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RESUME.

Prof. Dr. Albert Ferrer (Ph.D.) was educated in the French School of Barcelona and trained in some of the oldest universities of Europe: Barcelona, Paris-Sorbonne and Cambridge. Later, he visited schools of integral education of India, and did post-doctoral research in Vedantic ashrams of India and in Buddhist monasteries of Myanmar under the guidance of Prof. Raimon Panikkar.

After being a Lecturer at the University of Barcelona, Asia House (Ministry of Foreign Affairs/ Government of Spain) and several Departments of the Government of Catalonia (Religious Affairs, etc), he became Visiting Professor in Sri Sathya Sai University (South India), where he elaborated a project for integral value-based education from an international perspective, blending the best from the West and the East towards the unity of mankind and a paradigm shift. In his home town, he has been appointed as Consultant for Education to the Government of Catalonia.

Quantum education and paradigm shift. Integral education, quantum physics and the new holistic paradigm.

ABSTRACT.

It is well-known that the historical development of quantum physics has questioned the pillars of the materialistic/ mechanistic paradigm prevailing through the modern age. This scientific revolution has certainly opened the door to the rise of a new paradigm, essentially holistic at the junction of science and spirituality. However, Dr. Ferrer's paper is quite original by showing the profound link between new science and integral education. According to this paper, integral education would be the pedagogic translation of quantum physics and the new holistic paradigm, just as the mainstream school system was the pedagogy of mechanism at the age of Industrial Revolution.

KEY WORDS.

Quantum physics

New science

New paradigm

Paradigm shift

Integral/ holistic education

Introduction.

A lot has been written about quantum physics, new science and the new holistic paradigm, and as it would happen for any subject some clichés have been established at the popular level that do not present enough accuracy. At the same time, these new disciplines or rather the world view unveiled by them have been attacked by the prevailing materialistic “statu quo” hostile to many uncomfortable discoveries of quantum physics and even more irritated by its philosophical conclusions, especially when they openly converge with spiritual philosophy. This hostility has obviously not prevented the capitalistic system from making big business through the practical application of quantum physics, which is much more important than many people would imagine.

Probably few have grasped the real significance and the historical importance of quantum physics and new science, precisely because it implies a paradigm shift, as it happened in Renaissance with the transition from the Middle Ages to the modern world. This paper is not about pure physics, but rather about the philosophical implications of quantum physics, which exist and are –we believe- fundamental for the future of civilization. This is certainly a paper of philosophy of science that tries to outline not only the philosophical implications of quantum physics but more precisely the paradigm shift that it does represent. Here, there are two aspects to be underlined.

First, it is not the author of this article who stresses the historical convergence between quantum physics and spiritual philosophy, but it is the major figures of quantum physics who have said it quite clearly.¹ This convergence has tremendous epistemological implications. Not only it reminds narrow-minded scholars and scientists that there is only one reality –the same for scientists and mystics- but also that there is a unity of knowledge sharply overlooked by the extreme fragmentation of scholarship in the modern world. This underlying unity of knowledge may evolve new connections between consciousness and technology unbelievable for the modern fragmentation.

As it was stated in the scholarly symposium held in Mumbai (Bombay) in 1983 gathering leading scientists and thinkers:

“In the meeting of Spirituality and Science lies the hope of reaching the ultimate goal of human quest of knowledge and truth, and the Reality pertaining to life and Creation.”²

Secondly, this paper tries to show that the new emerging paradigm puts forward a new kind of education –obviously-. Education is a mirror of civilization. If there is a paradigm shift, there will be an educational shift. Just as modern mainstream schooling was the educational system of the age of Industrial Revolution and capitalistic expansion, integral education will be the pedagogy of the new holistic paradigm. This will be an education of the whole human being, an education of consciousness far beyond the merely cognitive/ intellectual inputs of mainstream schooling.

Integral education has not always been respected; quite often even not understood. The visible esoteric dimension of Steiner’s educational philosophy has not helped in front of the prevailing prejudice and hostility. Integral education needs an epistemology and a

¹ Cf, for instance, Russell P., 2003, p 103-129, writings of a scientist, Cambridge scholar.

² Sathya Sai Trust, 1995, p 28.

scientific foundation –together with a psychology of education and a philosophy of education-. This paper brings a humble contribution in this direction, hoping that the interest of some readers will be awoken to pursue research, reflection and educational practice in this horizon.

The renowned philosopher of science, E. Laszlo, warns us:

“There are stringent requirements for any new paradigm. A theory based on it must enable scientists to explain all the findings covered by the previous theory, and must also explain the anomalous observations. It must integrate all the relevant facts in a simpler yet more encompassing and powerful concept.”³

This “more encompassing and powerful concept” has been under elaboration and development through the last decades and is still going on. The paradigm shift is in motion, it is not over. This paper makes it clear that any paradigm has its own pedagogic translation. If modern mainstream schooling was the pedagogy of the age of mechanism and Industrial Revolution, integral value education -as an education for consciousness- will be the educational philosophy of the new emerging paradigm. Still, we must be aware of Laszlo’s warning, which means that the new educational system must be able to integrate the findings and inputs of the previous pedagogy with the anomalous observations and the new findings and the new inputs. This wider and deeper integration is what we have tried to elaborate in our educational project, “International Education for a New World. In this paper we offer a brief philosophy of science for integral value education, or to put it in other words, an epistemological foundation for holistic education.

In the last part of E. Laszlo’s “Science and the Reenchantment of the Cosmos”, a co-author, E. Sahtouris, gives a meaningful title to one of the chapters: “From a Mechanistic and Competitive to a Reenchanted and Co-Evolving Cosmos”. Many are unaware of the intimate relationship between the mainstream school system and the present model of civilization. If the modern paradigm has been mechanistic and competitive as this well-known book recalls, it is obvious that mainstream education has nurtured this mechanistic and competitive kind of society; how this has happened is something that we can study in depth and expound in detail through scholarly research. Similarly, the new emerging paradigm, “reenchanted” as Laszlo defines it, will inevitably unfold a new kind of education, certainly more holistic, humanistic and also spiritual. It is the main argument of this paper to suggest that what we know as integral value education constitutes the pedagogic translation of this “reenchantment of the cosmos”, which, by the way, was the driving force of Romanticism and German Idealism with Hegel and Goethe at the front in conscious opposition to Newton and Adam Smith.⁴

³ Laszlo E., 2004, p 17.

Cf also Laszlo E., 2006, Part Three: The Re-Union of Science and Spirituality.

⁴ Cf Sahtouris E., in Laszlo E., 2006, p 101-108.

Towards the new holistic paradigm.

Prof. Anton Zeilinger, Director of the Institute for Quantum Optics and Information (University of Vienna) has stated that: Quantum physics opens a totally new world view - when compared to the modern materialistic paradigm produced by an extrapolation from Newtonian physics-. All the major figures of quantum/ physics and new science have been convinced of this same fundamental point.⁵

In this paper, we try to show the profound coherence between integral value-based education and the new holistic paradigm, which provides the epistemological foundation for this kind of pedagogy. Or to put it in a reverse order, integral value education constitutes the pedagogy of the new holistic paradigm, just as modern mainstream schooling was the pedagogy of the materialistic mechanistic paradigm of the Age of Industrial Revolution.

Before examining in more detail the new insights of quantum physics and new science opening the door to a new quantum/ holistic paradigm coherent with spiritual philosophy and wisdom, **let us clarify some fundamental issues to avoid any misunderstanding.**

The advocates of the old mechanistic frame stress that all the disturbing discoveries of quantum physics are related to the microscopic level only, while at the macroscopic level mechanistic physics is still valid.

This is partly true, and it is obvious that mechanistic physics has its own scope and role to play; in particular, it helps to make machines.

But what we cannot accept anymore is that this kind of mechanistic physics goes out of its natural boundaries and becomes a world vision. What is a fallacy is not mechanistic physics as such, but its extrapolation to everything –included life and human society- and its conversion into a paradigm. This historical extrapolation was produced by Industrial Revolution, capitalistic expansion and the modern state.

Even if the provoking principles of quantum physics apply to the microscopic level, we should not forget that this constitutes the very foundation of the macroscopic level.

Moreover, the portion of the macroscopic cosmos to which mechanistic physics applies is only 4% of the universe; the rest is made of energy and dark matter, and here, the functioning seems to me more quantum too.

In addition, it is not true that the new concepts of quantum physics are related to the subatomic level only. There is a whole branch of astrophysics with scientists such as Michio Kaku that understands the cosmos as a multidimensional holographic multiverse that is more quantum than mechanistic.

Bohm's Implicate Order, Laszlo's Akashic Fields, Talbot's Holographic Universe, Kaku's Multiverse, Pauli and Jung's Synchronicity, Haisch's God Theory, Capra's Tao of Physics, Relational Theory, Sheldrake's Morphic Fields, the Gaia Studies, etc, suggest a quantum cosmos far beyond the subatomic realm.

Moreover, the latest research of quantum physics already outlines the bridge from the micro to the macroscopic level: from Strings/ M. Theory to the quantum field/

⁵ Cf for instance Laszlo E., 2006, with the sub-title: "The Rise of the Integral Vision of Reality".

vacuum and the bioelectromagnetic field unifying energy and consciousness/ physis and psyche.

Even the human brain is now considered by the latest developments of neuroscience as a quantum medium, not a machine. Photons emission is also quantum in nature.

Finally, quantum physics has opened new avenues of technological application, from quantum medicine to quantum computers; this is only the beginning of a new quantum technology and science.

There is a whole spectrum of new science together with quantum physics: other fields of new physics and astrophysics, and still other disciplines such as relational theory, spiritual/ aesthetic neuroscience, new biology, Gaia studies, epigenetics, the mind's new science, sophrology, Jungian psychiatry and transpersonal psychology, etc.

The whole vast and fascinating spectrum of new science, not only quantum physics at the subatomic level, has concluded that reality or the cosmos is holistic, multidimensional and holographic, not the dead machine in the materialistic/ mechanistic vision of Newtonian physics.

Furthermore, in this new quantum reality consciousness is the key within an interdependent unity of psyche and physis –while physis is not the inert matter of the Newtonian age but a dynamic continuum of matter-energy inseparable from information, and hence consciousness-.

The unity of physis and psyche and the primacy of consciousness: from the Observer Effect to the intrinsic link between the spectrum of consciousness and the spectrum of the bioelectromagnetic field.

The perception of the phenomenon by consciousness; from the phenomenon to the noumenon: consciousness is the key.

These fundamental conclusions of the whole spectrum of new science open the door to a new cosmovision or world view, a new paradigm, essentially holistic, that is far beyond the mechanistic views.

All the main figures of new science –not only quantum physics- have agreed that the discoveries of new science unfold a new paradigm after realizing that the mechanistic world view was false as a world view; it can only be a specific field of research and technological application, not a world view. Here, in the paradigmatic extrapolation lies the fallacy.

It is clear today that the subatomic realm is not mechanistic, neither the cosmos as such –which is pure energy up to the 96% of its composition-, nor life, the human body, the brain, the psyche or human society.

In these fundamental conclusions and in the horizon of this new holistic paradigm, quantum physics and new science deeply converge with the traditions of mystical philosophy and wisdom and Philosophical Idealism. Again, the forerunners of quantum physics and new science have been aware of the historical confluence and have spoken about it.

It is precisely this new unity of science and spirituality that really unveils a new paradigm, that will be essentially relational and dialogical as well as holistic, multidimensional and holographic; to sum up in one word: quantum.

Let us follow now **the historical development of quantum physics, new physics and new science**, unveiling a new paradigm through the dialogue with spiritual philosophy and wisdom.

As **Stuart Hameroff** has pointed out, reality seems to be very strange, with **two sets of laws ruling the universe**.

* At the macroscopic level, from ants to stars, things can be understood according to the laws of Newtonian physics, and the 3 laws of motion seem to work.

* But, when we reach the level of atoms and the sub-atomic world, the Newtonian laws stop working, and a whole new group of laws emerges: quantum laws.

Classical physics regarded light as wave and the electron as particle. Heisenberg and Schroedinger showed that light exhibits properties of particles whereas the electron exhibits properties of waves.

Quantum physics has evidenced that one particle can be in more than one place at the same time. This turns out to be astonishing for Newtonian science, but it seems to be as real as the fall of an apple from the tree.

Einstein said that nothing can travel faster than light. But quantum physics has evinced that sub-atomic particles communicate instantaneously.

Einstein still believed –like Newtonian physics- in the existence of an objective reality independent from the observer. Quantum physics concluded that any phenomenon is but an observed phenomenon, which means that there is no phenomenon independent from the observer.

Moreover, the Newtonian kind of certainty –still cherished by Einstein- was replaced by quantum probabilities.

Maybe that is why Einstein felt upset with the new quantum theory, for which he said that God does not play dice with the universe; Niels Bohr replied: -Stop telling God what he must do.

Newtonian physics was deterministic, pretending that we can determine the evolution of things from the established laws that rule matter. Quantum science is probabilistic; we can never know for sure the evolution of (microscopic) things.

Newtonian physics was reductionistic, reducing the vast and multi-dimensional nature of reality to a small part of it only, but still pretending that this reduction was the whole. Quantum science is holistic, acknowledging a multi-dimensional universe based on interdependence and again open to the mysterious, the ineffable and the sacred.

In fact, the last scientific developments put forward the limitations of human knowledge. As Dr J. Baker writes:

“String Theory, or rather theories, are still in a state of flux. No final theory has yet emerged.”

“A Theory of Everything is a goal of some physicists, who are generally reductionists and think that if you understand the building blocks then you can understand the whole world. (...) Other scientists find this whole attitude ridiculous.”⁶

Quantum physics has identified the most minute indivisible unit of electromagnetic energy: the quantum, as described by the **Quantum Theory through 5 main ideas:**

- Energy is not continuous, but comes in discrete units –quanta- that jump from one energetic state to another one through discontinuous quantum leaps.
- The elementary particles behave both like particles and like waves.
- The movement of these particles is inherently random.
- It is physically impossible to know both the position and the momentum of a particle at the same time.
- The sub-atomic world is nothing like the macroscopic world.

To develop these key ideas we can outline the following points.

I. The mechanistic order was shaken when the advance in physics demonstrated that the apparently solid matter is in fact made of atoms that are inside mostly empty: vast regions where tiny particles move. Newtonian physics thought that atoms were solid –like snooker balls-. Quantum physics discovers **emptiness** at the level of atoms, the pillars of the physical universe, mostly void at the core of solid matter, even in a stone! Any Buddhist monk would kindly smile at the astonished face of the materialistic scientist: Shunyata.

II. The Newtonian pattern was even more deeply questioned when the new research in physics set forth that the sub-atomic particles have a **dual nature**, which means that they can be seen both as **particles and waves**. A mostly empty atom made of waves! At the subatomic level, matter does not exist with certainty at definite places, but rather shows tendencies to exist, and events show tendencies to occur. In quantum physics, these tendencies are formalized as probabilities and are associated with mathematical quantities that take the form of waves. Hence, particles can be seen as probability waves. In the quantum realm, there are only probabilities of finding any particle in a specific place. Any Vedantic sage would smile at the perplexed mechanistic scientist: the cosmic dance of Shiva.

III. If all this was not enough to break the classical rules of the “logical” and seemingly reasonable reality of mechanism at the macroscopic level, quantum physics discovered something even more puzzling: when the electrons move around the nucleus through different orbits, they do not travel through space and time as normal objects of the macroscopic level, but instantaneously and discontinuously through what has been called **quantum jumps**. Furthermore, scientists realized that it was not possible to determine when and how the electrons would jump –while determination was one of the pillars of the

⁶ Baker J., 2007, p 159.

Newtonian paradigm-. At the most, scientists could calculate –as Schroedinger tried to do- probabilities about the movement of electrons. How far this quantum vision of reality from the mechanistic pattern, and how close to the vision of mystical philosophy!

IV. In front of the pretension to exactly measure everything, as postulated by mechanistic science, quantum physics has put forward **the principle of uncertainty**, especially through the work of **W. Heisenberg**, which irritated Einstein and most of mechanistic scientists. The Uncertainty Principle means that we cannot know at the same time the impulse of a particle and the exact value of its position.

“Thus, it is only “energy in action” which is at the base of all living organisms, giving rise to a boundless variety of structures and phenomena in the universe.”⁷

Especially important in quantum theory would be the **Particle/ Wave Duality**, which brings to the famous **Copenhagen Interpretation by Niels Bohr**. Sometimes a particle acts like a particle, sometimes like a wave. So, which is it? From Bohr’s point of view, the particle is what you measure it to be; when it looks like a particle, it is a particle. But when it looks like a wave, it is a wave. In conclusion, nothing is real unless it is observed, a crucial point where quantum physics meets mystical philosophy. Amazingly enough, the duality between particle and wave in quantum physics reminds us of the duality between Being and Becoming in mystical philosophy; the same reality can be seen as Being or Becoming, depending on how we observe it.

According to the Newtonian paradigm, there was a clear distinction between the observer and the object of observation, which means that we can know scientifically or just through the senses an objective world. Quantum physics has manifested through the scientific method that there is no separation between the observer and the object of observation, because we mould ourselves the world that we perceive, something that, once more, was already explained by the traditions of wisdom of mankind. This is known as the **Observer Effect**, which has become even more evident through the **Double Slit Experiment**.

When the scientist studies a particle, he is modifying it through the observation. Similarly, the human eyes do not see an objective world per se, but a specific world as it is presented and filtered by the structure of the eyes.

Recent psychosomatic studies and the analysis of stupefying cases of self-healing have proved how real can be our capacity to create our own reality, which certainly questions the vision of a mechanistic kind of medicine. It has been medically proved that negative thoughts promote illness, while positive ideas enhance health –until the capacity of healing oneself-. All this has been corroborated by **psychoneuroimmunology**.

Even more enthralling, neuroscience has identified the “**mirror neurons**” that are activated both when an animal or human being acts and when it observes the same action performed by another. This kind of neurons mirror the action performed by the other as

⁷ Sathya Sai Trust, “Spirituality and Science. The Turn of the Tide in Scientific Thought”, symposium, Mumbai, India, 1995, p 111.

though the observer were itself performing the action. For instance, when we are contemplating a film it is as if we were ourselves there in the film living that story. The conclusion of this astounding discovery in neuroscience corroborates the Observer Effect of quantum physics, and consolidates -on scientific grounds- one of the major tenets of the new holistic paradigm already stated by Philosophical Idealism: there is no separation between the observer and the object of observation, between subject and object –whereas the typically modern epistemology was built upon a sharp separation that seems to be fallacious today.

Classical figures of quantum physics already emphasized the historical convergence between quantum physics and the traditions of spiritual philosophy and wisdom within the frame of a new holistic paradigm that will be fundamental for the future of humanity on Earth. According to the contemporary European physicist, Prof T. Versyp:

“This notion of a hidden dimension (in mysticism) would be parallel to the invisible matrix or implicate order that we have discussed (in quantum physics). (...) In all these metaphysical observations there is a fundamental truth of the uttermost importance.”⁸

The Double Slit Experiment shows that particles replicate the same pattern when we add a second slit through which they are shot, hence producing two bands on the screen instead of one. But waves behave in a different way when we add a second slit; instead of two bands they produce an interference pattern of many bands. What happens when we go to the quantum realm and we fire electrons –which seem to be tiny particles/ objects-? When shooting electrons through one slit they behave like particles producing one band on the screen. But when we shoot electrons through two slits we do not get two bands –as it happens with particles/ objects- but an interference pattern of many bands –as it happens with waves-. It turns out that tiny particles/ objects –electrons- behave like waves when we add the second slit. When we fire electrons one by one instead of all together, the same wave-like interference pattern appears after some time, which implies that the single electron behaving like a wave goes through both slits and interferes with itself. Still more enthralling: when we install a device to observe/ measure which slit the electron goes through, even through the two slits the electron behaves like a particle producing two bands instead of the interference pattern typical of waves, which means that the observer collapsed the wave function simply by observing.

⁸ Versyp T., 2007, p 106-108.

The quantum dimension: beyond the frontiers of Newtonian physics.⁹

At the subatomic level, the components of matter and the forces that interrelate them constitute a net of relations or interconnectedness and a unified field. Interdependence lies at the very core of reality, something that coincides in depth with the traditions of spiritual philosophy and wisdom, which stated that things are connected rather than caused. This quantum world evolves beyond the common parameters of space-time characteristic of the macroscopic realm. The ordinary tri-dimensional world view and the classical laws of Newtonian physics collapse at the threshold of the quantum dimension –though they work at the level of senses-.

The quantum field works upon connections that are non-local. The famous experiment of Alain Aspect corroborates the non-local nature of the quantum net of interconnectedness, showing that both photons in the experiment instantaneously “know” what the other has done. Still more fascinating, the last developments of neurology suggest that the functioning of the brain is also non-local or quantum. The relation cause-effect is absent in this quantum non-local dynamism; this non-causality coincides with Jung’s concept of synchronicity. F. Capra has developed this aspect of the quantum field in his famous “*Tao of Physics*”.

The non-locality of the quantum field is closely related to another fundamental feature, its holographic nature, which means that every component already contains all the information of the whole. The quantum dimension is a cosmic hologram containing unlimited information within the energetic field itself. We know, for instance, that each cell of the human body contains a replica of the whole original DNA. Reality is holographic from particles to cells.

The principle of non-locality and the holographic nature of the quantum dimension put forward the multidimensional nature of humanity and reality, something that the traditions of spiritual philosophy and wisdom clearly understood, and lies at the very core of an integral form of education that mirrors the deeper quantum dimension of reality.

The traditions of holistic medicine have described the holographic pattern of energy of the human body, which we may call bioelectromagnetic, bioenergetic or subtle body, and which is parallel to the multidimensional spectrum of consciousness. We have examined these topics above, but we want to insist here that the holographic and multidimensional features of the quantum realm are present at three levels of reality: the human body, human consciousness and the cosmos, something astounding that manifests the underlying unity stressed by the traditions of spiritual philosophy and wisdom.

This historical convergence between new science and spirituality outlines a new paradigm beyond the limitations of the mechanistic and materialistic world view. In our educational project we try to elucidate the consequences for education, which unfolds all the depth of integral or holistic education.

⁹ Cf Sathya Sai Trust, “*Spirituality and Science. The Turn of the Tide in Scientific Thought*”, symposium, Mumbai , India, 1995.

David Bohm's Implicate Order and Laszlo's Akashic Field. The historical convergence between quantum physics and mystical philosophy.

David Bohm's Implicate Order. |

According to the renowned physicist D. Bohm, what we perceive through the senses and has been apprehended by mechanistic science –a visible, tangible and stable world- is but an illusion; in fact it is dynamic, multidimensional and holographic.¹¹

What we see is the explicit order, unfolded from an underlying order that we may call “the implicate order” and is the father and mother of the second generation order that we see. There is a certain parallelism with DNA. The implicate order would be like the DNA, containing all potential life and directing its deployment. Needless to say, in the implicate order such notions as space and time are simply non existing.

As we can easily realize, Bohm's philosophical interpretation of quantum physics is strikingly similar to Plato's Theory of Eternal Ideas to be unfolded down to the physical world; it is deeply akin to Philosophical Idealism in general, that suggests in all the major spiritual traditions the existence of higher planes containing the potential display of lower levels till the physical realm perceived by the senses. With Bohm's Implicate Order, the convergence between new science and mystical philosophy becomes clearer than ever.

Bohm goes still farther in his theory, and postulates that any element of the universe contains the totality in itself: the holographic nature of the cosmos. Still more important, this totality includes both matter and consciousness. Here, Bohm reformulates the old philosophical idea according to which the micro and the macro-cosmos are ultimately inseparable.

Matter can be seen as field, and any field can be seen as a content of information that is objective and active, since the activity of this information is to some extent similar to our subjective experience. From this point of view, matter behaves somewhat like rudimentary spirit. When mystical philosophy was saying that the Spirit lies everywhere, and there is consciousness even in the stone, the sceptics from materialistic mechanism would laugh. With Bohm's scientific work, they could not laugh so easily anymore.

¹¹ Cf Bohm/ Krishnamurti (1999), “Limits of Thought”
- Bohm/ Krishnamurti (1985), “The Ending of Time”
- Bohm/ Peat (1987), “Science, Order and Creativity”
- Bohm/ Hiley (1993), “The Undivided Universe. An Ontological Interpretation of Quantum Theory”
- Bohm/ Edwards (1991), “Changing Consciousness. Exploring the Hidden Source of the Social, Political and Environmental Crisis Facing our World”
--Bohm D. (1983), “Wholeness and the Implicate Order”

Bohm's Implicate Order is totally holistic, an evolving cosmos in process where everything is connected with everything, and where any individual element contains information about every other element and the whole. Bohm's world view depicts –in his own words- the unbroken wholeness of the totality of existence.

Bohm was puzzled like other quantum physicists by the amazing behaviour of subatomic particles, capable of interacting instantaneously at a speed higher than light – which was impossible according to Einstein-. This phenomenon is called EPR Effect –named after the Einstein, Podolsky, Rosen experiment-. Bohm suggests that this puzzling effect may be caused by unobserved subquantum forces and particles. This hiddenness is then reflecting a deeper dimension of reality, the Implicate Order.

Within this deeper dimension, everything is interconnected, and every element can reveal information about any other element and the whole: the holographic nature of the cosmos from this hidden deeper oneness. In fact, the hologram would be Bohm's favourite metaphor to describe the Implicate Order. Bohm makes it clear that this holographic Implicate Order implies a multidimensional reality –one of the major topics of new science, in parallel to the very nature of integral education-.

When we go deeper into the Implicate Order, Bohm speaks of enfoldment; when we go to the Explicate Order of the manifest empirical realm, Bohm uses the term unfoldment: the physical world flows out, unfolds from deeper dimensions of reality; at the same time, everything in the universe is enfolded within the Implicate Order. The layers of this Implicate Order can go deeper and deeper to the unknown and unfathomable –a major mystic theme-. In this process Bohm identifies the holomovement, the fundamental ground of all matter. At the very root of all existence there is a special energy, an immense background of energy –as Bohm describes it-, something that has been felt by mystics and is reported in mystical traditions-. This energy is linked to one whole and unbroken movement, the holomovement.

Hence, the ultimate ground for existence is not something static but universal flux. This dynamic picture of the cosmos was already outlined by Philosophical Idealism. The holomovement is the extension of the Implicate Order into a multidimensional reality. The world-famous physicist insists that the manifest Explicate Order is secondary or derivative, while the Implicate Order would be primary –something that Plato would totally agree on, and with him, all the traditions of Philosophical Idealism, both Western and Eastern-.

Bohm distinguishes **three basic levels in the Implicate Order:**

- The continuous field with its holomovement.
- A superfield of information that organizes the quantum field.
- The underlying cosmic intelligence or consciousness supplying the information. The deepest level obviously corresponds to the traditional idea of God, although the Indian concept of Brahman would be closer to it than the bearded old man from the Sistine Chapel

Bohm's world view through 5 layers of reality:

- The empirical manifest explicate order.
- The fundamental building-blocks of matter: the subatomic particles.
- The holomovement of immeasurable energy.
- The Implicate Order as a superfield of information.
- The underlying intelligence or consciousness –God or Brahman-.

The ultimate level, the Cosmic Apex, the Subtle-Nonmanifest, something akin to Spirit, is the real mover or player. It is also part of the Implicate Order, through which Bohm avoids dualism and embraces the “advaita” or non-dual vision of mystical philosophy -so beautifully expounded by Raimon Panikkar-.

Needless to say, Bohm's three-fold or five-fold Theory of the Implicate Order is strikingly coherent with the world view of mystical philosophy in all spiritual traditions, suggesting a cosmos with several layers of reality from the explicate to the underlying through the implicate. With the extraordinary work of D. Bohm, the convergence between quantum physics and mystical philosophy becomes more mature and detailed, and the unity of science and spirituality more comprehensible.

Ervin Laszlo's Akashic Fields.¹²

In 2004, E. Laszlo published a book that has become famous: “Science and the Akashic Field. An Integral Theory of Everything”, where he suggests the existence of a field of information at the foundation of the cosmos –an idea closely related to Bohm's structure of the cosmos in several layers as examined above-.

Laszlo's theory was somewhat prefigured by one of the forerunners of modern integral education, R. Steiner. Centuries back, mystics and sages from different traditions already suggested the existence of an interconnecting cosmic field at the very root of reality conserving and conveying information. This kind of field was already called as Akashic Records.

Borrowing the Sanskrit term “akasha”-which means ethereal space or higher sky, from the verb “kash”, to shine or radiate-, Laszlo coins the word “akashic fields” to signify these energetic information fields that Bohm also considers in his structure of the cosmos. The Akashic Fields inform not only the present visible universe but all universes past and present –collectively called “metaverse”-. Such an information field explains why the universe forms galaxies, stars and planets, and also life and human beings. Hence, cosmic and life evolution are informed, not random, processes.

Through the Akashic Fields Laszlo tries to comprehend critical issues in quantum physics such as non-locality and quantum entanglement. In fact, the Akashic Fields Theory is

¹² Cf Laszlo E., 2006, "Science and the Reenchantment of the Cosmos. The Rise of the Integral Vision of Reality",

Laszlo E., 2004, "Science and the Akashic Field. An Integral Theory of Everything".

Cf in particular Laszlo E., 2004, p 46-105, and Laszlo E., 2006, p 23-35.

linked to the discovery of the Zero Point Energy Field or Quantum Vacuum in quantum physics. Quantum scientists have recently discovered a new field called Quantum Vacuum or Zero Point Energy Field: a super dense cosmic medium carrying energy, light and universal forces. Laszlo would connect this recently discovered field with his theory of the Akashic Field, but he would make it clear that this kind of field is not only a super dense ocean of frictionless energy, but also a sea of information generating the holographic medium that is the memory of the universe. The Akashic Field is like a subtle communication network underlying physical reality, connecting everything in a relational interdependent oneness.

This quantum field consists of a subtle sea of fluctuating energies from which everything arises, from atoms to galaxies, from microorganisms to human beings, and hence also consciousness. This Zero-Point Akashic Field is not only the ultimate source of everything, but also the memory of this universe and all universes, past and present. ¹³

The Akashic Fields keep the records of all that has happened in this cosmos in relation to all that has yet to happen. It contains the historical experience of the cosmos and its future; it contains all the information of the cosmos and life. Laszlo further suggests that this kind of Akashic Field is holographic in nature. The eminent philosopher of science shares the holographic vision of many forerunners of new science such as Bohm, Talbot, Gabor, Pribram, Grof, Floyd, etc.

Laszlo has been one of the most ardent advocates of the new paradigm. Th. Kuhn showed in his famous book, “The Structure of Scientific Revolutions”, that the transition from one paradigm to the next is not smoothed, and is prompted by some anomaly that is encountered and defies the assumptions of the old world view. With the Copernican Revolution of Renaissance the anomaly was the physical cosmos, the solar system questioning the dogmas of the Church. Today what is challenged is precisely the physical realm and the dogmas of scientism and materialism; the new anomaly is consciousness. Quantum physics brings to quantum consciousness.

Another major figure of the new paradigm, the Cambridge scholar, P. Russell, warns:

“The illusion comes when we confuse the reality we experience with the physical reality, the thing-in-itself.”¹⁴

Russell delves into the “unknowable reality” –as he says- of both mystics and quantum physicists that Sir James Jeans named “a non-material reality”. To reveal the nature of this underlying reality that was experienced by mystics constitutes the main challenge of a new form of quantum science and this new holistic paradigm far beyond the limitations and fallacies of the mechanistic world view. In Russell’s words:

“In the Copernican revolution, the key insight was the realization that the earth was spinning through space. Kant’s distinction between the two realities is likewise the key insight that opens the door to a new metaparadigm.”¹⁵

¹³ About the Zero-Point Field, cf also Haisch B., 2006.

¹⁴ Russell P., 2003, p 45.

¹⁵ Russell P., 2003, p 53.

J.J. Kineman and K. Anil Kumar show that this metaparadigm where new science and mysticism converge lies at the very core of the Relational Theory of Bateson and Rosen.

“We know that Bateson had direct contact with the ancient ideas of the Far East, particularly the Vedas and Upanishads of India. (...)

The Vedas speak of a single interconnected reality, which we see through the veil of Maya, but which emerges from a single creative principle that exists in all parts of the universe and the whole itself.”¹⁶

In the words of Peat and Briggs, with H. Poincare’s problem Newton fell and no one noticed. This French mathematician and physicist sounded a warning against the fallacies of the Newtonian paradigm. “But though the cry was dramatic, it took almost a century before it was heard.” Newton’s laws were supreme in the XIXth century. Poincare’s impertinent questioning through the study of mechanics of closed systems and chaos theory opened the way to the still more irritating discoveries of quantum physics.¹⁷

“Poincare had thrown an anarchist’s bomb into the Newtonian model of the solar system and threatened to blow it apart. (...) The immediate import of Poincare’s discovery was to challenge the grand Newtonian paradigm that had served science for almost two centuries.”¹⁸

Similarly, E. Laszlo writes:

“Somewhat over a hundred years ago, the mechanistic predictable world of Newton ran into trouble. (...) The very foundation of natural science was shaken.”¹⁹

Laszlo plainly says that quantum physics demolished the Newtonian paradigm with findings such as The Observer Effect, the Uncertainty Principle, non-locality, etc. But he also underlines that the major anomaly and challenge for the mechanistic paradigm has been consciousness, and at this point new science meets mystical philosophy in depth.

Let us examine below in more detail the main characteristics of this common metaparadigm emerging from the historical convergence between quantum physics/ new science and the ancient traditions of mystical philosophy.

¹⁶ Kineman J.J., Anil Kumar K., 2007, p 1064.

¹⁷ Cf Peat, Briggs, 1989, p 26-27.

¹⁸ Peat, Briggs, 1989, p 28.

¹⁹ Laszlo E., 2004, p 33.

The historical development of the new paradigm.²⁰

We have followed in the previous pages the historical process through which the development of quantum physics and new science in dialogue with the traditions of mystical philosophy dismantles materialistic mechanism to its very roots and outlines a new holistic paradigm that is essentially multidimensional and spiritual.

The new paradigm reverses the modern materialistic fallacy at two levels:

- Not only the objective physical and the subjective psychic realm are not separated;
 - But in their essential interconnectedness what is primary is certainly the second one: the primacy of consciousness put forward by quantum physics, biocentrism and new science in deep coherence with the traditions of wisdom.
- The properties of matter have NOT an objective existence independent of observation and therefore the observer, that is, the psyche.

Hence, consciousness becomes the most crucial issue for the future of humanity on Earth. It also appears to be the very core of the educational process in a new holistic and value-based education as we defend here. Our paper tries to show that integral education is the pedagogy of the new holistic paradigm -evolved through the convergence of quantum physics/ new science and spiritual philosophy/ wisdom-. Both integral education and the holistic paradigm blend science and spirituality, and acknowledge the primacy of consciousness in a multidimensional cosmos where there is no separation between matter and mind.

Einstein's Relativity and quantum physics undermined fundamental tenets of mechanistic physics such as space, time, movement, matter, energy, locality, causality, determinism, and the whole nature of the cosmos. These tenets could work at some macroscopic level but not at other levels.

The new findings of quantum physics would become coherent with later research in the bio-sciences. R. Sheldrake's Morphic Resonance, for instance, would corroborate D. Bohm's Implicate Order and parallel theories such as the Akashic Fields and the holographic nature of the cosmos. Relational Theory, initially stemming from the bio-sciences, would continue to open the fascinating spectrum of new science.

In parallel to this revolution in the domain of physics –the very core of the modern mechanistic paradigm- and afterwards in the field of the bio-sciences, new developments in psychology introduced the issue of human consciousness into the scientific arena in terms that could not leave the prevailing materialistic views unquestioned.

New disciplines such as epigenetics, sophrology, the Mind's New Science, etc, would endorse the revolution brought by Jungian and Transpersonal Psychology. The astonishing results of neuroscience, in particular the so-called aesthetic and spiritual neuroscience, would

²⁰ Cf Capra F.: "The Tao of Physics", 1975,
"The Science of Leonardo", 2008,
"The Turning Point. Science, Society and the Rising Culture", 1983.

bring supplementary evidence to scientifically challenge the fallacies of materialism and support the major arguments of the new paradigm.

The new paradigm in psychology: From Freud to Jung and Transpersonal Psychology.

S. Freud already shook modern culture by putting forward a psychological unconscious that could be deeply irritating to the bourgeois morality with all its sexual implications adequately buried by XIXth century Puritanism. But the main revolution in the psychological arena would be brought by CG. Jung, not by Freud. The unconscious as presented by Freud could be uncomfortable to the bourgeois prejudice, but it would never question the materialistic assumptions of modern civilization, whereas Jung's Collective Unconscious and Archetypes with their transpersonal implications and spiritual depth presupposed a psychic reality that did challenge the very roots of the materialistic understanding of humanity and reality.

Furthermore, Jung's Synchronicity, evolved in dialogue with the quantum physicist W. Pauli, evidenced that the deepest levels of the unconscious transcend the modern –false- distinction between psyche and matter, pointing at a deeper “implicate order” –called *Unus Mundus* by Jung and Pauli- strikingly akin to the subtle and causal realms of mystical philosophy. Later on, Transpersonal Psychology, with eminent figures such as K. Wilber, S. Grof, A. Maslow, R. Assagioli, etc, would further elucidate the new perspectives of Jungian psychology and deepen into their spiritual foundation and also into their pedagogic consequences –the main purpose of this book-.²¹

After-death/ near-death experiences have always happened throughout history, but they have been scientifically recorded in the last decades; even more, new science has provided a theoretical frame to understand these experiences and also parallel phenomena: spontaneous mystical states and similar altered states of consciousness induced by psychedelics or hypnosis. The outstanding conclusion is that consciousness can exist without or beyond the brain –and hence matter-, which the mystical traditions of mankind had always suggested. In these higher states, consciousness manifests supra-empirical capacities open to other dimensions. In dreams as well as in meditation, consciousness can visualize places that the waking mind had never seen, travel through space and visit other worlds or dimensions, and even forecast future events that the ordinary mind could never know. Meditation still unfolds a much deeper potential than dreams.

Can we deny the wonder and the primacy of consciousness far beyond the typically modern materialistic reductionism? The most lucid minds of the XXth century have realized that the advent of quantum physics and new science in dialogue with the traditions of spiritual philosophy has opened the door towards a new paradigm, that is radically different

²¹ Cf Grof S., “The Cosmic Game. Explorations of the Frontiers of Human Consciousness”, 1998, Maslow A., “Towards a Psychology of Being”, 1998, Wilber K., ed., “Quantum Questions. Mystical Writings of the World's Great Physicists”, 1987.

from the previous world view based on an extrapolation of Newtonian physics and which sustained the Industrial Revolution and capitalistic expansion.

From machines to thought. When science speaks the language of mysticism.

In 1935, Einstein and some of his colleagues at Princeton University tried to demonstrate that some tenets of quantum physics were logically unsustainable. Nevertheless, the XXth century has consolidated the main principles of quantum physics. Einstein wanted to prove that there is an objective reality independent from the observer or from any theory and which can be objectively and accurately described by the scientific method. The historical development of quantum physics has concluded that it is impossible to describe the properties of a system independently from the context and the process of observation. At the sub-atomic level, it is clear that the elementary particles do not exist as independent objects per se; they only exist in relation to the process of observing them. Any quantum event starts and ends through the process of observation; it does not exist without the very participation of the observer.

The new paradigm outlines a participatory cosmos from which we are not separated, where the observer is intimately intermingled with the object of observation, whereas the modern world view established a rigid –fallacious- separation between subject and object. This means that the new paradigm is based upon a dynamic binomial or an interdependent unity of physics –continuum matter/ energy- and psyche –information/ consciousness, where consciousness is the key –primacy of consciousness-, hence reversing the materialistic fallacy. The typically modern “Weltbild” –world view- depicted a cosmos that was rigidly fixed and finalized once forever, whereas the quantum/ mystical paradigm unfolds from an unceasing dialogue between the subject and the object, from relations between all the parts of the whole in interconnectedness and interdependence. Mechanistic science illusively defined separate objects and overlooked the relation between them. Quantum physics has unveiled a reality made of relations rather than objects in a vision of dynamic interaction.²²

Modern physics has described the universe as a machine. At the time of Newton the common metaphor was that of a clock, and more recently that of a computer. Even the human body and brain have been compared to machines. These modern metaphors and their mechanistic basis are suspiciously consistent with the world view of the Industrial Revolution and technocracy. However, the development of quantum physics has evidenced that the modern metaphors are inadequate, and their mechanistic foundation questionable.

With the emergence of quantum physics many physicists have realized that the universe is not a machine. For the new generation of scientists, the cosmos would be a living organism –Gaia- and also Thought/ Consciousness -rather than a clock or a computer, and hence a machine-. A number of physicists have concluded that consciousness is primary and the creative basis for the material world; metaphysically, this would be the masculine

²² Cf Goswami A.: (1995), “The Self-Aware Universe”, 1995, “Creative Evolution. A Physicist’s Resolution between Darwinism and Intelligent Design”, 2008, “God is not Dead. What Quantum Physics Tells Us about our Origins and How We Should Live”, 2009, “Physics of the Soul. The Quantum Book of Living, Dying, Reincarnation and Immortality”, 2001, “The Visionary Window. A Quantum Physicist’s Guide to Enlightenment”, with D. Chopra, 2000.

Cf also Koenig M., “Das Urwort. Die Physik Gottes”, 2010.

principle –Shiva-; Gaia would be the feminine –Shakti-. The views of quantum/ new physicists would be astonishingly coherent with the main tenets of the traditions of wisdom: a radical turnabout compared to the Newtonian age.

J.J. Kineman and K. Anil Kumar have worked together for this radical turnabout at the junction of the West and the East, between India and North America:

“Gregory Bateson professed that there is more to nature than can be described from the traditional mechanistic view; that to understand living nature we must think differently and escape the machine metaphor.”²³

The astrophysicist J. Jeans advanced a non mechanical world view more than eighty years back, while he already dared to compare the cosmos to thought. In the same period, A. Eddington, another reputed physicist who worked out Einstein’s Theory of Relativity, would add that the real content of the universe is nothing else than our own consciousness. One of the most renowned fathers of quantum physics, Schroedinger, also suggested that the basis of reality cannot be found in matter but in consciousness. The conclusions of Jeans, Eddington and Schroedinger can be regarded as pure Vedanta, the prominent Indian philosophic school that never denied the reality of matter, but warned that the illusion consists of reducing everything to it, while the foundation of everything lies in consciousness –exactly what quantum physicists have also understood-.

Mechanistic science exclusively focused on matter from the perception of the physical senses. Quantum physics later discovered the subatomic realm below apparent matter and the senses, and through the Observer Effect, it asserted the primacy of consciousness. The new holistic paradigm confirmed the basal role of consciousness in dialogue with spiritual philosophy. The adventure of consciousness as Sri Aurobindo disclosed would require the same respect and attention than the material world seized by the physical senses. From here unfolds a new science of consciousness in a new holistic paradigm. This constitutes the epistemological foundation for integral value-based education.

Even Einstein sought for Truth, Goodness and Beauty –Satyam, Shivam, Sundaram in Sanskrit-, which he found in the lives and teachings of mystics and sages. He was truly convinced that at this level –mysticism, not organized religions or priestly hierarchies- there is a space for interaction between science and spirituality. According to Prof. Alois M. Haas, renowned Swiss Professor and expert on mysticism: Science already speaks the language of mysticism. Einstein himself had stated: Mysticism is the source of any true science.

Can the educational process continue to ignore all these developments stressing the primacy of consciousness? The mainstream school system has been the pedagogy of modern materialism, and hence, Newtonian physics, the Industrial Revolution and capitalistic expansion. That is why the prevailing school system has reduced the multidimensional nature of humanity to a rational mind overstressing science –mechanistic science-, and has reduced reality to matter and objects, while it has encouraged competition, the ego and boundless desires of things. The new paradigm summons a totally different pedagogy that is essentially multidimensional and holistic as the new paradigm itself. This new pedagogy can only be child-centred, acknowledging the multiplicity of geniuses and the uniqueness of every child or human being in a vision of underlying unity.

²³ Kineman, Anil Kumar, 2007, p 1055.

According to J.J. Kineman and K. Anil Kumar, one of the fathers of Relational Theory, G. Bateson, “minced no words in criticizing the Western contemporary education system for encouraging this myopia.”²⁴

Travelling back to Earth on board of Apollo 14 after having walked on the Moon, the astronaut **Edgar Mitchell** had an experience that was not foreseen and that changed his world view for the rest of his life. As he approached our beautiful blue planet, he was filled with an inner deep conviction: that the Earth to which he was returning is part of a cosmic living system, harmonious and whole, and that we all participate in it, as he expressed it later, "in a universe of consciousness."

Trained as a scientist and astronaut, Dr Mitchell was educated in the frame of mechanistic science still prevailing in our world. Yet the return to Earth on Apollo 14 produced an unexpected turnabout, after which Captain Mitchell shared the basic assumptions of the new holistic paradigm, stressing that the key lies in consciousness. In spite of science's technological achievements, Dr Mitchell realized that mankind has barely begun to apprehend the deepest mystery of the universe: consciousness itself. He became convinced that this is the next frontier to explore, for which within two years of his expedition he founded the Institute of Noetic Sciences.

As the Catalan researcher, J. Pigem, stresses, modern materialism illusively identified things through a linear and dualistic kind of thinking, whereas quantum physics has discovered that the cosmos is in fact made of relations in interdependence within a participatory reality where the observer determines the object of observation. This unceasing flux of reality under the primacy of consciousness was clearly understood by the traditions of mystical philosophy, especially in India.²⁵

²⁴ Kineman J.J., Anil Kumar K., 2007, p 1066.

²⁵ Cf Pigem J., 2013, p 127-128 and 131.

From the previous developments about the new paradigm, **we can outline the common grounds underlying all the disciplines that converge as complementary forms of knowledge into the new holistic world view.**

This may be the foundation for a unified theory of knowledge –which will be relational, dialogical, systemic, holistic and holographic-; it can also be regarded as the epistemological basis for integral value-based education.

- Truth = reality (Sat/ Satyam in Sanskrit) is relational; hence, the new paradigm evolves from the unceasing dialogue between complementary disciplines and aspects of reality. Complementarity is another crucial concept.
- Both the cosmos and humanity manifest a unity of physis and psyche –matter, energy and mind-. In this inherent interconnectedness and interdependence, consciousness is the key; however, consciousness is inseparable from vibration.
- Both the empirical world and higher strata of consciousness/ reality unveil the capital role of the Light, which constitutes the common stuff to which everything is ultimately reduced: physis and psyche, empirical and subtle, manifest and potential.
- Both reality and the knowledge of it ultimately stem from Love –another common stuff which the cosmos and consciousness are made of-.
- All human knowledge and experience ultimately unfold the awareness that: the I is We, and that We are That from which everything emanates.

From quantum science to quantum consciousness.

Although Descartes was a pioneer of modernity from a certain point of view, he emphasized the capital role of consciousness from another point of view, which is at the core of the new paradigm. His famous “Cogito ergo sum” –“I think, therefore I am”- reveals the foundational nature of consciousness, a mystery and an uncomfortable burden for mechanistic science, yet the key for the new paradigm. In the words of the contemporary physicist Prof. T. Versyp:

“Consciousness emerges from the world of quantum events. The understanding of ourselves and our relationship with others reflect the same laws that rule the quantum world.”²⁶

On parallel lines E. Laszlo shows that consciousness works in ways that are not mechanistic but quantum and non-local.²⁷ Transpersonal Psychology has extensively researched on this quantum dimension of consciousness already acknowledged by quantum physics.

²⁶ Versyp T., 2007, p 26.

²⁷ Laszlo E., 2004, p 90-105, and Laszlo E., 2006, p 121-129.

The foundational role of consciousness has been asserted by a set of instances through the XXth century.

Quantum physics puzzled and irritated the advocates of materialism by confirming that the act of observation does impact upon the reality that is observed.

Further developments of quantum physics with D. Bohm and E. Laszlo suggested the existence of a cosmic ocean of energy inseparable from fields of information.

New biology -with R. Sheldrake- postulated the existence of these fields of information moulding living beings in the biological domain.

Epigenetics has proved that the DNA is not deterministically deciding our lives, since a change in our mental patterns can modify this biological determinism.

Sophrology has evidenced how a constructive psychological therapy can positively affect not only mental health but even the human body.

Psychosomatic studies have demonstrated that the state of mind does have significant effects on the person's health and ability to heal itself.

The PEAR/ ICRL research (Princeton University) has empirically verified that the mind does alter the functioning and outputs of various machines.

Last but not least, spiritual neuroscience has produced scientific data showing that the spiritual experience not only exists but even influences the whole organism.

In the new emerging paradigm, consciousness cannot be reduced to matter –to neurological processes-; it becomes a fundamental component of reality within a profound unity of physis and psyche –matter, energy and consciousness-; at the same time, it is also regarded as the key due to its foundational role: everything we know manifests from consciousness.

Various scientific findings confirm this foundational role of consciousness.²⁸

The prevailing materialistic world view has operated a confusion between the reality as such and the reality as perceived by the mind. This confusion corresponds to the Vedantic idea of “maya” –illusion or delusion-. The illusion/ delusion consists of thinking that we perceive the world directly as it is. Today we know that the human eye is sensitive only to the light of a narrow frequency range from 430 000 to 750 000 gigahertz; at lower frequencies we find infrared radiation, at higher frequencies ultraviolet rays, and beyond them X and gamma rays. We also know that many animals have access to other bands of the electromagnetic spectrum, which means that they perceive a world pretty different from our perception. For example: with their sonar, dolphins have a perception of things more similar to that of the ultrasound scan. In conclusion, one thing is reality as such –Kant's “noumenon”-, another thing is what we experience, the reconstruction of reality by our perception –Kant's “phenomenon”-. At the level of the phenomenon, consciousness appears to play a foundational role. As we said, everything we know manifests from consciousness.

The new holistic paradigm unveils the “maya” –illusion/ delusion- of modern materialism or common assumptions, and opens the scientific arena and human knowledge to a wider, richer and more accurate vision of reality. In the materialistic world view, only the material realm was acknowledged, and the mind was reduced to matter –to neurological

²⁸ Cf Rubia F.J., 2015, and Walach H., ed., 2011.

processes-. In the new holistic paradigm, consciousness is an essential component of reality within the fundamental unity of physis and psyche –as we develop below-.

In this fundamental unity the key lies in consciousness, since the ordinary mind does not know the “noumenon” but the “phenomenon”, something that is scientifically evident today, while the mystical experience –scientifically studied by neurology- manifests an aperture of consciousness exposing the mind to other “phenomena” of the “noumenon” that were already existing though they were overlooked by the gross mind –like many areas of the electromagnetic spectrum-.

Therefore, in the new paradigm consciousness appears to be multidimensional and holographic, much vaster and deeper than the flat monolithic reduction of materialism. This has been the conclusion of a major psychiatrist, Dr S. Grof; according to him, the common perception is limited by the physical senses, whereas in transpersonal states of consciousness, either meditative or induced by LSD, those limitations vanish and the mind perceives a range of phenomena unknown to the ordinary mind, which means that transpersonal consciousness opens itself to the multidimensional and holographic nature of reality. In its multidimensional and holographic nature, consciousness is inseparable from the physis or cosmos, from the binomial matter/ energy. Both psyche and physis are holographic and multidimensional and constitute One reality beyond the limitations of the ordinary mind and the physical senses.

What we have presented above is also related to the issue of **the two brain hemispheres –left and right-**. We have already stressed that the modern materialistic world view overemphasized the left hemisphere to the detriment of the right in its general policy of alienation of the human being. The new paradigm and its crucial reappraisal of consciousness will foster the harmony between the left and the right hemispheres, with a balanced interconnected development of both –this is the task of integral education as defended in this book-. The harmony between the two brain hemispheres will nurture a richer and deeper psyche and higher states of consciousness, and hence, more holistic human beings living in harmony with the cosmos.

**At the junction of deep psychology and quantum physics.
The unity of physis and psyche in a multidimensional reality.²⁹**

The quantum physicist W. Pauli, who worked out the concept of Synchronicity with C.G. Jung, emphasized the “complementarity” of psyche and physis, consciousness and matter, as twin aspects of the same holistic reality in an integral world view. In fact, complementarity would apply to other fundamental notions of the holistic paradigm. Seemingly mutually exclusive pairs of concepts must be used to characterize quantum or holistic phenomena in all their aspects in a multidimensional reality. At the same time, Jung warned that any conceptual formulation that tries to apprehend the deepest levels of this multidimensional cosmos will be imperfect, and hence metaphoric or symbolic –not literal-.

Quantum physics has proved that any defined universe is an observed universe; the properties of particles depend on the observer: the Observer Effect. So, it is true that we create the world. However, quantum physics has also shown that the Unified Field generates

²⁹ Cf the classic of G. Bateson, “Mind and Nature. A Necessary Unity”, 2009, and the classic of R. Rosen, “Life Itself. A Comprehensive Inquiry into the Nature, Origin and Fabrication of Life”, 1991.

everything, so we are also created by the world. The relation between the world and ourselves is dialectical. Reality is essentially dialectical.

Parallel binomials for the complementarity of psyche and physis.

- In physics: the wave/ particle duality;
- In psychology: the unconscious/ conscious duality.

The parallelism between physics and psychology would be striking, strongly suggesting the integral nature of reality.

- The wave is the unobserved aspect of physis, just as the unconscious is the unobserved aspect of psyche;
- The particle is the observed aspect of physis, just as the conscious is the observed aspect of psyche.
- The wave function represents probabilities in contrast to the actualized particle;
- Similarly, the archetypes of the unconscious represent psychic potentialities while the conscious mind is an actualization of these potentialities.

This comparison between structures in physics and psychology evidences the most crucial point of the new holistic paradigm: the interconnected unity of physis and psyche - matter, energy and mind-, the two or three of them constituting inseparable aspects of the same One reality. (Einstein already understood that matter is but a form of energy.)

This profound truth shakes the biases and fallacies of modern materialism, but it was well known by the traditions of spiritual philosophy. In the Indian world view, for instance, Brahman, the Ultimate Reality, foundation for all that exists, is both Shiva and Shakti, Cit and Citi, that is, Consciousness and Energy/ Matter, Father and Mother, Heaven and Earth. The integral view of the ancient traditions has been reappraised by the development of new science in our time.

Then, **the deeper Implicate Order of reality –Bohm-, the Unus Mundus –Jung-**, could be seen as a potential world nurturing the empirical and psychic phenomena of the physical/ conscious realm, the “explicate order”.

The Implicate Order or Unus Mundus can be understood as a deeper realm of unified potentiality beyond spatial separation and causal connection in time, a unified ground for mind and matter.

The universe constitutes a gigantic endless flowing from this integral multidimensional whole with various degrees or levels of implication and explication –nothing to do with the flat limited views of modern materialism-.

This deeper level of reality comprises not only potentiality but also orderedness and meaning; there, vibration/ energy and information/ intelligence are inseparable. It is a world of Logos prior to and basis for the physis and psyche of the manifest realm. But this Logos is also a boundless ocean of energy. It is the very source of Life.

Linked to Jung's Collective Unconscious and Bohm's Holomovement or field of energy/ intelligence, the deeper Implicate Order suggests a multidimensional depth of consciousness and reality that goes far beyond the limitations of mechanistic materialism.

The key to understand the new reality is the interdependent unity of energy and matter, of physis and psyche, knowing that this dynamic unity is essentially multidimensional and holographic as the phenomenon of synchronicity manifests.

The interdependent unity of the new holistic paradigm is not only the unity of psyche and physis –mind, energy and matter-, but also the unity of the implicate and the explicate, of the potential and the manifest, the dynamic and the static, the particle and the wave, the conscious and the unconscious.

Furthermore, this holistic living unity cannot be reduced to a polarity between implicate and explicate realms, but rather as a multidimensional holographic continuum with a whole series of strata of consciousness/ reality.

The mystical traditions of mankind had explored and systematized this enthralling spectrum of consciousness/ reality, stressing that every layer of the spectrum is at the same time a level of consciousness and a field of reality, an integral world in a multidimensional multiverse of parallel worlds. Then, the very essence of human realization would be the ascent from the lower to the higher states of consciousness and planes of reality, being aware of the dialectical relation between ourselves and the cosmos.

The development of new science with Jungian/ Transpersonal Psychology and quantum physics has provided a modern scientific understanding of these millenary accounts of reality and humanity.

The Cambridge scholar, P. Russell, stresses that “spiritual teachings and scientific knowledge now share a common ground. (...) With the shift to a consciousness metaparadigm the integration goes much further. (...) This meeting of science and spirit is crucial, not only for a more comprehensive understanding of the cosmos, but also for the future of our species.”³⁰

Mystical consciousness.³¹

In the new holistic paradigm, the mystical experience acquires a totally different consistence: from being ridiculed or accused of pathological by the materialistic prejudice to being the key to enter the mystery of consciousness.³²

Just as many animals have the perception of strips of the electromagnetic spectrum that the human senses do not grasp, the mystical experience opens consciousness to dimensions of reality that the ordinary mind does not see. The visualization of the aura, energetic fields or the Light of lights, for instance, implies the existence of realms of reality that exist at the level of the “noumenon” though the ordinary mind does not have a perception of it as a “phenomenon”. But the “phenomenon” exists for the mystical consciousness.

³⁰ Russell P., 2003, p 117.

Cf also Laszlo E., 2004, p 39-44.

³¹ Cf Wilber K., ed., “Quantum Questions. Mystical Writings of the World's Great Physicists”, 1987.

³² Cf Laszlo E., 2006, p 168-175.

The mystical dimension broadens and deepens human consciousness:

- By opening it to other strata of “**phenomena**” beyond the gross mind or reality;
- By ultimately allowing it to perceive the “**noumenon**” itself through advaita –non-duality-, when the Pure Consciousness is One with everything and the source of everything, something that Kant did not experience but mystics do.

Already in 1901 the British doctor, R.M. Bucke, published a classic of mysticism, “Cosmic Consciousness”. Another famous author, W. James, studied it in “Varieties of Religious Experience” and “A Suggestion about Mysticism”. Later on, the renowned writer, C. Wilson, expounded the mystical extension of ordinary consciousness in “Super Consciousness”, and the reputed philosopher, R. Panikkar, presented it in scholarly terms for the modern mind –always in an intercultural perspective East/ West-. C. Wilson writes:

“Bucke concluded that there is another form of consciousness. (...) James suggests that mystical experience is not different in kind from ordinary consciousness, but is merely an extension of ordinary consciousness.”³³

The typically modern prejudice against mysticism cannot be sustained anymore by any scholar or scientist today after the huge amount of research and scholarship already published. However, the materialistic prejudice has changed its strategy; instead of attacking mysticism and considering it as pathological, it ignores it –it is still puzzling and it can only question the materialistic fallacy-. Quantum physics and new science have gone far beyond the accusations or the silence of materialism. Not only they have acknowledged the reality of the mystical experience, but they have even integrated it into the new world view as a higher state of consciousness parallel to deeper levels of reality corroborating and illustrating the new multidimensional world view.

The higher states of consciousness that may be called “mystical” unfold all the depth and purity of human values such as love, compassion, peace, etc. They also manifest a healing capacity that cannot be denied anymore after the clinical study of Reiki or the astonishing results of spiritual neurology. Certainly, they develop other supraempirical powers that should never be searched per se –as wisdom warns-.

In conclusion, the rise of mystical consciousness will disclose all the potential of the human being, while it will nurture ethical persons capable of living in peace on Earth and capable of cooperating and creating -instead of fighting and destroying-.

³³ Wilson C., 2010, p 44.

The Light of Consciousness.

Mystics have often spoken of the experience of the Light. The fact that the same experience is described by spiritual books and traditions from different continents and periods of history gives it an objective consistency that must be seriously considered by scientists and scholars.

From Upanishads, Buddhist Sutras, Plato's Dialogues or Sufi stories to Sri Aurobindo, J. Krishnamurti, A. Huxley or C.G. Jung, all of them speak of the same Light, unfathomable, more real than anything else, identical to our own self.

That is why spiritual masters from India such as Sathya Sai Baba, following the Vedantic tradition, has proposed the Meditation in the Light for children in an integral spiritually-based education.

Spiritual scientists such as P. Russell stress the profound parallelism between the inner light of the mystical experience and the light of new physics.³⁴

The Light of lights appears to be a major recurrent theme in mysticism, while light has been a major topic in XXth century physics –we have expounded above the fascinating research of B. Haisch for instance-

The light of new physics has no mass and is not part of the material world; similarly, the mystical light is immaterial and reveals deeper realms of reality.

Physical light seems to be fundamental in the cosmos described by new science, just like the inner light is likewise fundamental in higher states of consciousness.

Distance and time ultimately disappear from physical light; in parallel to that, the mystical light is beyond space and time.

Every photon of physical light constitutes an identical quantum of energy, while the Light of consciousness shines in all in the same way.

Hence, renowned figures of new science such as P. Russell wonder whether there is some deeper significance in these similarities, whether there is some profound connection between the light of the physical world and the inner light of higher consciousness.

If there is such common ground between the two lights, something that Russell and Haisch believe, then the common basis for the cosmic unity of psyche and physis would be light, a light inseparable from consciousness, something already discovered and understood by mystical philosophy in all cultures of mankind. Some scientists reach the same conclusion at the end of the XXth century.

That is why the Genesis commands:

-“Let there be Light.”

³⁴ Russell P., 2003, p 57-86.

The confluence of quantum physics/ new science and spiritual philosophy has a direct translation in the field of education: integral education in human values.

Or, to put it in a reverse order: holistic education will find a philosophical and scientific foundation in this convergence of quantum physics/ new science and spiritual philosophy towards the new holistic paradigm.

However, we must underline a fundamental point: integral education may be seen as the pedagogy of quantum physics not exactly through the experimental part of it as pure physics, but rather through the new world view that it certainly discloses, and also through the dialogue that it opens with spiritual philosophy from this new paradigm. The main figures of quantum physics/ new science have been convinced that their discoveries unveil a new paradigm coherent with mystical philosophy, and this is what becomes crucial for the future of mankind. This is what constitutes the epistemological basis for integral value-based education.

Quantum physics/ new science give a more fluid picture of the universe –like mystical philosophy-, whereas the mechanistic order was founded upon a petrification of reality. Integral education can also open the window to allow the flux and rhythm of Becoming to flow freely –verb, not only noun, hence relation and dialogue-.

Meanwhile, the revolution in the medical sciences towards a more holistic vision of health corroborates the Observer Effect of quantum physics, validating therefore the mystical insights. Integral education can unfold here a tremendous potential towards a positive transformation of the human being: the power of the mind, helping children and youths positively direct their thoughts, and become masters of their own destinies.

Science and spirituality together again, as Swami Vivekananda predicted at the end of the XIXth century together with N. Tesla. Amazingly enough, the unity of science and spirituality was present in the first civilizations of mankind, like Mesopotamia, Egypt or the Indus Valley. Some kind of spiritual approach to science was also elaborated by the Vedas and Upanishads in India, and by Orphism, Pythagoreanism and Platonism in Ancient Greece; it was still present in European Renaissance, especially in the spirit of the Italian genius: Leonardo da Vinci. The last cultural movement to defend it was Romanticism. But the Romantic dream was overthrown by the arrogant triumph of the materialistic paradigm –with mechanism and capitalism- that has finally devastated the planet and humanity; the ecological catastrophe is inseparable from the massive depression and anxiety of people.

Mechanistic physics has been utilized through a process of extrapolation to build up a whole materialistic world view that shaped Industrial Revolution and Capitalistic expansion – and, of course, colonization-. Europe has dominated and exploited other continents, and Man has exploited and dominated Nature –in the name of progress-. This paradigm has brought mankind to the verge of self-destruction. (We refer here to the materialistic paradigm as such, as a world view, not about physics strictu sensu in its pure scientific dimension.)

Integral education in human values, linking academic excellence and self-inquiry, will be the philosophy of education and the pedagogy of the new paradigm –both being equally holistic-.

It is clear that a new model of civilization requires a new pattern of education.

* The school system that we had until now, and that is presently facing serious problems in Western countries, was the education of mechanism and the Industrial Age.

* Holistic value education will be the pedagogy of the new paradigm.

Let us put forward **the main points of this historical convergence.**

New science and oriental wisdom have spoken of a multi-dimensional cosmos, in parallel with education in human values that is based upon an integral anthropology depicting a multi-dimensional human being.

The vision of a multi-dimensional reality is truly holistic.

New science and oriental wisdom have overcome the illusion –“maya”- of materialism, showing that there is much more than the macroscopic empirical matter perceived by the senses, exactly like education in human values, which has stressed that there is much more than the body and the mind, and therefore, much more than physical or intellectual training.

The development of quantum physics, in deep coherence with mystical philosophy, has suggested the holographic character of the cosmos: every part contains the whole, and hence, is linked to any other part. This notion of interconnectedness and interdependence is essential to integral education.

New science and oriental wisdom have refused to see Man and the Cosmos as machines, in deep coherence with education in human values, which brings to the pedagogic arena the highest dignity of Man, as expressed by Vedas and Upanishads in India, or by Romanticism in modern Europe.

The new paradigm emerges at the junction of scientific research -like quantum/ new physics and relational theory- and mystical traditions; at the same time, holistic value education is based upon the intimate link between academic excellence and spiritual self-inquiry.

Relational theory brings its name from the decisive role of relation in our living cosmos. Similarly, education in human values integrates the relational and dialogical dimension as an essential part of its pedagogy: not only the relation of man with his fellow beings, the community and the cosmos, not only the dialogue of a discipline or culture with others, but also the inner dialogue within ourselves and the relation between the different domains of our multi-dimensional being.

Quantum physics has acknowledged the open unfinished character of the universe, made of uncertainty and continuously recreating itself. Education in human values is also an open pedagogy, that does not lock the child in a fixed system, but unfolds in front of him or her a path of inquiry that is always evolving like Life itself.

New science has come back to the Romantic vision of a living cosmos that still keeps a sense of the sacred, the mystery and the unfathomable. Education in human values totally shares this Romantic vision, and invites students to wonder, like the true scientist, at the depth, the beauty and the magic of the Cosmos and Life.

Just like new science, education in human values does not pretend to dominate nature anymore, but to live in harmony with others, the environment and the whole universe, participating in the never-ending re-creation of Life.

The coherence between quantum physics/ new science and integral education is particularly striking when we tackle the fundamental binomial consciousness/ energy.

Integral education is essentially an education of consciousness, something that the greatest philosophical tradition of India, Vedanta, beautifully expounded, and recent scientific disciplines like sophrology or epigenetics have further developed. In fact, there is an entire new scientific field which we may call the science of consciousness or the mind's new science. Quantum physics already anticipated this undercurrent of postmodern science. With the famous Observer Effect, the quantum theory could already assert the crucial role of consciousness.

At the same time, quantum physics realized that matter is but a form of energy, and still more important, that consciousness is inseparable from energy within a vision of underlying unity through interrelatedness and interdependence. Together with the work on consciousness, integral education also acts at the level of energy through a sensible use of meditative paths and techniques of inner work.

The profound introspection which is essential to integral education at both levels –consciousness/ energy- constitutes a pedagogic translation of the quantum world view later refined by different disciplines within the new holistic paradigm.

Therefore, integral education shares the astounding conclusions put forward by the different branches of new science –quantum physics, epigenetics, sophrology, etc-: we can build our own destiny, and become masters of our lives. The innumerable and impressive cases of self-healing by the destitutes of conventional medicine express this capital statement in more appealing terms than any scientific discourse. When a human being is capable of curing himself from the threshold of death, can we deny anymore the crucial role of consciousness and the work on the energetic realm? This dormant potential unfolds the highest dignity of the human being, and also the deepest meaning and purport of education.

Beyond the fallacious determinism and mechanism of modern materialism, quantum physics has given a more fluid and vivid picture of reality: a living cosmos of interrelatedness and interdependence, deeply coherent with integral education and its emphasis on relation and dialogue –at all levels-. In front of the petrified Being of modernity, based on nouns and systems, the new emerging paradigm flows like the very Rhythm of Becoming, stressing verbs and relations, open to the boundless recreation of life.

From the first atomic investigations, quantum/ new physics have enlarged the picture of a vast energetic field made of manifold frequencies/ vibrations even beyond the non-visible colours and the conventional electromagnetic spectrum.

It is especially fascinating to connect this new world view, so different from Newtonian physics, with the scientific experiments on meditation performed in the last decades, for instance in the frame of Maharishi's Transcendental Meditation. It has been empirically proved that in a genuine meditative state the brain shows special waves that will never be found in its normal functioning.

Quantum physics made a true revolution in the scientific arena when it removed the veils of modern materialism: what seems to be solid matter is in fact mostly empty inside, and it is but a form of energy. Another revolutionary statement of quantum physics shattered the dualism of mechanistic science by postulating that the same reality can be seen as particle and wave.

All this scientific revolution becomes even more enthralling when it is related to the functioning of the human brain and the neurological experiments on meditation. The empirical evidence about the new waves present in the meditative brain has tremendous consequences in the educational world.

First of all, it becomes quite obvious on empirical grounds that the energetic dimension of the cosmos and humanity cannot be dissociated; both the universe and the human being can be seen as energetic fields which are always alive in interconnectedness and interdependence and inseparable from consciousness.

Moreover, conceiving integral education as an education of consciousness with an impact at the energetic level becomes too serious a matter when we can empirically prove that the brain presents unknown waves in a meditative state. The fundamental goal of integral education, that is, the transformation of the human being towards higher states of consciousness and vibration, gets empirical evidence through the research on meditation, while it manifests a deep coherence with the world view of quantum physics/ new science.

Conclusion.

This essay has delved into the various disciplines that have been evolving the new emerging paradigm in the last decades. In this paradigm shift, quantum physics has played a major role and will continue to develop in the future. As Einstein said, quantum physics is the beginning of a long path ahead.

In this paradigm shift that is going on everything will change. To start with, what was the very foundation of the modern age: not science but economy. There are already proposals all around the world outlining a new economic system beyond the fallacies and the catastrophe of communism. However, it is clear that the present capitalistic system and the recent neoliberal reign will come to an end and will have to be transformed.

Not only the economy will change; education will also change completely. We said in the introduction that education is a mirror of civilization. If you want to know any society, just observe its educational system; it will tell you in depth what kind of society it is. Renaissance was the transition from the Middle Ages –in fact the ancient world- to modernity, which was radically different from all previous forms of society. This transition constituted a real paradigm shift, and it obviously incorporated an educational shift. If we study the pedagogic developments in Europe through the XVth and XVIth centuries we can realize that the advent of modern education is being prepared, which culminates in the XVIIIth century, the dawn of modernity with Industrial Revolution, the French Revolution and the Kings of Prussia –the first inventors of the modern school-.

The present paradigm shift will again imply an educational shift. The movement has started and already had its forerunners –Steiner and Montessori in Europe, Dewey in North America, Vivekananda, Tagore, Aurobindo, Krishnamurti or Sathya Sai Baba in India-. The mistake that many Waldorf or Montessori Schools have done consists of thinking that the beginning is the end. Steiner and Montessori were geniuses and pioneers –in front of their mediocre followers that have often misunderstood them as usual in the human condition-. They broke with the rigidity of modern mainstream schooling and they opened the door. However, this is only the beginning of the path, not the end. And the worst we can do for the future of integral education is to get dogmatically stuck to the past instead of being open to innovation in the future.

The advocates of integral education should also become aware of the intrinsic link between this new pedagogy –which is in fact as old as mankind- and the new holistic paradigm presented here, with quantum physics in particular.

First of all, integral education needs a theoretical frame, which can be brought by philosophy of education and psychology of education certainly; but it also requires an epistemology, a scientific foundation, and this is the contribution of quantum physics and new science in convergence with spiritual philosophy. As this paper defends, quantum physics and new science constitute the scholarly foundation for integral education; or to put it in reverse terms, integral education is the pedagogy of the new holistic paradigm.

Prof F. Torralba dares to say from the prestigious Jesuit University in Barcelona, Universitat Ramon Llull:

“The transformation of the world and the building of the society start by practising spiritual intelligence. (...) The development of spiritual intelligence is a fundamental part of the educational process of an individual and has direct consequences on other areas of learning.”³⁵

The renowned British scientist, P. Russell, similarly states:

“Today, more than ever, we need a world view that validates spiritual inquiry, for it is the spiritual aridity of our current times that lies behind so many of our crises.”³⁶

One of the major psychiatrists of the XXth century, E. Minkowski, considered that the excess of rationalism of our civilization is pathological; he called it in French “rationalisme et geometrisme morbides”. Minkowski was aware that there is something else that mainstream culture has buried under this pathological scientism and rationalism, which is not irrational but rather trans-rational. As Prof Raimon Panikkar always stressed, the second eye of knowledge –the intellect- has its own role, but there are three eyes of knowledge, not one, and this pathological civilization has especially discarded the third eye.

Secondly, the new holistic paradigm with the contributions of quantum physics and new science will help educators to understand the depth and the significance of integral education, precisely because it is the pedagogic translation of the new paradigm. Montessori warned the schools bringing her name that the techniques are not essential; the mindset, the intention is of uttermost importance, which means that consciousness is the key –one of the major conclusions of quantum physics-. The philosophical conclusions of quantum physics outlining the new holistic paradigm provide deep insights to understand what integral education is really about; it is about consciousness, it is ultimately an education of consciousness.

As Dr J. Pigem beautifully emphasizes:

“Quantum physics shows that the materialistic and mechanistic vision becomes false when we approach the nucleus of reality.

The social and economic context shows that the search for prosperity through material growth is today unsustainable.

Neuroscience shows that the materialistic vision of the world stems from a kind of thinking, which is logical, linear and literal, that should be at the service of another kind of thinking, broader and more vital: holistic, participatory, contextual and relational.”³⁷

According to Pigem and others, this is more than enough. Educational authorities will have to understand all the implications of this paradigm shift that is going on and will not stop, and they will have to design new policies in this horizon. This paper is a small contribution in this direction; our expression may be limited, but at least we are sure that this is what the future will unfold.

³⁵ Torralba F., 2011, p 299-301.

³⁶ Russell P., 2003, p 117.

³⁷ Pigem J., 2013, p 143.

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