can be recorded using appropriate specific tools.

Method

An expert therapist used a Tibetan meditative practice called Tsarlung on a healthy participant, who volunteered to the study. The session was recorded using two highly specific recording devices, the FAST video-camera and the FUTURA camera. The recording was performed under temperature and humidity controls. The background was measured in the empty room and with the therapist and the participant had not come into contact prior to the meditative session. At the same level of cameras' sensitivity, the images were showing regular images with no signs of unexplained photons.

Results

Frames from the active session show different steps of a shift of energy from the therapist to the participant.

Conclusion

Evidence from this first observational case study, which shows the existence of an energy in form of bio-photons emission intentionally created and then transferred from a human being to another one, presents strong incentive to set up more challenging and tightly controlled studies.

Aims

The aim of the current study is to detect the intentional transfer of energy shifting from an individual to another one. The energy is retrieved as bio-photons movement, recorded using highly sophisticated and specific cameras.

***Corresponding Author:** Gioacchino Pagliaro, Psychotherapist, Director of the Operative Unit of Hospital Psycholog, Bellaria Hospital, Bologna, Italy, E-mail: gioacchino.pagliaro@ausl.bologna.it

Sub Date: September 28th 2017, **Acc Date:** October 23rd 2017, **Pub Date:** October 23th, 2017.

Citation: Pagliaro G, Mandolesi N, Parenti G, Marconi L, Galli M, Sireci F and Agostini E (2017) Human Bio-Photons Emission: an observational Case Study of Emission of Energy Using a Tibetan Meditative Practice on an Individual. BAOJ Physics 2: 025.

Copyright: © 2017 Pagliaro G, et al. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

This preliminary observational case study does not intend to demonstrate a healing effect of an intentional transfer of energy, but solely to show that the transfer of energy is present and that its movements can be traced using appropriate measuring tools.

Keywords: Meditation: Tsar Lung: Bio-Photons: Bio-Field: Energetic System: Luminescence

Introduction

The evolution of the theoretical basis of quantum physics throughout the past century to the present has shed light on a number of puzzling questions and opened innovative fields [1-4]. To date the principles of quantum physics, supported by repeated experiments, are being applied to a number of new areas including quantum computing, quantum cryptography, quantum optics and chemistry up to quantum biology. The quantum long distance communication has been proved [5] through photon entanglement, up to 143 Km, as predicted by Einstein. The feasibility of a quantum channel between space and earth is ready to be tested [6].

On the side of neurobiology, the role of quantum physics in understanding how the brain works is not yet clear. Similarly, it is unclear if quantum coherence applies to brain's neurons. All this has a connection to philosophy: is consciousness a fundamental property of nature or does it exist outside the known laws of science?

In this context of bio-fields and energy information processes, the concepts of consciousness and energy in health promoted in the Tibetan philosophy and medicine may be suitable to foster an enhanced understanding of the role of bio-fields in the status of health.

Bio-Photons Emission

According to Popp and colleagues [7] all living organisms spontaneously emit weak light in absence of external photo-excitation, which is known to be part of their metabolic processes. The phenomenon is known as bio-photons emission [8,9].

The existing literature on the bio-photons effect is particularly ample. Early research experiments on the topic were conducted by Gurwitsch in the 1920s [10] and in the following decade more than 600 studies were published. The current literature reports hundreds of published papers describing this emission in plants, bacteria, animals and humans [7,11]. However, bio-photons emissions are not visible to the naked eye and optical detectors sensitive enough to measure this type of radiations were not developed until the 1940s with the advent of photomultiplier tubes PMTs [12-14].

Nowadays, it is widely recognized that monitoring bio-fields around living organisms provides information concerning their health status and their way of healing. Some researchers postulate that bio-photon emission may also be responsible for intra- and inter- cellular communication [15].

Recent technological innovations led to remarkable progresses of the measuring instruments, which are light detectors allowing images of bio-fields to be monitored as a function of time. In particular, arrays of charged coupled devices CCD are used as detectors in video cameras X-UV-visible IR bands for their features of low-noise, high sensitivity and excellent angular resolution.

In their review article, Create and Schwartz [17] revised their own studies conducted over a period of 2.5 years concerning attempts to develop instruments detecting bio-photons emission from living beings, most of which involved plants as subjects of study. The authors' assumption was that monitoring bio-fields would lead to relevant conclusions on health status and healing processes of the subject investigated. Findings from the studies showed how physiological processes are successfully monitored by bio-photon imaging instruments, providing quantitative information on the organisms' health status, and thereby allowing significant deductions. The use of plants as experimental subjects allowed researchers to carefully adjust the instrumentation and to collect data from a large sample.

Bio-Photons Emission from Plants

Measurements of these spontaneous emissions from different species of plants were first presented by a research team led by Coli in the early 1950s [19,20]. The authors found that beans cut into pieces emitted 2-3 times stronger light than whole beans, indicating that mechanical injuries lead to increased bio-photons emission in plants. Further studies and trials confirmed the paradigm that stressed or injured cells emit significantly more photons compared to healthy cells and this feature was then found to be cross-sectional to all types of cells [21-28]. For example, increased radiations from stressed cells were also observed in parts of wounded plants ([26]), algae stressed with poison Go e Popp, 1992 seedlings stressed with salt [29], plants stressed by chilling or drought [23,29,30], and cancerous human cells compared to normal cells [25]. Therefore, bio-photons detection is likely to reveal information about the state of health of a biological object. When plant parts are used as objects, unhealthy and cut areas have a greater emission compared to healthy and uncut areas.

As previously mentioned, an additional relevant aspect of the experiments conducted by Create & Schwartz [16,17] is the measurement of energy healing efficacy. Create and Schwartz designed a study testing the effectiveness of healing energy on bio-photon emissions of geranium leaves aiming at determining whether energy healers are able to affect the metabolism of a biological organism [31]. The authors compared treated and untreated leaves from a single geranium plant. Leaves from the experimental group were treated for 10-15 minutes with one of the following techniques: Vortex Healing VH, Reiki or Barbara Brennan Training. The control group did not receive any treatment. In the first trial, the practitioner's hands were positioned 3 inches from the leaves, whereas in the subsequent 3 trials they were at a 6-to-10 inches distance from the leaves. Results showed that the untreated leaf sections exhibit a

greater photonic activity near the injured edges and, at the same time, the treated leaf section had a noticeably lower bio-photons emission.

Bio-Photons Emission from Humans

At a later time, Create and Schwartz [18] focused on bio-photons emission from human subjects. Due to numerous research studies carried out in the last decades, it is now confirmed that also the human body emits bio-photons, not related to thermal radiation emitted by matter warmer than the absolute zero temperature. With its typical temperature of 37° C, the human body radiates in the infrared with a peak of about 12 microns.

Several recent studies in this field allowed to investigate both human bio-photons emission and its relationship with the individual's health status. As it was observed in other living organisms, more detailed images of human bio-photons emission can be obtained using highly sensitive CCD-cameras with 10-minute exposure in total darkness. For instance, it was observed that fingertips emit more bio-photons than the back of the hand, and the intensity of palms emission is concentrated between fingertips and palms. A weak photon emission was retrieved in all living organisms and their cells. From the 1960s, different international research groups focused on the topic [21,31,33, 34].

In 1986, Indaba and colleagues [32] launched a bio-photon project with the intention to improve knowledge on health status of individuals affected by medical conditions. Their documented observations showed that the blood of patients suffering from medical conditions such as cancer, diabetes, and jaundice emits more light than that of healthy individuals [32].

At a later time, also Cohen & Popp [35] investigated human bio-photons features by building a dark, large and comfortable room for two people with a moving bio-photon detector (Photo Multiple, EMI 9558 QA). This device could measure less than 0,1 photons/sec/cm² and it could examine human skin in the dark room. The photon detector hung from the ceiling of the room, where the temperature was at 20° C, and it could rotate in 3 different position on the human body. The duration of each recording was chosen in a way that allowed to both registering over as many locations as possible and to distinguish between intensity of different locations. The monitoring and data recording were taken using electric instruments located outside the dark room.

Two elements are to be considered: first of all, the existence of a disturbing phenomenon called delayed luminescence DL, which can interfere with the recordings if the object studied is exposed to light prior to the experiment, secondly, psychological aspects related to the measurement process, due to discomfort derived from lying down in room entirely dark for a long period of time.

This first system of measurement allowed Cohen & Popp [35] to study 200 individuals and final results confirmed that bio-photon emissions

research could be an innovative, powerful and non-invasive method of cell tissue analysis and control of health and disease status in human subjects. In fact, the authors demonstrated that healthy people displayed a low ultra-weak photon emissions UPE average and a relatively high intensity of delayed luminescence DL; individuals with pathological conditions, such as multiple sclerosis, had high UPE values and remarkable left-right asymmetries [35]. A further study also investigated left-right and ventral-dorsal asymmetries in unhealthy patients. The protocol required 29 different body parts to be recorder for a period of 1.5 hours each. Results highlighted that UPE were not evenly distributed throughout the body, although some similar areas presented relatively low and relatively high emissions. For instance, the core parts of the body such as thorax and abdomen recorder lower intensity while the limbs and extremities of the body displayed higher levels. In addition, the authors retrieved how despite the intensity of the overall emission was subject to change when measurements were repeated after 3 hours, the anatomical pattern of emission's intensity still presented high degrees of left-right asymmetries and the dorsal-ventral asymmetry was slightly lower compared to the left-right one.

A systematic review on ultra-weak photon emission as a measure of non-invasive health assessment was recently conducted by Ives and colleagues [36], which included 56 studies conducted over a period of 50 years. The authors were able to conclude that UPE are good to high quality health assessment measures and future directions should focus on the applicability of human photons emission to human health. Additionally, findings also highlighted a weaker intensity of UPE emission during daytime and a growth of the same emission at evenings and nighttime.

Bio-Photons Emission and Meditation

Part of the scientific literature focuses on the role of bio-photons emission in meditation. For instance, a research team led by Van Wink conducted studies looking at induced changes in UPE and meditative practice [37-40]. In two of their studies, the researchers conducted a comparative investigation measuring photon signals of 12 anatomical locations in a sample of 60 males. Participants were divided into three different groups depending on their 10-year experience of a specific meditative practice (transcendental meditation or TM, other mediation types or OM, and no meditation. Results showed that the TM and OM group had a significantly lower biophotons emission for each anatomic location respectively 27% and 17% lower than the no meditation group. The TM group showed a significantly lower UPE compared to the OM group in 11 of 12 body regions, suggesting that TM is more effective in producing relaxing outcomes than other types of meditations.

Within this framework, further studies investigated the influence of intentionality on UPEs [37,41]. In particular, Visalia [41] retrieved how intention is able to decrease the mean count of bio-photons emitted from hands. Similar findings were also found by Van Wink and colleagues

[37], who also suggested that UPEs are influenced by rhythmic pulsation of blood in the cardiovascular system and breathing rhythm, which are known to be amenable to meditation practices.

All in all, these evidences suggest that systematic measurements of ultra-weak biophotons emission are useful analytic and non-invasive tools able to provide useful information on the status of health and illness in humans.

Bio-Photons Emission and Their Detection

The idea that the human body is able to emit light is a familiar concept in eastern medicine, in particular for experts in subtle energetic physiology of the human body, as light derives from the energy of the Mind and of the five Elements. Subtle energetic physiology refers to the representation of the flow of energy present in each individual's energetic system, such as chakras and meridians in the human body. It is well known how these medicines postulate the presence of electromagnetic radiations, and focus on the use of specific practices to rebalance them or to enhance them, such as meditation, yoga, tai chi chuan, qigong and other energetic practices.

Methods

The research consists of a case study where a therapist intentionally transfers energy to a healthy individual who volunteered to participate. The movement of energy is traced using the and the FUTUR e FAST A cameras, which features are presented in the following sections. The therapist has been practicing Tibetan medicine meditation for over 30 years. In the current procedure, he uses a type of practice called Tsarlung, which consists of a period of preparation during which the therapist meditates in order to collect the energy which will be intentionally transmitted to another individual.

The recording was performed under temperature and humidity controls. The background was measured in the empty room and with the therapist and the patient not entangled before the meditative practice. At the same level of cameras' sensitivity, the frames were showing regular images with no signs of unexplained photons.

The Bologna Experiment with Tsar Lung

The ancient Tibetan Tsarlung practice belongs to tantric practices, which are deemed to be curative in Tibetan medicine. It is a well-known practice in India and in Tibet, where it is applied by Tibetan doctors, Lama healers and spiritual masters. As many other practices belonging to the eastern tradition, the Tsarlung practice does not have written references and it is transmitted orally from skilled experts to their trainees. The practice consists of the intentional and conscious transmission of energy between two individual on two levels, hands and heart, while the person transferring the energy visualizes the different steps of the process. Initially, the therapist prepared for the session by meditating, which

allowed him to develop the intention to transmit energy: he visualized this energy allocated above his head, descending to the heart and transferring to the person lying down in front of him through both the heart and his hands, towards the participant's head and chest. Therefore, the energy is transmitted from the therapist on a twofold level, of which the former is a distant transmission where there is no contact between the two participants and the bio-photon emission occurs through the cognitive action of the intention, and the latter occurs through contact where the therapist's hands are placed in specific acupuncture points on the head of the participant. The energy is purposely addressed towards the patient both through the fingers and the cognitive action of the intention. It should be noticed that in each meditative study practiced by a skilled therapist, a limited amount of energy is spread into the surrounding environment, which is also detected by the camera. Most importantly, to date, the current practice has never been studied.

The energy movements are recorded using the FAST and the FUTURA cameras. The technician using the cameras was not aware of the practice that was being performed or of the different steps involved.

FAST and FUTURA Cameras

The FUTURA* camera is based on the technology used by Create and Schwartz [17] and it is employed in astronomy and in aerospace research. This technology allows detecting light from invisible stars and emissions from bodies and mental activities which are not visible to the naked eye. The camera used for the current investigation is a CCD, able to function also in conditions of daylight. The assumption on which this technology is based is that each individual has a bio-field (referred to as individual energetic system in eastern medicine) which emits or absorbs light, and, depending on the individual's mental activities or on the energy originating from the surrounding environment, the camera records a phenomenon called luminescence in form of white light, which can be located in one or more body areas, or outside the body.

The camera presents the following features:

- CCD 1048x1048 sensor with X-UV-IR. 14-micron pixel
- Spectral range from X strip continuously to IR
- QE 60% at 200 nm, 76% at 300 nm, 94% at VIS, 50% IR, 16 belt dynamic
- Forced cooling with 4 phases, to -90° C
- Mechanical shutter and filter holder wheel with 8 strip
- Acquisition in multispectral mode
- Combination in RGB and Quadric my for UV photo and IR with colors
- Reading with binning to 20x20 and fair reading of less significant bits

- Reading and visualization in various levels, logarithmic and exponential or with subtraction of noise, FFT filters, etc..
- Video acquisition 4 ft/sec
- Counting of single photons
- Extra device for remote stimulation, microwaves, low frequency and acoustic ultra-frequency, luminous stimulation on different optical range
- Quartz optic and calcium fluoride optimized for 200-1100 nm range

The Future Attribute Screening Technology (or FAST) video-camera has the same system used in security control points of some USA airports, to record the vibrations deriving from emotions, psychological tension state, modification of breath and heartbeat recorded from by individuals deemed to be potentially dangerous. The vibratory states are also related to a color scale which links them to different types of cerebral waves. High-sensitivity sensors intercept those vibrations and transmit them to the software, which connects them to the images detected by the camera as horizontal lines and specific colors through Fast Fourier Transform FFT system. The range of color oscillate from red to fuchsia, where red corresponds to beta waves, dark blue to theta waves, light-blue and green to alpha waves and fuchsia stands for delta waves. Alpha and delta waves indicate a state of deep quietude and peace of mind.

Results

Results can be observed in the hs section. Figures 1 to 5 present frames taken from a video recorded using the FAST video-camera while figures 6 to 9 are pictures taken using the FUTURA camera.

Figures 1 to 5 show the therapist entering a status of deep physical coherence with bio-energy fields waves emitted in phase and channeled towards the participant. The different colors ranging from pale blue to purple and fuchsiarepresenttheta and delta waves,as energy emitted by the therapist and addressed towards the participant. Theta and delta waves

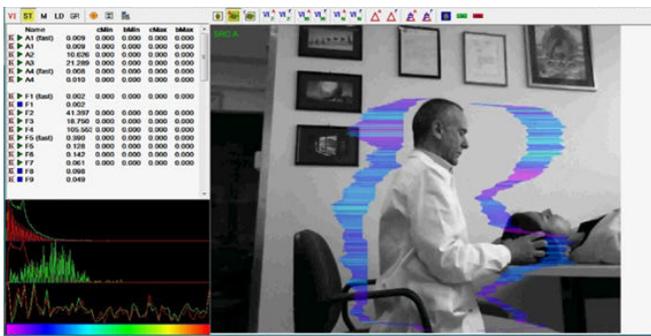


Figure 1: In the first frame of the video, recorded using the FAST video-camera, it is possible to notice the biofield of the therapist extending to the participant's one.

are typical of a state of deep relaxation, thus not present in the normal state of awakening or ordinary states of consciousness. This indicates that the therapist was in altered state of consciousness derived from the meditative practice. The therapist's bio-field represented in purple-shade waves appears to gradually extend to the participant's bio-field, from the therapist's heart and hands. Figure 5 shows a reduced intensity of the therapist's bio-field, consistent with the final phases of the practice.

Frames 6 to 9 display the movements of the energy throughout the whole practice visible as a white cloud of bio-photon. The energy moves from the therapist's head, to his heart and gradually surrounding the participant's head and upper body parts, where the luminescence is strong to such an extent that pixels are saturated.

The recording was later repeated with additional healthy participants, also using different meditative practices focusing on the intention to transmit energy. In all cases, the same effect of luminescence was detected, in a greater or more limited way. By using meditative practices, it is possible to act on the organism's energy and consequently on bio-photons emission. The physicality of the human organism is the aspect which is more easily perceived of the Mind-Body-Energy unit, while the individual energetic system can only be detected using appropriate measuring tools.

Discussion

The current study intends to show how an intentional transmission of energy from one individual to another can occur, be detected and

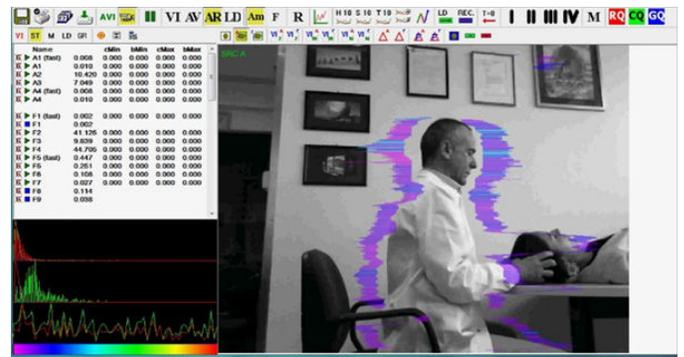


Figure 2: The second frame shows the micro-vibrational components going towards a fuchsia-monochromatic state and arriving to the participant's face (as a kind of mask).

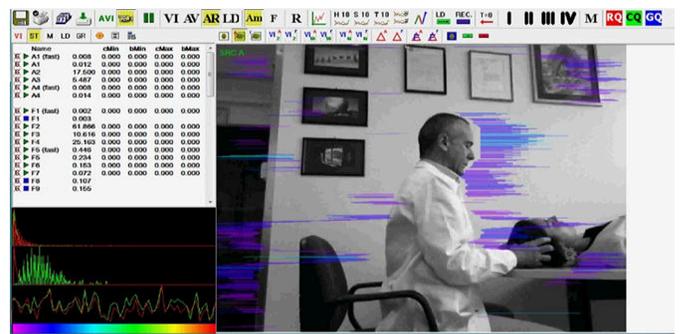


Figure 3:Therapist and participant

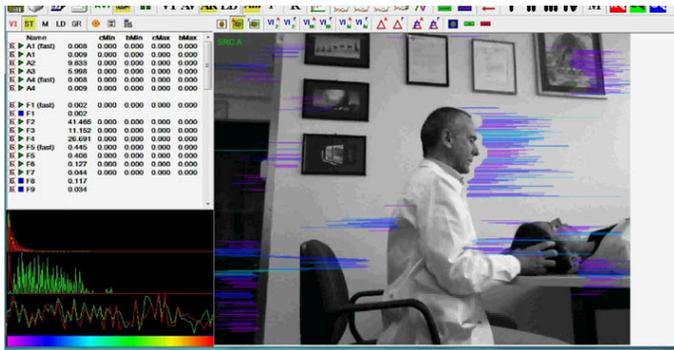


Figure 4

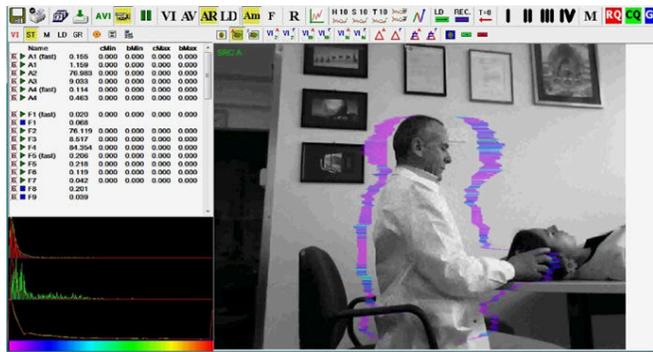


Figure 5 : The fifth frame presents the final phases of the practice, where the biofield of the therapist begins to reduce.



Figure 6 : This picture illustrates the meditation session performed by the therapist before the Tsarlung practice with the participant. In this frame, the therapist is intentionally visualizing the energy above his head, which is detected by FUTURA as a cloud of biophotons.

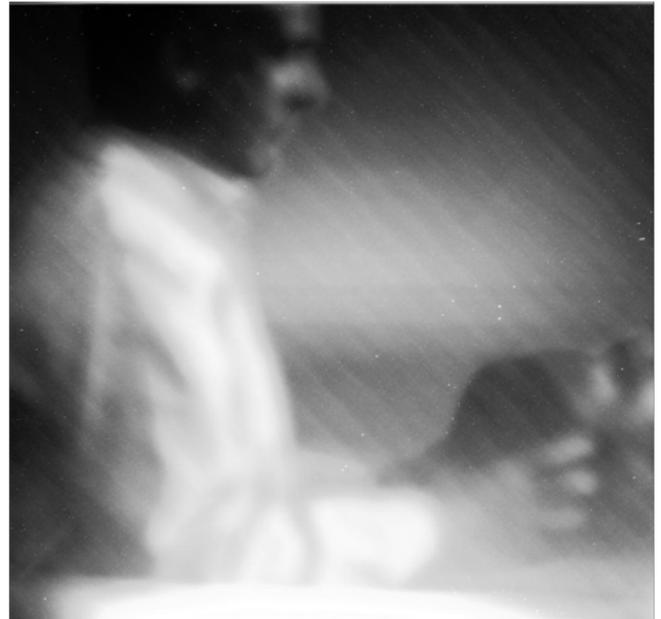


Figure 7 : The luminescence of the energy is visible near the area of the heart, where it is intentionally canalized in order to be transferred to the participant.



Figure 8 : A UV RAW picture during the meditation practice with the participant. In this frame, it is possible to see the luminescence on the volunteer's face, which then extends to the whole body.



Figure 8 : UV RAW photo of the participant during the meditation session, where the luminescence is strong enough to saturate pixels. Figure 9 is composed by two parts. On the left, the luminescence coming from the heart and the chest of the participants. The second part of the photo on the right presents how powerful the energy is so that it saturates the pixels and partially hides the body of the participant

recorded. The attached figures report different stages in which energy is intentionally collected and later intentionally addressed towards another individual, which highlights how the ability to create and influence reality becomes an essential feature of life. The energy is retrieved as bio-photons emission and represented in form of theta and delta waves.

As previously mentioned, bio-photons emission plays a pivotal role in certain physiological functions and biological processes and studies have postulated that it also may be responsible for intra- and intercellular communication [35,36,15]. Therefore, the observation that bio-fields seem to be intentionally modified and not only those belonging to the performer but also those of other individuals external to the performer of the practice, is a significant conclusion for innovative trends in quantum entanglement.

Premises of this first observational case study are that each individual has a bio-field that emits or absorbs light, depending on mental activities, mental states or the external energy. This phenomenon is called luminescence, which can be found in one or more body areas or outside the body and it can be recorded using specific types of cameras and video-cameras.

Further studies and closed controlled experiments will be performed to enhance understanding of the phenomenon and enter in a secondary phase of investigating how the detected bio-fields are linked to patients' health statuses.

Conclusion

The current study contributes to shed light on the ability of an individual

to transfer energy to another human being. This lays a solid groundwork for future investigations on systematic measurements of emission of light as a non-invasive method of understanding the status of health or illness of an individual, and eventually leading to the opening of innovative scenarios for enhanced scientific investigations on distant healing.

In fact, findings from the literature on bio-photons emission highlighted their usefulness in informing on living beings' health status. Evidence also revealed that relaxation techniques such as meditation influence the emission by stimulating the production of theta and delta waves which indicate a state of deep relaxation and altered status of consciousness. It is therefore possible to confirm that bio-photons emissions are intentionally modifiable. This preliminary case study does not establish a healing action of intentions. It however demonstrates that intentional and conscious transmission of energy from an individual to another is possible and traceable. Since the luminescence effect was detected in subsequent observations, evidence suggest that it is possible to perceive energy through the reawakening of mind. The current study is also useful in enhancing the understanding of the role of bio-photons in health and of how they can be rebalanced using external actions. Further investigations are required and future research should focus on the potential effectiveness of bio-photons emission in improving health status.

To conclude, it may be relevant to refer to one of the many mysterious problems of quantum physics: the entanglement. When two photons or other particles are entangled to each other, what happens to one determines the fate of the other, no matter how far apart they are. The quantum entanglement predicted by Einstein, has recently been demonstrated by

sources distant 143 Km and experiments from earth to space are ready to be done [5].

Our study case will soon get us to the difficult question: are we facing an entanglement class of phenomena or do bio-fields belong to an independent mystery?

References

1. Planck M (1901) On the law of distribution of energy in the normal spectrum. *AnnalenderPhysik* 4: 553.
2. Einstein A (1905) On the motion of small particles suspended in liquids at rest required by the molecular- kinetic theory of heat. *Annalenderphysik* 17: 549-560.
3. De Broglie L (1924) *Recherchessur la théoriesdesquanta* (Doctoraldissertation, Migration-université en cours d'affectation).
4. Heisenberg W (1927) Multi body problem and resonance in quantum mechanics II. *Z Phys* 41: 239.
5. Ma XS, Herbst T, Scheidl T, Wang D, Kropatschek S et al. (2012) Qunatum Teleportation over 143 Km usign active feed-forward. *Nature* 489: 269-273.
6. Villoresi, P, Jennewein T, Tamburini, F, Aspeleyer, M Bonato, C, Ursin, R, Pernechele C, Luceri V, Bianco, G, Zeilinger A, Barbieri C (2008) Experimental verification of the feasibility of a quantum channel between space and Earth, *New Journal of Physics* 10(3): 33-38.
7. Popp F A, Gurwitsch A A, Indaba H, Lewinski J, Client G (1988) Biophoton emission, review *Experientia*, 44(7): 543-600.
8. Kobayashi M, Takeda M, Sabot, Yamazaki Y, Kaneko KH et al. (1999) In vivo imaging of spontaneous ultra weak photon emission from a rat's brain correlated with cerebral energy metabolism and oxidative stress. *Neuroscienceresearch* 34(2): 103-13.
9. Kobayashi M, Takeda M, Ito K I, Kato H, &Indaba H (1999) Two-dimensional photon counting imaging and spatiotemporal characterization of ultra weak photon emission from a rat's brain in vivo. *Journal of neuroscience methods* 93(2): 163-168.
10. Gurwitsch A (1925) The mitogenetic rays. *BotanicalGazette* 80(2): 224-226.
11. Van Wijk K J (2001) Challenges and prospects of plant proteomics. *PlantPhysiology* 126(2): 501-508.
12. Engstrom R W (1947) Multiplier photo-tube characteristics, Application to low light levels. *JOSA*37(6): 420-431.
13. Morton G A, and Mitchell J A (1948) *RCA Review* 9: 632.
14. Westoo R, Wiedling T (1949) Investigations of the pulse-distribution of an RCA multiplier phototube. *ArkivFysik* 1.
15. Popp F A (1999) About the Coherence of Biophotons. Published in *Macroscopic Quantum Coherence*. In *Proceedings of an International Conference on the Boston University* edited by Boston University and MITWorld Scientific.
16. Creath K, & Schwartz G E (2004) Biophoton images of plants: Revealing the light within. *The Journal of Alternative &Complementary Medicine*, 10(1): 23-26.
17. Creath K, & Schwartz G E (2005) What biophoton images of plants can tell us about biofields and healing, *Journal of Scientific Exploration* 19(4): 531-550.
18. Creath K, & Schwartz G (2006 August) Measurement of bioluminescence and thermal fields from humans comparison of three techniques for imaging biofields. In *Proceedings of SPIE* 6285: 628505.
19. Colli L &Facchini U (1954) Light emission by germinating plants, *Il Nuovo Cimento* 1943-1954 12(1): 150-153.
20. Colli L, Facchini U, Guidotti G, Lonati R D, Orsenigo M, Sommariva O (1955)
21. Boveris A, Cadenas E, Reite r R, Filipkowski M, Nakase Y, & Chance B (1980) Organ chemiluminescence: noninvasive assay for oxidative radical reactions. *Proceedings of the National Academy of Science* 77(1): 347-351.
22. Gu Q & Popp F A (1992) Nonlinear response of biophoton emission to external perturbations. *Experientia* 48(11-12): 1069-1082.
23. Hideg É, &OlofBjör, L (1996) Ultraweak light emission, free radicals, chilling and light sensitivity. *PhysiologiaPlantarum* 98(2): 223-228.
24. Iyozumi H, Kato K &Makino T (2002) Spectral Shift of Ultra weak Photon Emission from Sweet Potato During a Defense Response. *Photochemistry and photobiology* 75(3): 322-325.
25. Nagl W &Popp F A (1987) Opposite long-range interactions between normal and malignant cells. In *Energy transfer dynamics* 248-256 SpringerBerlin Heidelberg.
26. Salin ML, Bridges SM (1981) Chemiluminescence In Wounded Root Tissue Evidence For Peroxidase Involvement. *Plantphysiology* 67(1): 43-46.
27. Slawinska D, Polewski K, &Slawinski J (1992) The stress-induced electromagnetic emission from biosystems chemiluminescence response of plants to mechanical and chemical damage. *Journal of ElectroanalyticalChemistry* 343(3): 483-488.

-
-
28. Slawinski J, Ezzahir A, Godlewski M, Kwiecinska T, Rajfur Z (1992) Stress induced photon emission from perturbed organisms. *Cellular and Molecular Life Sciences*, 48(11): 1041-1058.
 29. Ohya T, Kurashige H, Okabe H & Kai S (2000) Early detection of salt stress damage by biophotons in red bean seedling. *Japanese Journal of Applied Physics* 39(6): 3696.
 30. Xing D, Tan S, Tang Y, H Y & Li D (1999) Observation of biophoton emission from plants in the process of defense response. *Chinese Science Bulletin* 44(23): 2159-2162.
 31. Creath K & Schwartz G E (2004) Measuring effects of healing energy on plant leaves using biophoton imaging. In *ISSSEEM Annual Meeting Proceedings Colorado Springs CO*.
 32. Inaba H (1988) Super high sensitivity systems for detection and spectral analysis of ultraweak photon emission from biological cell cells and tissues. *Cellular and Molecular Life Sciences*, 44(7): 550-559.
 33. Quickenden T I, Comarmond M J & Tilbury R N (1985) Ultra weak bioluminescence spectra of stationary phase *Saccharomyces cerevisiae* and *Schizosaccharomyces pombe*. *Photochemistry and photobiology* 41(5): 611-615.
 34. Vladimir I A (1967) Ultra weak luminescence accompanying biochemical reactions. National Aeronautics and Space Administration for sale by the Clearinghouse for Federal Scientific and Technical Information Springfield: 76.
 35. Val Cohen S, Popp FA (2003) Biophoton emission of human body.
 36. Ives J A, van Wink E P, Bat N, Crawford C, Walter A (2014) a systematic review *Polson* 9(2): 8740
 37. Van Wink E P, Ackerman J & Van Wink R (2005) Effect of meditation on ultra weak photon emission from hands and forehead. *Complementary Medicine Research* 12(2): 107-112.
 38. Van Wink R, Kobayashi M & Van Wink E P (2006) Anatomic characterization of human ultra weak photon emission with a moveable photomultiplier and CCD imaging. *Journal of Photochemistry and Photobiology B Biology* 83(1): 69-76
 39. Van Wink EP Lu dtke R Van Wink R (2008) Differential effects of relaxation techniques on ultra weak photon emission. *Journal of Alternative & Complementary Medicine* 14(3): 241-250.
 40. Van Wijk EP Van Wijk R Bajpai RP (2008) Quantum squeezed state analysis of spontaneous ultra weak light photon emission of practitioners of meditation and control subjects. *Indian J Exp Biol* 46: 345-352.
 41. Vekaria M (2003) Biophoton emission and intentionality (Doctoral dissertation, Ph D dissertation. Californian. Institute for Human Science, Encinitas) 23: 2159-2162.