

International Journal of Scientific Research and Reviews

Information, Perception and Quantum Objectivation: The Potential of Human Consciousness

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ABSTRACT

The universe is a system of physical information that is perceived by conscious observers as a plurality of mutually interacting things and beings. Perception itself involves such interaction of the observer with the observed. The perception is in terms of qualia which cannot be categorized as physical information and hence must be regarded as a separate class of information that is indispensable for perception. Source-Field duality of physics provides the clue for ascribing the mind a creative role in perception. Objectivities is the process of creation of objective reality by the conscious subject with the help of its perceptual apparatus of the mind. It is proposed on the basis of the psychophysical interpretation of quantum theory that focused attention can bring about materialization of thought in the outer world by sending out advanced waves as offer waves of a possible transaction reinforced by continued attention. The implications of such objectivation capability for the possible projection and evolution of the universe by the cosmic mind and also the potential of human consciousness for materialization of conscious thought are also discussed.

KEYWORDS: Neural correlate, Information, Qualia, Perception, Quantum Objectivation, Consciousness

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1. INTRODUCTION:

The manifested world of names and forms with their various interactions must have at the very basis of it all, a cosmic unitary guiding principle which remains for ever hidden under the appearance of multiplicity. What could possibly be behind all this phenomenal appearance that is the content of our everyday experience? This fundamental question needs to be pondered over, if at all we are to have a comprehensive understanding of reality¹. The assertion of existence of the world itself is a matter of a complete faith in the experience of the world by the observer(s). The things and the beings that go to make up our experience are ultimately our perceptions and conceptions. Perception is through the senses—a percept becomes registered as a concept in the mind with *qualia* as its characteristics². Conception has concepts as its ingredients and may entirely be an operation at the mind level. Even in the absence of corresponding objects of the external world, conceptions can be there in the mind as often happens, e.g. in dreams and deep meditational states.

The propagation of the familiar physical information can be traced till the brain-state or the neural correlate but not beyond that³. There is need for a deeper explanation of the process of perception. The biggest puzzle is whether the mind is caused by the brain or the vice versa! We have a clue from the source-field duality of classical Physics that allows for taking each as the cause of the other. But can it be extended to apply to the mind-brain connection problem? Does the mind have the ability to create the brain states and then the phenomenal appearance⁴? Is quantum mechanics sufficient to explain these questions concerning mental creation of objective reality or objectivation? These are the questions that we try to address in this article and try to hint at a possible quantum mechanical description of objectivities.

2. THE CLASSICAL SOURCE-FIELD DUALITY

Consider the case of gravitational field which is assumed to be produced by a massive object in order to explain gravitational force on another object. But the massive source and gravitational field are coexistent and coeval with no time lag between the instants of their manifestation. But the source is said to have produced the field. Thus if it is acceptable that the source produces the field, it must also be equally acceptable that the field concretizes as the source. In particular a point mass (source in general) can be considered to be an effect of the gravitational field existing at all points. This point source is a singularity of the field and it applies equally well to all the other fields also.

In electrostatics for example, Coulomb's law gives the Electric field as a function of the source while the corresponding Maxwell equation (Gauss Law) does just the reverse:

$$\text{Coulomb's law: } \mathbf{E}(\mathbf{r}) = \frac{1}{4\pi\epsilon_0} \int \frac{d^3r \rho(\mathbf{r})}{r^3} \mathbf{r} \quad (1)$$

$$\text{Gauss law: } \varepsilon_0 \nabla \cdot \mathbf{E}(\mathbf{r}) = \rho(\mathbf{r}) \quad (2)$$

Mark the inversion of integration over source density in eq. (1) to divergence of Electric field in eq. (2).

In case of Gravitation, similar analysis in Newtonian theory can generate mass (source) from the field. This is more succinctly brought out by the Einstein field equations⁵

$$G_{\mu\nu} = \frac{8\pi G}{c^2} T_{\mu\nu} \quad (3)$$

Wherein, $G_{\mu\nu}$, the Einstein field tensor dynamically determines, and is also determined by, the matter-energy density through the stress-energy tensor $T_{\mu\nu}$; G is Newton's gravitational constant and c is the speed of light. The description is such that the 'determined' is the 'determinant' and vice-versa. It is only in the Newtonian sense that we say that matter *produces* curvature (gravitational field) around itself but equally well we can say that a point mass is a singularity of the gravitational (curvature) field. The fact is that matter-energy and space-time are coeval and coexistent.

Thus in such situations cause and effect can be interchanged. Source can be said to have caused the field and field can, equally well be said to have caused the source, unless it is an explicit non-relativistic time-evolution equation like the diffusion equation or heat flow equation which describe the preceding events as causes and the succeeding events as effects. For example, in the continuity equation reversing the sign of the time would convert the source to a sink and so on.

Source and field both can thus be regarded as cause and effect of each other. Can the same be applied to the mutuality of the mind and the brain, as Eccles proposed⁴?

3. QUALIA-MORPH DUALITY

We now discuss a duality existing between the Physical object and the mental image in terms of *qualia* that has been utilized to propose the psychophysical interpretation of quantum theory. Thoughts are made up of 'subtle matter', which in modern cognitive science terminology are called *qualia*. Sound, touch, form, texture, taste, smell, feelings, emotions, urges etc. are the experiential qualities which are felt by us and which form the corresponding thoughts and hence are called *qualia*.

The *qualia* being metaphysical in character, pervade all space as constituents of morphogenetic (electromagnetic) fields and indeed can be considered as the very source of all physical objects including physical space itself. Physical objects are formed out of the *qualia* in some manner by the mind, of which we are yet to have a definite formulation. Physical space is created by perception of boundaries of finite objects and their separation. Thus definite thought-forms

corresponding to various objects exist at all points of space as various appropriate combinations of these qualia. Therefore, contrary to the common belief that the thoughts originate in the brain, we are led to propose that the nervous system and the brain actually serve the purpose of being mere conduits for the objective physical manifestation of the subjective thoughts through the morphogenetic fields⁶. In fact, the notion of the brain being the source for mind (considered as a field, whose quanta are the thought forms) can be inverted to have the mind itself as the cause for the appearance of the brain (a fundamental kind of materialization).

4. THEORY OF PERCEPTION

The signals emanating from the objects in the external world first of all become sensations in the sense organs which move through the nerve channels to the brain, that excite a corresponding neural correlate. This results in the formation of a percept^{2,7}. The percept acts as a connecting link between the neural correlate in the brain and the concept in the mind and therefore it sits on the boundary between the brain and the mind and hence has a dual character. When its objective characteristics such as frequency of neural oscillations, neural recruitments etc are taken out, it becomes a concept in the subjective mind forming a particular unit of experience. All our experiences are thus ultimately lodged in our consciousness as a series of concepts. Thus, in the mind dimension, the external objective world is projected as a subjective internal world of concepts^{2,3}.

5. P-INFORMATION AND Q-INFORMATION

We need to distinguish between two kinds of information handled by our brain. The physical information or **P-information** is what we ordinarily understand by “information”. But the **Q-information** is *qualia* information that is made up of the perceived color, texture and brightness etc. P-information is related to order and organization in the Physical world of matter and energy while the Q-information is entirely in the mental world. For example, an artist wants to make a painting. He has the canvas, colors and brushes etc. as his means and he adopts a certain approach which is his method and then he proceeds. Can he proceed without a particular form in his mind of that which he wants to put on the canvas? The idea in the mind is the concept which is made entirely of *qualia*, and hence is a piece of Q-information. By his efforts he brings that Q-information on to the canvas which then becomes a piece of P-information for all.

Our eyes have visual sensitivity down to the level of single photons^[8,9]. The visible window (wavelength λ between 390 nm to 780 nm and frequency ν between $3.84 \times 10^{15} \text{ Hz}$ to $7.69 \times 10^{15} \text{ Hz}$ of the electromagnetic spectrum (from below 1 Hz to 10^{25} Hz and beyond) that we utilize for visual perception has both particle nature and wave nature, fully manifest, since from the Ultraviolet and

beyond, the particle nature starts becoming dominant while from the Infrared and beyond, the wave nature dominates. The Energy of a photon (given by the Planck-Einstein formula: $\varepsilon = h\nu$, h = Planck's constant) denotes the particle nature (spatially localized) while, the wavelength denotes the wave nature (spatially extended). In human eyes, rods are sensitive to photon number (intensity), while cones are sensitive to photon wavelength (color). Thus we infer that the particle character is sensed by the rods while the wave character is sensed by the cones and thus the complementary quantum mechanical dual nature of light is fully utilized by the visual apparatus. The nerve signals carrying this information of the visual field to the brain form the neural correlate with both these kinds of information.

The percept is formed from the neural correlate with both kinds of information and there is a resulting amalgamation to have P-information consisting of all physical information and Q-information consisting of all *qualia* related inputs. Wavelength or frequency is physical or P-information while the corresponding color perceived is the Q-information. Similarly the number of photons is P-information while the intensity perceived is Q-information. Photons can carry both kinds of information and physicists have so far studied only the P-information aspects while the Q-information content is yet to be studied. How exactly the Q-information get translated to P-information and vice versa is not yet known, though many ideas have been put forward^{10,11,12}.

6. FOCUSED THOUGHT AND MATERIALIZATION

Creation of phenomenal experience by concentrated thought focused on the desired experience can be said to be materialization or manifestation. Understanding the mechanism of such materialization can give us clue to the resolution of ultimate mystery of the universe, its creation, sustenance and dissolution as a process in time. Just as matter acts as a substrate for storage of energy and a vehicle for its transmission via the relativistic mass-energy relation, similarly also energy can, and does act, as a substrate for storage of information and a as a vehicle for transmission of information as per Landauer's principle^[13]. We have here specifically in view the electromagnetic field which is routinely used for the purpose of information coding and transmission. The degree of subtlety of categories grows in the sequence:

Matter → *Energy* → *Information*

It is only to be expected that quantum theory plays an important role in establishing the connection between the energy (in the electromagnetic field) on the one hand and the information (in the mind) on the other, in the process of perception as well as objectivation. In objectivation, the information originates and proceeds from the mind realm and manifests in the matter realm through the intermediate role of the field energy.

Objectivation or materialization is the successful culmination of a goal-directed activity. Any goal-directed activity first of all has a thought-form corresponding to the goal and in course of time, after a series of well-directed efforts it is achieved. Such examples are galore indeed in the life of each of us, but when we try to formulate a theory for the explanation of the possible mechanism for such materialization, we are faced with an uphill task, when we see the kind of ingredients that went into it. The materials, the methods, the technical issues, the preparation, the proper environments, the time scale often running into several years and so on and so forth are indeed a mind-boggling and bewildering variety of factors to be taken into account in the formulation. But nevertheless these are our everyday experiences and need to be explained in a scientifically acceptable manner. Therefore, the analysis of the structure and function of thoughts assumes a great significance.

7. QUANTUM OBJECTIVATION

The wave equations involving second order time derivatives are time-reversal invariant and hence allow backward time propagation, as in Wheeler-Feynman absorber theory of electrodynamics^{14,15}, while the Schrödinger equation has the conjugate equation for such backward propagation as in Cramer's Transactional Interpretation and Pradhan's psychophysical interpretation of quantum Theory^{16,17,3}. These backward propagating advanced waves can be utilized to explain the process of materialization or objectivation.

The psychophysical interpretation of quantum theory can explain the process of materialization of urges that we fervently cherish. We recall that the psychophysical interpretation is an augmentation of Cramer's transactional interpretation by associating the backward traveling advanced waves with psychic aspects corresponding to the physical aspects represented by retarded waves. As part of the discussion of the implications, it was proposed that the brain can be supposed to be a medium of reception and transmission of advanced waves³. This can be taken as the starting point of the explanation of materialization.

The desired object or event is a thought in the mind is nothing more than a set of hazy *qualia* at first, which gradually takes up more and more well-defined contours. But, fortunately that is enough to start with! We only need to have the mental image of the desired object or event in terms of the *qualia* and nothing more. The details in terms of neural correlate or signals or frequencies are automatically taken care of by the brain, just as in case of visual perception we are directly aware of the *qualia* only such as blue or red color but not of the corresponding frequencies.

Thinking of the experience of blue or red object excites the corresponding neural correlates and sends out information through the optic nerves to the cones in the eyes which are extensions of the nervous system and through the eyes to the external world of objects. The information can be in

the form of half-retarded and half-advanced waves of Wheeler-Feynman absorber theory, as adopted in the psychophysical interpretation. Thus, thinking of the object in terms of the qualia leads to the excitation of the corresponding neural correlate from which advanced waves spread out both through the corresponding senses and also directly from the brain in all directions into the past. These act as advanced offer waves till they are confirmed by the presence of the actual object which sends out the corresponding retarded confirmation waves for the transaction to complete. When the confirmed transaction occurs, the desired object is perceived outside as an element of objective reality. The more uninterrupted the advanced offer waves the deeper they spread into the past and thus, the sooner is the completion of the transaction by the appropriate confirmation waves. In the psychophysical interpretation completion of transaction is only objective collapse, while the subsequent subjective collapse in the mind of the observer is *sine qua non* for the perception to arise.

A particular thought-form θ , which is a concept in the mind representing the corresponding object perceived to exist outside, can be schematically expressed by the **perception equation**:

$$\theta = f(\{q_n\}) = g(\{N_n\}) = h(\{s_n\}) = i(\{\omega_n\}) = j(\text{object}) \quad (4)$$

where,

$\{q_n\}$ = set of qualia corresponding to the thought

$\{N_n\}$ = set of neurons in the neural correlate

$\{s_n\}$ = set of sensory signals reaching the brain and forming the neural correlate

$\{\omega_n\}$ = set of frequencies of electromagnetic signals from the object as inputs to different senses.

Note that we have not explicitly expressed the physical and physiological signal transmissions as any kind of solutions of wave equations involving space and time, which we assume to be understood. Our aim is to effectively represent the object as a concept by reducing it to a thought-form in the mind generated by the neural correlate formed from the signals emanating from the object and impinging on the senses^{2,3}

Inverting the equation, we get the **materialization equation**:

$$\text{object} = j^{-1}(\theta) \quad (5)$$

But, this inversion is not as simple as it looks on the face of it. The entire forward time process in the perception equation (eq. 4) is to be gone through in the reverse in order to generate the material source i.e. the object! One such case of experimentally observed psychic influence affecting the quantum mechanical double-slit interference pattern has been explained by Pradhan using the psychophysical interpretation^{18,19}. Pradhan has further extended the psychophysical interpretation to quantum field theories bringing us closer to explaining Henry's proposal of the mental universe^{20,21}.

The question that troubles us at the upper end of the process is this: How does the thought-form activate the neural correlate? We don't yet have any viable theory of interaction of the unphysical with the physical^[4]. But it is remedied once we take the thought (or any mental process) as just being non-material or metaphysical i.e. field-like, which can somehow have couplings to the brain, that is physical. This field has been proposed in the literature to be a spatially structured or patterned electromagnetic field or the morphogenetic field^{6,22,23,24}. The emergence of order in the universe despite the movement towards ever-greater disorder in the thermodynamic sense does point to the existence and operations of a cosmic ordering principle²⁵. The clouds of classical Cartesian mind-matter dualistic parallelism are gradually getting cleared by a gradual but definite emergence of quantum mind-matter interactionism which can ultimately pave way for the practical fulfillment of the unique potentiality of human consciousness^{3,26,27}.

8. CONCLUSION

To bring clarity to the understanding of the process of perception we have distinguished between the physical information and the *qualia* information respectively associated with the brain and the mind. Cognitive perception of an object is the result of a completed transaction at the objective level which leads to the subjective collapse to the definite image of the object in the mind of the observer according to the psychophysical interpretation. Advanced waves emerging from the mind as probe waves can act as the offer waves for a possible transaction by bringing into existence the corresponding object which is the process of quantum objectivation. Objectivation, though itself a sort of perception, still in a certain sense, it occurs by a reverse process.

Quantum objectivation clearly places the mind over and above the matter, as it is capable of molding matter into a specific desired form of an object. In translating the Q-information into P-information by using advanced waves, the mind establishes its superiority over matter. The approach proposed here not only has the potential to explain simple everyday experiences like finding a misplaced object to the great long term achievements of individuals through years of struggle for realizing a particular goal. Moreover it can be used to explain the deepest questions about the genesis and the evolution of the universe itself if we accept the meta-evolution proposal that it is a manifestation proceeding from the cosmic mind. The physical universe is an evolving system of P-information which originally was in the cosmic mind as Q information. The evolution of the universe from Bingbang onwards can then be seen as a gradual unfoldment of under the guiding intelligent ordering principle that is the cosmic mind.

REFERENCES

1. Shukla S. Understanding Reality Through Science and Philosophy, (Ed. V. Bhatkar) Multiversity Publication, ISBN. 978-81-930986-2-2, 2015.
2. Pradhan RK. The problem of Conscious Observation in relativistic Description, NeuroQuantology. December 2014;12(4): 417-423. DOI: [10.14704/nq.2014.12.4.755](https://doi.org/10.14704/nq.2014.12.4.755).
3. Pradhan RK. Psychophysical Interpretation of Quantum Theory. NeuroQuantology, 2012; 10(4): 629-645. DOI:10.14704/nq.2012.10.4.592.
4. Eccles, JC. Do mental events cause neural events analogously to the probability fields in quantum mechanics? Proc. Roy. Soc. Lon. B 1986; 227: 411-428.
5. Weinberg S. Gravitation and Cosmology, John Wiley & Sons, 1st edition. Ch.7.1972
6. Sheldrake R. The presence of the past: Morphic resonance and the habits of nature. London: Vintage Press; 1988; 1–391.
7. Pradhan RK. Minimal Neural Recruitment from generalized Fechner law, Neuroquantology, 2017; 15(1): 1-6, DOI:10.14704/nq.2017.15.1.1007.
8. Hecht S. Schlaer S. Pirenne MH. Energy, Quanta and vision. Jour. Opt. Soc. Am. 1942;38:196-208.
9. Baylor DA, Lamb TD, Yau KW. Response of retinal rods to single photons. Journal of Physiology, Lond. 1979; 288: 613-634.
10. Hut P, Alford M, Tegmark M. On Math, Matter and Mind. Found Phys 2006; 36: 765-794.
11. Peruš M, Loo CK. Quantum Neural Information Processing, ch. 9 in Biological and Quantum Computing for Human Vision: Holonomic Models and Applications. DOI: 10.4018/978-1-61520-785-5.ch009.217-221. Hershey, PA. IGI Global. 2011.
12. Wendt A. Quantum Mind and Social Science: Unifying Physical and Social Ontology. Cambridge University Press. 2015; 91-143.
13. Landauer R. Dissipation and heat generation in the computing process. IBM Journal of Research and Development, 1961;5:183–191.
14. Wheeler JA, Feynman RP. Interaction with the absorber as the mechanism of radiation. Rev Mod Phys 1945; 17: 157- 181.
15. Wheeler JA, Feynman RP. Space-time approach to non-relativistic quantum mechanics. Rev Mod Phys 1949; 21: 425– 433.
16. Cramer JG. The Transactional Interpretation of Quantum Mechanics. Rev Mod Phys 1986;58(3):647.

17. Cramer JG. An Overview of the Transactional Interpretation. *Int Jour Theor Phys* 1988; 27 (2): 227.
18. Radin D *et al.* Consciousness and the double-slit interference pattern: Six experiments. *Physics Essays*. 2012;25(2): 157-171.
19. Pradhan RK. An explanation of psychophysical interactions in the quantum double-slit experiment, *Physics Essays*, 2015 July 10;28(3):pp324-330. DOI:10.4006/0836-1398-28.3.324
20. Pradhan RK. Psychophysical Interpretation and Conscious Observation in Quantum Field Theory, *NeuroQuantology*, 2018 September;16(9):pp34-45, DOI: 10.14704/nq.2018.16.9.1258.
21. Henry RC. The mental universe. *Nature*, 2005; 436:29.
22. McFadden J. The Conscious Electromagnetic Information (CEMI) Field Theory. *Journal of Consciousness Studies* 2002; 9(8): 45–60.
23. Pockett S. The electromagnetic field theory of consciousness: A testable hypothesis about the characteristics of conscious as opposed to non-conscious field. *Journal of Consciousness Studies*. 2012 Dec; 19(11-12):191–223.
24. Tripathy, A.; Pradhan, R.K. A Prelude to Meta-evolution, *Indian Journal of Science and Technology*, Vol 11(31), DOI: 10.17485/ijst/2018/v11i31/130098, August 2018.
25. Tripathy, A.; Pradhan, R.K. The Interplay of Order and Disorder in the Dynamical Evolution of Physical and Biological Systems. *Preprints* 2018, 2018100711. DOI: 10.20944/preprints201810.0711.v1.
26. Pradhan RK. Subject-Object Duality and the States of Consciousness: A Quantum Approach, *Neuroquantology*, 2010;8(3): 262-278. DOI: [10.14704/nq.2010.8.3.292](https://doi.org/10.14704/nq.2010.8.3.292)
27. Tripathy A, Pradhan RK. Methylation-assisted epigenetic evolution and the psycho-biology of human experiences. *Indian Journal of Public Health Research and Development*. (in press). 2018.