Modern Physics and Ancient Vedanta

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Physics, the crowning glory of science, has a long history of development—both in the West and in the East. Ideas of classical physics may be discovered in the works of Greek civilization as well as in the ancient Indian texts[1]. The intellectual and speculative perceptions vary widely, but they constitute the seeds from which the latter-day theories developed. Initially the ideas were part of philosophy, which later on bloomed into the new branch of science which we now know as physics. As physics gave birth to more and more spectacular technological innovations, a perception of dichotomy, even a schism, emerged between physics and philosophy (particularly in the post-Industrial Revolution era in the Western context). Dramatic developments, in both theoretical and practical physics, could be observed from the late nineteenth century, known as the most fascinating era of modern physics. Philosophical interpretations of these developments seem almost to concur with the conclusions of Vedanta, reconciling the schism in a beautiful way.

For the sake of brevity, only a few drops from the vast and almost unfathomable ocean called Vedanta may be presented here. Etymologically, Vedanta implies the end or conclusion of the Vedas (in the sense of textual presentation) or the essence of the Vedas. Academically, it includes the Upanishads, *Brahmasutra* and *Bhagavadgita* with their innumerable commentaries and notes (i.e. *sutra*(s), *bhāshya*(s) and *vārtika*(s)) developed through thousands of years and forms one of the nine (or twelve) systems of Indian philosophy. Spiritually, according to Swami Vivekananda, it is the highest philosophy, the greatest poem, the first as well as the final thought on the spiritual plane, and the foundation of all other schools in India including Buddhism[2]. Many contemporary Western scholars and thinkers have praised it thus. The central idea of Vedanta is Oneness—the grand culmination and the zenith of human experience—it is achieved through graded interpretations involving *dvaita* (dualism), *vishishtādvaita* (qualified monism) and *advaita* (monism), with many sub-branches and ramifications. It is highly theoretical, intellectual, practical and experiential. Thus it is the crown jewel of all the branches of knowledge and wisdom under the sun.

Now, we shall point out the profound philosophical implications of some spectacular developments of modern physics and the parallels between such implications and the age-old aphorisms of Indian Vedanta.

(1) *Reality transcends ordinary language*: 'Quantum theory and relativity theory, the two bases of modern physics, have made it clear that this reality transcends classical logic and that we cannot talk about it in ordinary language.'[3] Heisenberg agrees, '...we cannot speak about atoms in ordinary language.'[4] Same is the view of Vedanta: 'The eye does not

reach there, nor does speech, nor the mind. We do not know how a teacher can possibly explain it to a disciple….'[5]

(2) *Mysticism is the common base*: Rishis, the Indian mystics, experience the Reality through intuition; the modern physics tries to comprehend the same through logical experimentations and arguments supported by reason, but when they try to express their understanding through human language, they appear strikingly similar and paradoxical. Let us consider the following two statements—one by a famous Nobel laureate physicist, Robert Oppenheimer and the other from Upanishad: 'If we ask…whether the position of the electron remains the same, we must say "no"; if we ask whether the electron is at rest, we must say "no"; if we ask whether it is in motion, we must say "no".'[6] Here is what Upanishad says, 'It moves, It moves not. It is far, and yet it is near. It is within all this, and it is outside all this.'[7]

These apparently contradictory Koan-like statements justify the fact that 'Although physicists are mainly concerned with rational knowledge and mystics with intuitive knowledge, both types of knowledge occur in both fields. This becomes apparent when we examine how knowledge is obtained and how it is expressed, both in physics and Eastern mysticism.'[8]

(3) *The ultimate reality is beyond sense perception*: 'What we see or hear are never the investigated phenomena themselves but always their consequences. The atomic and sub-atomic world itself lies beyond our sensory perception…like the mystics, physicists were now dealing with a non-sensory experience of reality and like the mystics, they had to face the paradoxical aspects of this experience. From then on, therefore, the models and images of modern physics became akin to those of Eastern philosophy.'[9]

(4) *Gross to Subtle*: The philosophical implication of the transition from classical to modern physics is a progression from gross to subtle. The transition started at the interface between the two, when the force concept of Newtonian physics was getting replaced with the more subtle field concept of Maxwell's Electro-magnetic theory.[10] The development got much more pronounced later with the application of quantum theory and relativistic theory to sub-atomic entities. Similar transition we observe in the development of a seeker's mind in Vedanta, e.g. in *Taittiriya Upanishad*: as the *sādhaka* (spiritual aspirant) moves from *annamaya purusha* (the outermost part of human personality constituted by the essence of food) to *ānandamaya purusha* (the innermost part of human personality which is blissful), his understanding and later realization rises from the gross material to the subtlest spiritual level.[11]

(5) *Diversity to Unity*: As the journey of modern physics began and progressed rapidly through the various landmarks and milestones, an increasing tendency is observed towards unification of ideas and concepts e.g. '…chemistry can now in principle be understood on the basis of the laws of atomic physics.'[12] Mass-energy equivalence ($E=mc^2$) and space-time continuum (Einstein's Special Theory of Relativity), applicability of laws in all frames of reference (inertial and non-inertial) (Einstein's General theory of relativity), unification of wave and particle (DeBroglie's wave-particle duality), matter-anti-matter duality and its final consummation into a unified whole (Paul Dirac's theory) attempt to arrive at a Unified Force Field Theory

(basic four types of interactions are gradually getting unified—though the experimental culmination is not yet achieved) or Theory of Everything etc. This basic unity lies in both microscopic and macroscopic worlds. Thus 'the basic oneness of the universe is not only the central characteristic of the mystical experience, but is also one of the most important revelations of modern physics.'[13] The same was foretold by Swami Vivekananda, an accomplished Vedantist: 'Science is nothing but the finding of unity. As soon as Science would reach perfect unity, it would stop from further progress because it would reach the goal…'[14] Indian Vedantic Rishi(s) realized this ultimate unity thousands of years ago, following their own intuitive path and expressed it in so many immortal statements e.g. '*ekam eva adwitiyam*' (one, without a second)[15], '*ekam sat*, *viprāh bahudhā vadanti*' (The Truth is one, the learned express it in many ways)[16] etc. They realized the unity in diversity[17] as well as diversity amidst unity[18] and hence the grand unity of Existence transcending all opposites and dualities[19].

(6) *Objective Observer to Subjective Participator*: The objective world-view of classical physics has given way to 'quantum inter-connectedness' in which the universe is seen 'not as a collection of physical objects, but rather as a complicated web of relations between the various parts of the unified whole.'[20] In such a universe, 'the scientist cannot play the role of a detached objective observer, but becomes involved in the world he observes…'[21] and 'to describe what has happened, one has to cross out the old word "observer" and put in its place the new word "participator". In some strange sense, the universe is a participatory universe.'[22] The Vedantic Rishi(s) thousands of years back had the similar experience—'On this Cosmic Self is resting everything…Know this Self, which is one and the same…'[23], all dualities dissolve into a grand unity[24].

(7) *Omnijective Reality*: Thus the objective physics is increasingly becoming subjective and attempting to transcend the duality into being omnijective. 'To describe this phenomenon Michael Talbot in recent book *Mysticism and New Physics* uses the word "omnijective"…'[25]

(8) *Dynamic equilibrium and Symmetric universe*: Vedanta visualizes the universe as a web of dynamic interactions, just as modern physics sees the universe as a web of dynamic relations[26]. Nature appears to be in dynamic equilibrium both in the small and large dimensions when viewed through quantum theory. The concept of expanding universe and Big Bang in the light of Einstein's General Theory of Relativity, oscillating universe (periodically expanding and contracting universe)—all these ideas are in consonance with Vedantic cosmology. The Indian spiritual idea of *Lilā* (God's sport) 'is a rhythmic play which goes on through endless cycles—the One becoming the many and the many returning into the One.'[27] (Dynamic) 'symmetries and laws of nature' (e.g. conservation laws) are 'in harmony with the world-view of modern physics…and…is in perfect agreement with Eastern philosophy.'[28]

(9) *Beyond Space, Time and Causation*: In the relativistic modern physics, space, time are fully equivalent—they are unified into a four dimensional continuum. Time dilation, length contraction and other 'relativistic effects seem strange only because we cannot experience the four-dimensional space-time world with our senses, but can only observe its three-

dimensional "images". These images have different aspects in different frames of reference…'[29] Thus when particle interactions 'are taken as four-dimensional patterns without any definite direction of time attached to them, there is no "before" and no "after", and thus no causation.'[30] Hence, modern physics points to a paradigm beyond space, time and causation, but they are 'facts' in our normal everyday experiences. Thus modern physics verily arrives at a fundamental concept of Advaita Vedanta namely, *Māyā*. Swami Vivekananda puts the idea of *Māyā* thus—'What you call matter or spirit or mind or anything else you may like to call them, the fact remains the same, we cannot say that they are, we cannot say they are not…A fact, yet at the same time, not a fact. This is a statement of facts, and that is what is called Māyā.'[31]

(10) *Advent of Consciousness* (*Transcending the Māyā*)—Modern physics has been increasingly converging on ancient Vedanta. 'Einstein's greatest achievement consisted not in showing that everything is relative but in discovering the way to truth through the relative world, in establishing the absolute validity of fundamental physics laws in spite of relativity. In similar way, Vedanta does not simply describe the world as Māyā and leaves you there, but shows you the way to the Truth, the absolute nature of consciousness.'[32] In a similar vein, Swami Vivekananda says, 'Time, space and causation are like the glass through which the Absolute is seen…In the Absolute there is neither time, space nor causation.'[33] Thus we see how the interpretations of the theories of modern physics naturally lift us beyond space, time and causation and hence to the Absolute which is Consciousness. 'To understand the implicit order, Bohm has found it necessary to regard consciousness as an essential feature on the holomovement and to take it into account explicitly in his theory.'[34] Hence physics is arriving at a position of 'consciousness over matter' and 'oneness of mind and matter' and increasingly getting 'spiritualized' in the Vedantic sense of the term.

This convergence of modern physics and Indian Vedanta becomes more and more accentuated in recent years. So many great physicists have written path-breaking books celebrating this confluence e.g. Heinz Pagel, Michael Talbott, Fritzof Capra, Gary Zukav, Robert Oppenheimer, W. Pauli, Erwin Schrodinger, Werner Heisenberg, Milik Capek, James Jeans, D. Bohm, Hideki Yukawa, Lincoln Barnett, Brian Greene, Paul Davies, John Wheeler, Freeman Dyson, Neils Bohr etc. The following assertion of A. D. Reincourt is representative of the trend—'…Can a connection between the scientific and mystical frames of reference be established over and beyond a certain metaphysical parallelism? The answer lies in the fact that Indian mysticism, at least as far as its leading representatives are concerned, has evolved as much in the past hundred years as the science of physics itself, in a direction that points towards an inevitable convergence of the two.'[35]

Another interesting aspect may be pointed out here—a lot of information suggest that many modern physicists (and by implication modern physics) have been influenced by Vedanta e.g. Heisenberg was influenced by Tagore and Indian philosophy[36], Oppenheimer was influenced by the *Bhagavadgita* (the quintessence of Vedanta). Looking at 'the stupendous dazzling conflagration' of the first experimental atom bomb explosion, Oppenheimer 'began to hum spontaneously'

some lines from the *Bhagavadgita*. (11.12)[37].

The significance of Vedanta in our present context is very effectively asserted by the famous Indian nuclear scientist Raja Ramanna—'The discovery of quantum mechanics and relativity have shaken the very foundations of epistemology. In spite of these violent changes it is only Vedanta which seems to be in a position to absorb the tremendous impact of the new science.'[38] In the conclusion one very important point of distinction needs to be highlighted—whereas Vedanta, being essentially a *parā-vidyā*, leads to transformation of being ('*brahmavit brahmaiva bhavati*': the knower of Brahman verily becomes Brahman)[39], physics, being an *aparā vidyā,* has witnessed a transformation of interpretations.

This transformation of interpretations has a great significance for the contemporary thinking—it bridges the illusory gap between science and Vedanta, scientific rationality and spiritual mysticism and promises harmony, unity and peace. ■

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