ICCR

International Conference

on

Quantum Reality and Theory of Shunya

December 09-10, 2016

Azad Bhavan, New Delhi

भारतीय सांस्कृतिक सम्बंध परिषद्
INDIAN COUNCIL FOR CULTURAL RELATIONS

प्रो. लोकेश चन्द्र
Prof. Lokesh Chandra
अध्यक्ष / **President**

Foreword

During any discourse on India's contributions to the human civilization, what is left behind or least emphasized is its achievements in the field of science and technology and Indian academia has miserably failed to assess and evaluate influence of Indian knowledge of science and technology on the development of science and technology in other parts of the world.

Government of India, under the leadership of Shri Narendra Modi has posed unprecedented impetus on promotion and propagation of India's contribution in the field of science and technology. Following that path, Indian Council for Cultural Relations (ICCR) has planned a number of programmes and projects to explore and assess the development of science and technology in India and its overall impact. Academic discourse in the form of seminars and conferences is one such step and a number of seminars and conferences are being organized this year highlighting that aspect. International conference on 'Quantum Reality and Intimations of Shunya' is one among them.

I am thankful to Prof. S. R. Bhatt for his coordination and cooperation to make it happen and hope that the Conference will be a great academic success.

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महानिदेशक
भारतीय सांस्कृतिक सम्बंध परिषद्
अमरेंद्र खटुआ

Foreword

Concept of Shunya is one of the foremost contributions of India to the world. It may be reasonably maintained that this concept has served the humanity more than what any other concept could do. It has revolutionized study of mathematics, physics, chemistry and all other physical sciences and human understanding of natural phenomena. On the other hand, it is a thought provoking philosophical concept as well. Everything begins with shunya and ends with shunya. It has given rise to innumerable theories and thinkers throughout the ages have contributed their shares in this all-encompassing concept of shunya.

Percolating from philosophical thought, shunya has touched upon history and shaped the history of mankind. It has left no human endeavor untouched and as a result we find an overwhelming contribution of the concept in shaping human civilization.

ICCR is proud to organize an International Conference on the topic 'Quantum Reality and Theory of Shunya'. The conference is being organized to asses anew India's contribution in the field of quantum reality and shunya. The Conference, a brain-child of our revered President, ICCR, Prof. Lokesh Chandra and duly nurtured and shaped under able care of Chairman, ICPR, Prof. S. R. Bhatt, is destined to explore unexplored facts on the concept of quantum reality and shunya and have an in-depth understanding of the contemporary research on them. It is designed to unfold the unknown facts and generate academic output in the form of reasoned analysis.

Needless to maintain that the Conference is a part of ICCR's renewed efforts to highlight and unearth India's contributions in the field of science and technology. In another proud moment, only in April this year, ICCR donated a bronze bust of Aryabhatta, which has been unveiled at the UNESCO Headquarters in Paris. Following this agenda to highlight India's contribution in the field of science and technology, an International conference on Vedic Mathematics is being organised during the last week of this month (December, 2016). I am thankful towards the participants of the Conference for accepting our invitation to be a part of it and hope that the Conference on 'Quantum Reality and Theory of Shunya' will be remembered in future for its unprecedented academic discourse.

I welcome all the participants and wish the Conference all success.

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CONCEPT NOTE

QUANTUM REALITY AND INTIMATIONS OF SHUNYA

The multifaceted concept of *Shunya* has been an ingenious thought of fertile and innovative Indian mind. It has been a unique contribution of India to world culture and civilization. This seminal and pivotal concept has its ramifications in various fields like Metaphysics, Cosmology and Cosmogony, Physics. Mathematics, Religion, Yoga etc. In different contexts it has different meaning. It would be a worthwhile and rewarding exercise if it's different facets are attended to and analyzed. They are all correlated and only a holistic and integral approach can bring out their significance and value.

The concept of *Shunya* has a profound metaphysical connotation which stands for the totality of Reality. In this sense it is equated with *"Purna"* (completeness, infinitude and boundlessness). The Reality is a Whole which comprehends all iota of the universe as its intrinsic parts. But each part *(kosha or khanda)* is also a whole *(pinda)* within this Whole (brahmanda). It is represented as a Supreme Circle and in the cosmos there are circles within circles presenting a picture of concentric wholes. The Ultimate Reality is full circle, an overarching circle. The invocation of *Isha Upanishad* remarkably puts forth this intuitive vision. It states that the Reality is a whole or totality comprising all that was, that is and that will be, an idea available in the Purusha Sukta of the Rigveda. From this whole only whole can spring forth even though we may not be aware of it. This whole is infinite. Infinite cannot be *finitized* and therefore the Advaita Vedanta regards all differentiations as finite appearances which are in ultimate analysis infinite only. Bhaskracharya, a later mathematician also avers the same. He opines that no change takes place in the infinite and immutable Brahman when worlds are created or destroyed even though in these processes numerous orders of beings are put forth and absorbed. The equation of *'shunya' and 'purna'* was a wonderful feat of Indian logical acumen which could be apprehended only by a *'mantradrshta Rishi'*. This concept of *'shunya'* is not emptiness or void-ness but 'devoid-ness' in the sense that in its proto nature the Reality is devoid of all differentiations. In itself it is emptied of all manifest diversity. It is a non-dual realm, a quantum vacuum. In logical terms it is referred to as 'null set' but this null set is not devoid of membership but only devoid of manifest membership. It is not to be regarded as 'nothingness' as nothing can come out of nothing. The Nasadiya Sukta of the Rigveda begins with this intuitive realization. All quantum phenomena arise within it and get dissolved in it. The modern Quantum Physics endorses this understanding and it is struggling to explain how this cosmic event takes place. The Big Bang theory is only an indication of this. The search for 'God- particle' or 'Boson' seems to be a futile exercise of the western scientists. The *impartite* approach to Reality is a unique and ingenious gift of the Indian mind and western scientist should pay heed to it.

Deriving inspiration from this intuitive realization the Indian mathematicians like Bodhayana, Brahmagupta and many others have invented the idea of Zero (cipher) and the decimal system . The mathematical zero has its obverse as infinity. All numbers or numerical signs act as tangible reference to finite but zero represents the non-dual realm, the infinity. The western mind has adopted zero only functionally for practical utility, it could not grasp its deeper metaphysical meaning. The concept of zero did have tremendous impact on western science and mathematics in terms of 'decimal system' and 'quantum vacuum' but they could not reach to its metaphysical heights and depths because of the limitations of their empirical methodology. Only through *''ritambhara pragya',* to use Indian terminology, this realization is possible in a state of *'samadhi'.*

Apart from metaphysics, physics and mathematics this concept of *Shunya* has been profitably utilized by schools of Shaivism wherein Lord Parama Shiva is referred to as *Shunya' or 'Bindu'.* The *Shunya* is described as *Ashunya* which means that it is beyond one and many but supreme source of one and many. The worship of Lord Jagannatha in Puri and the text Shunya Samhita followed by the Mahima school advocated by Panchasakhas of Orissa are the elaborations of this idea synthesizing it with the Buddhist concept of shunyata. Their concept of *'Shunya Brahma'* or *"Shunya Purusha"* is a remarkable idea, the implications of which need to be brought out shorn of its religious connotation. Shunya Purusha is 'Anadi mandala', also described as ' 'Shunya Mandala' which is the source of all creation. It is proto cause as well as the effects. The Buddhist concepts of 'dependent origination' and 'interdependent existence' coupled with this idea of shunya can help in revealing the nature of empirical and trans- empirical Reality as Nagarjuna has pointed out. Nagarjuna avered that there are two levels of Reality. There is transcendental Reality underlying the world of phenomena. A depth analysis of this seminal concept of shunya can open up new horizons and intellectual vistas and help in enriching improvised western science and mathematics. Indian contributions in terms of place value decimal system, domestication of fire, invention of wheel and original gifts to science and mathematics are certainly recognized but they have not been adequately utilized. Now that Indian contributions are gradually appreciated and the saturated western mind is looking towards India for newer insights and fresh approaches in depth delineation of this concept will go a long way in spiritualizing science and making Indian spirituality more scientific. The initiative taken by Indian Council for Cultural Relations under the Presidentship of Prof. Lokesh Chandra is a welcome step in right direction. Hope it will lead to some positive results.

Prof. S.R.Bhatt
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International Conference

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Quantum Reality and Theory of Shunya

Friday, December 09, 2016

10.00-11.08 am	**:**	**Inaugural Session**
10.00-10.05 am	:	Lighting of Lamp followed by Veda Mantras
10.06-10.11 am	:	Welcome Address by **Sh. Amarendra Khatua,** Director General, ICCR
10.12-10.40 am	:	Thematic Note by **Professor S.R. Bhatt,** Chairman, ICPR & Academic Cordinator
10.41-11.01 am	:	Address by Chief Guest **Prof. Lokesh Chandra,** President, ICCR
11.02-11.07 am	:	Vote of Thanks by **Ms. Namarata S. Kumar,** Dy. Director General, ICCR
11.08-11.30 am	:	Tea Break
11.30-12.30 pm	**:**	**SESSION – I**
CHAIR	:	Professor Geo Lyong Lee
11.30-12.30 pm	:	Paper Presentation by: Professor Sisir Roy & Professor Herbert J. Bernstein
12.30-01.30 pm	**:**	**SESSION – II**
CHAIR	:	Professor S S Rama Rao Pappu
12.30-01.30 pm	:	Paper Presentation by: Professor R. S. Kaushal & Professor Parameswaran Murthiyedath
02.30-03.30 pm	:	SESSION – III
CHAIR	:	Professor Kashyap V. Vasavada
02.30-03.30 pm	:	Paper Presentation by: Professor Gopal Rao and Professor Surendra Pokharna

03.30-04.30 pm	**:**	**SESSION – IV**
CHAIR	:	Professor Bal Ram Singh
03.30-04.30 pm	:	Paper Presentation by: Professor Geo Lyong Lee and Dr. Rajeshwar Mukherjee
04.30-04.45 pm	:	Tea Break
04.45-05.45 pm	:	SESSION – V
CHAIR	:	Professor Sisir Roy
04.45-05.45 pm	:	Paper Presentation by: Professor Anand Rangarajan & Prof. Sreekala M. Nair

Saturday, December 10, 2016

09.30-10.30 am	**:**	**SESSION – VI**
CHAIR	:	Professor Gopal Rao
09.30-10.30 am	:	Paper Presentation by: Ven. Geshe Dorji Damdul & Bhakti Vijnana Muni
10.30-11.30 am	**:**	**SESSION – VII**
CHAIR	:	Dr. S. Ram Mohan
10.30-11.30 am	:	Paper Presentation by: Professor S S Rama Rao Pappu & Bhakti Niskama Shanta
11.30-11.45 am	:	Tea Break
11.45-12.45 pm	**:**	**SESSION – VIII**
CHAIR	:	Ven. Geshe Dorji Damdul
11.45-12.45 pm	:	Paper Presentation by: Professor Bal Ram Singh & Dr. S. Ram Mohan

12.45-01.45 pm : **SESSION – IX**

CHAIR : Professor Geshe N. Samten
12.45-01.45 pm : Paper Presentation by: Professor Kashyap V. Vasavada & Professor R. Srikanth

02.30-03.30 pm : **SESSION – X**

CHAIR : Professor Herbert J. Bernstein
02.30-03.30 pm : Paper Presentation by: Professor Sangeetha Menon & Professor Tabish Qureshi

03.30-04.30 pm : **SESSION – XI**

CHAIR : Professor Debajyoti Gangopadhyay
03.30-04.30 pm : Paper Presentation by: Professor B. Kar & Professor Uttam Patti

04.30-04.45 pm : Tea Break

04.45-05.45 pm : **VALEDICTORY SESSION**

CHAIR : **Professor Lokesh Chandra,** President, ICCR

Report of the Conference : **Professor S.R. Bhatt,** Academic Coordinator

Perspective of Scholars

Vote of Thanks

International Scholars

Alex Hankey
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After being a senior scholar at Rugby School, Alex Hankey won a scholarship to Trinity College at the University of Cambridge, where he gained a triple First in the Natural Sciences Tripos and led university teams at two sports. During his PhD at M.I.T. his supervisors Steven Weinberg and Gene Stanley directed him to publish 10 articles including a Physical Review Letter and 8 in Physical Review. After a year at Stanford Linear Accelerator Center he joined universities established by His Holiness Maharishi Mahesh Yogi, for whose organisation he worked for about 30 years before returning to research in 2002. Since then, using much of his early research, he has published extensively on theories of complementary systems of medicine including Yoga medicine and Ayurveda. He is probably the leading theoretical physicist working on the ancient Vedic sciences, and has lectured on the physics of the Samkhya and Vedanta systems of philosophy. Most recently he has published a new information theory that permits the description of experience.

THE CONCEPT OF SHUNYA IN QUANTUM THEORY

There is an obvious analogy between the concept of the vacuum state in quantum field theory and that of 'emptiness' or Shunya. When the mind settles down in meditation to the state of pure consciousness, it has lost all content, all feelings and emotions, and qualia or qualities also disappear. Some describe the state as fullness, a 'field of all possibilities', while others emphasize its lack of content. As the Bhagavad Gita, II.45, puts it, *'Nistraigunyo Bhavarjuna'*, 'Be without the three gunas' and II.48 *'Yogastahkurukarmani'*, 'Established in Being Perform Action'. The reason is vital, only from a state of purity of heart and mind can a human fully realise his or her potential and act fully in accordance with all the laws of nature. Our approach shows that such a state is empty of wave functions or quantum fields, and that the human mind achieves a state where all such excitations are annihilated.

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Anand Rangarajan studied Electrical Engineering at the Indian Institute of Technology, Madras getting his B.Tech in 1984. He then pursued graduate studies at the University of Southern California, Los Angeles and obtained a Ph.D. in 1991 focusing on the area of computer vision. During his graduate work, he became fascinated by the problem of consciousness and this interest led to a best student paper award allowing him to attend "Geist Und Natur" (Mind and Nature) in Hannover, West Germany in 1988. After his graduate work, he joined Yale University, first as a postdoctoral associate and later as tenure track faculty in Diagnostic Radiology (focused on medical image analysis). During this period, the problem of consciousness came into prominence and he was active in the Tucson series of conferences on this topic. In the year 2000, he moved to the computer science department at the University of Florida, Gainesville where he now works in machine learning, computer vision and the science of consciousness. His recent work in consciousness studies has focused on physicalism, compositionality and the hard problem.

CAN A QUANTUM FIELD THEORY ONTOLOGY HELP RESOLVE THE PROBLEM OF CONSCIOUSNESS?

The hard problem of consciousness arises in most incarnations of present day physicalism. Why should certain physical processes necessarily be accompanied by experience? We begin with the assumption that experience cannot exist without being accompanied by a subject of experience (SoE). Strawson has elaborately defended the notion of a thin subject—an SoE which exhibits a phenomenal unity with different types of content (sensations, thoughts etc.) occurring during its temporal existence. Next, following Stoljar, we invoke our ignorance of the true physical as the reason for the explanatory gap between present day physical processes (events, properties) and experience. We are therefore permitted to conceive of thin subjects as related to the physical via a new, yet to be elaborated relation. While this is difficult to conceive under most varieties of classical physics, we argue that this may not be the case under certain quantum field theory ontologies. We suggest that the relation binding an SoE to the physical is akin to the relation between a particle and (quantum) field. In quantum field theory, a particle is conceived as a coherent excitation of a field. Under the right set of circumstances, a particle coalesces out of a field and dissipates. We suggest that an SoE can be conceived as akin to a particle—a Self On—which coalesces out of physical fields, persists for a brief period of time and then dissipates in a manner similar to the phenomenology of a thin subject. While it is odd at first glance to conceive of subjects of experience as akin to particles, the spatial and temporal unity exhibited by particles as opposed to fields and the expectation that selfons are new kinds of particles, paves the way for cementing this notion.

Bal Ram Singh
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Bal Ram Singh, PhD, has been a Professor since 1990 at UMass Dartmouth (until 2014) and Institute of Advanced Sciences (current), conducting research on botulinum and tetanus neurotoxins, and also on yoga, mind, and consciousness. He has published 10 books and nearly 300 articles, including articles related to India's philosophy and traditions.

Dr. Singh is Editor/Associate Editor of four journals, including Ayurveda Journal of Health and International Journal of Indian Culture and Business Management, and is the Editor-in-Chief of Vedic WAVES, an online blog of the World Association of Vedic Studies. He is the President of the Institute of Advanced Sciences. At the Institute, he is also the Executive Mentor of the School of Indic Studies where his research includes Ayurvedic science and technology, Yoga and Consciousness, Vedic education pedagogy, and Vedic social and political traditions.

He is the President of the Institute of Advanced Sciences. Dr. Singh has been visiting professors at Georgetown University, Harvard Medical School, Yang Ming University (Taiwan), and Jawaharlal Nehru University (India).

HOW TO APPROACH SHUNYATA AS THE QUANTUM REALITY THROUGH BIOLOGICAL CONSCIOUSNESS?

Although there is a dispute as to who discovered the concept of shunyata, there is agreement that a symbol of shunya was given in India in the fifth century AD. The dot symbol and its subsequent form of the open circle indicates not only nothingness as we know the meaning of shunya but it symbolizes infinity as well in its symbol as there is no beginning or end in the symbol. There-in lies a major symbolic meaning on how the shunya explains infinite from nothing. Mathematically also the shunya represent the whole as it cannot be divided by anything.

The concept of quantum basically developed to explain observed reality that was not possible to examine by material science laws that were created in nineteenth century. It ended up describing the whatness of the reality, without addressing the whyness. It has nevertheless become a major concept in physics today, and its mathematical expressions are being employed to many observations, from origin of the universe to functioning of atoms. However, it is worth noting that the quantum concept is a system developed by admitting the failure to comprehend, and making that as the basis to attempt explaining all the physical phenomena. It has obviously succeeded in explaining and predictive verification of many processes to a certain extent. However, it has also become limited when applied more broadly. In other words, it has failed to develop a unified principle for even all things physical. The basic narrative of physical science, or even science for that matter, is observational although theoretical concepts (both philosophical and mathematical) do play some role. In the observational world, sensory reality is perceived first.

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Devulapalli V. Rao had a brilliant academic record at Andhra University, India where he got the B.Sc (Honours), M.Sc and D.Sc Physics degrees and also taught for two years. He spent two years each at Duke and Harvard Universities as a Post Doctoral Fellow. He has been teaching at the University of Massachusetts, Boston since 1968 where he is currently Distinguished Professor of Physics. He also holds Adjunct Professor position at Amherst and Lowell campuses where he guides Ph.D. students. He was elected as a Fellow of the American Physical Society, Division of Laser Science in 2010. He published over 120 papers in peer reviewed prestigious journals like Nature, Physical Review Letters, Applied Physics Letters, Optics Letters etc., covering research areas of nonlinear optics, magnetic resonance, microwave absorption, optical Fourier techniques for breast cancer diagnostics, phase contrast and multimodal optical spectroscopy etc. He was recognized as Chancellors Distinguished Research Scholar and was one among top ten professors in the only student survey conducted in over thirty years. His group received the first nanotechnology award recognizing 50 top contributors to nano science. He holds 10 patents with two more in the pipeline and one of these on Fourier Phase Contrast microscopy is recently licensed to industry for marketing the technology.

QUANTUM REALITY, SPIRITUAL CONCEPTS AND MODERN OPTICS EXPERIMENTS

Truth is one, men call it various names. Both religious/spiritual philosophers and modern scientists have the same goal - pursuit of the ultimate truth. Science looks at 'objective reality' independent of the human observer whereas old Indian mystics adopted a holistic approach involving the observer and the observed- isolating the two is arbitrary. In terms of basic concepts quantum theory contains some parallels to Hindu scriptures- the fuzzy and nebulous world of atoms sharpens into the world of reality only when an observation is made, similar to the Hindu concept of Aham Brahmasmi (I am Brahman). The well known Schrodingers cat is a thought experiment illustrating this bizarre concept. The famous physicist John Wheeler's thought experiment about the observer creating even retroactive reality is spectacularly confirmed by recent experiments on Helium atoms scattered by laser light! Abstract concepts in Hindu scriptures are getting translated to real world objective demonstrations in modern science and technology. For example the sanskrit sloka "Om Purnamadah Purnamidam Purnaat Purnamadachyute, Purnasya Purnamadaya Purnamevaa Vasishyate" can be illustrated by a hologram (Purna or Whole) recorded by coherent light generated by lasers. The sloka implies: That (pure universal consciousness) is full (perfect); this (manifest universe of matter, individual consciousness) is full. This fullness has been projected from that fullness, what remains is fullness. When the hologram is illuminated by light, the whole event is displayed as virtual reality, close to the concept of Maya. One can cut the hologram into any number of small pieces, each piece contains the whole information and displays the event sharply.

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Geo Lyong Lee majored in Indian Philosophy and Yoga. He obtained a MPhil in 1990 from Radhakrishnan Institute for Advanced Studies in Philosophy, Madras University, with a thesis on the Theory of Creation in Visistadvaita. He also received a doctor's degree in 1995 from Delhi University with a thesis on a comparative study of Ramanuja Vedanta and A.N. Whitehead's Process Philosophy. He is a Professor & Dean of Graduate School of Integrative Medicine, Sun Moon University, Korea. He was a Vice-Chancellor of Seoul University of Buddhism, Korea and a Visiting professor of Madras University between 2005-2006 to teach Korean Language and Korean Buddhist Thought. He obtained a number of research projects of Indian Philosophy and Yoga supported by the National Research Foundation of Korea Grant funded by the Korean Government. He is a Principal of Korea Yoga Academy Leeashram established by him in 2006. He translated S. Radhakrishnan's Indian Philosophy (2 vols) into Korean and published 6 books and some dozens of articles.

THE CONCEPT OF REALITY IN QUANTUM PHYSICS AND ŚŪNYAVĀDA FROM THE PERSPECTIVE OF YOGA

There is a considerable similarity between the physical concept of reality implied by quantum physics and the philosophical concept of reality articulated by Nāgārjuna. For neither is there a fundamental core to reality, rather reality consists of systems of complementary and interacting objects (dharmas). From the perspective of sādhana (practice), the Madhyamaka and the Yoga have something in common in that both of them head toward nothingness of 'I-ness' (ahaṃkāra). As long as there is 'the I', no-self (anatta) cannot come out, and 'non-duality' cannot be realized. The goal of yoga is essentially to cause the mind to become like zero. When we look at the complementarity and interaction of the particles with the observer, we find interesting correspondences between quantum physics and Madhyamika philosophy. This observation or mental involvement is actually also apparent in the area of yoga and meditation. In fact, one of the most important aspects of yoga practice, even in haṭha-yoga, is this mental involvement. There is a maxim in the field of yoga: "Cakras are fed with observation of yogi." This means that the act of observation turns potentiality of cakras into actuality.

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Since 1971, Bernstein is Professor of Physics at Hampshire College. He has been a consultant to the World Bank, AAAS,and US President's Science Adviser on science policy. He served as an MIT visiting scientist from 1984 through 2004. In 1986 Herb took over as PI from Cliff Shull (Nobel Prize, physics 1994) to head an international team of research physicists. In twenty years of NSF-funded research the team produced a number of "firsts" in quantum teleportation, computation, and communication and in philosophical implications of modern sciences. Herb studied Physics at Columbia, UCSD, & IAS (Princeton), where he serves as Emeritus Trustee of the alumni association. His research interests include science and society; the effects of modern knowledge; quantum information and teleportation; and theoretical physics. He was a Mina Shaughnessy Scholar, a Kellogg National Leadership Fellow, and recipient of the 1984 Sigma Xi Procter Prize (with Victor F. Weisskopf). He is a 5-College "40th Anniversary" professor and winner of their Jackie Pritzen Prize for public scholarship. He is a Fellow of the APS whose nomination cited pioneering work at the start of two fields of phyiscs and his unique contributions to public (& professional) understanding through the Institute for Science that he helped to start and now heads. He co-founded a national professional organization of research theorists at 4-year colleges and universities.

SHUNYA, SHUNYATA AND REALITY IN MODERN PHYSICS

Quantum mechanics (QM) is the physics of atoms and their constituents. Under reductionism, QM should provide the solid reality for our world, as Einstein insisted. Instead, quantum properties depend strongly on their observer; they are empty (shunya) until co-dependently created. So physics provides a time-dependent, co-emergent reality (which I designate reality) reminiscent of shunyata.

Yet physicists justify QM because "It works," begging for the questions: Works for whom? to do what? Responding to these questions and similar ones in many fields, I helped start a small organization, The Institute for Science & Interdisciplinary Studies. Its political philosophical program aims to help reconstruct knowledge for progressive purposes. The Institute's analysis provided insight into Quantum Teleportation and helped me invent a variant that US-NASA currently develops for communication from space.

The author is also a Buddhist Dzogchen practitioner; this essay speculates on the relation of shunya and shunyata to scientific knowledge. Does the union of emptiness, cognizance and compassion within Dharmakaya imply that Eastern concepts from Hinduism and Buddhism can provide a second source of inspiration for reconstructive knowledge?

Kashyap V. Vasavada
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Kashyap V. Vasavada was born in Ahmedabad, India on July 25, 1938. He received his B.Sc. (Physics) in 1958 from M.S. University of Baroda and M.Sc. (Physics) in 1960 from Delhi University. Subsequently he received Ph.D. (Physics) from University of Maryland, College Park, Maryland, U.S. in 1956. He was a research associate with NASA at Godard Space Flight Center, Greenbelt, Maryland, U.S. from 1964 to 1966.After that he became an Assistant Professor of Physics at the University of Connecticut at Storrs, Connecticut, U.S. from 1966 to 1970. From 1970 to 1974 he was an Associate Professor of Physics at the Indiana University-Purdue University, Indianapolis, Indiana, U.S. There, he became Professor of Physics in 1974, retired in 2003 and has been an Emeritus Professor at the same institution since 2003. He was a Visiting Professor at Cornell University, Ithaca, New York, U.S.A. in 1985-86 and a visiting scientist at the University of California, Berkeley, California, U.S. and Stanford University, Palo Alto, California, U.S. in 1976. In addition, he has held visiting positions at a number of Physics Laboratories. He has published number of scientific articles in refereed international scientific journals.

CONCEPTS OF REALITY AND SUNYA FROM THE PERSPECTIVE OF A PHYSICIST

The Paper will discuss the philosophical concepts of Reality, Sunya and Sunyata which are integral parts of many Hindu and Buddhist scriptures from the perspective of a physicist. Amazingly, these concepts find strong parallels in areas of modern physics such as quantum physics and cosmology. These concepts in modern physics will be explained and it will be shown that they have strong resemblance to these concepts mentioned in our scriptures. Especially intriguing is the finding of lack of objective reality, subjective role of observer and non-realistic interpretation of quantum phenomena. Some speculations, on how this close agreement between such completely diverse areas could come about, will be also presented.

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Michel Bitbol is Directeur de Recherche at the Centre National de la Recherche Scientifique, in Paris, France. He is presently based at the Archives Husserl, a Center of Research in Phenomenology.

He worked as a research scientist from 1978 to 1990, specializing in biophysics. From 1990 onwards, he turned to the philosophy of physics, working on a neo-Kantian interpretation of quantum mechanics. In 1997 he was the recipient of an award from the Academie des sciences morales et politiques for his work in the philosophy of quantum mechanics.

Later on, he focused on the hotly debated connections between the philosophy of quantum mechanics and the philosophy of mind. He worked in close collaboration with Francisco Varela in the wake of this work and developed a conception of consciousness inspired from an epistemology of first-person knowledge. Besides, he also learnt some Sanskrit in order to get a better understanding of basic texts by Nagarjuna and Candrakirti, and published a book in which he drew a parallel between Buddhist Interdependance and non-supervenient relations in the theory of knowledge.

TWO ASPECTS OF SHUNYATA IN QUANTUM PHYSICS : RELATIVITY OF PROPERTIES AND QUANTUM NON-SEPARABILITY

The so-called « paradoxes » of quantum physics are easily disposed of as soon as one accepts that there are no such thing as intrinsically existing particles and their intrinsic properties, but that both particles and properties are relational "observables". Accordingly, quantum physics does not offer a "description of the outer world", but rather a prescription about how to make probabilistic predictions within a participatory environment. The latter view (or rather criticism of views) looks quite radical with respect to standard Western Aristotelian ontology; but it looks natural in the context of the Indian-Buddhist concept of Pratītyasamutpāda which underpins Śūnyatā. Special attention will then be devoted to the quantum feature of non-separability, which displays remarkable similarities with Pratītyasamutpāda. Finally, the meaning of such twofold parallel between quantum physics and Śūnyatā will be discussed. This parallel will be related to the similarity of epistemological situation between knowing a world from which we are not entirely separated, and knowing oneself.

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S S Rama Rao Pappu got his B.A. from Panjab University in 1961, M.A. from University of Delhi in 1963 and Ph.D. from Southern Illinois University, U.S.A. in 1968. He taught philosophy in Miami University, Oxford, Ohio, USA for 45 years retiring in 2013. At Miami University, he taught a wide range of courses in Western and Eastern Philosophy (Western Philosophy: History of Western Philosophy, Philosophy of Law, Ethics and Applied Ethics, Philosophy of Mind, Idealism; Eastern Philosophy: Oriental Philosophy (Chinese, Japanese and Indian Philosophy), Indian Philosophy, Buddhist Philosophy, Vedanta, Gandhian Philosophy, etc) to under-graduate and graduate students. The National Endowment for Humanities, USA appointed him as Visiting Philosopher to Wittenberg University, USA and the Indian Council for Philosophical Research nominated him as a Distinguished Visiting Philosopher in 1998. He is the Founder-Director of the International Congress of Vedanta, and had organized seventeen international conferences in USA, Russia, India and Trinidad.

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SUNYA AND PURNA

Being and Nothingness, Fullness and Void, Plenitude and Vacuity, One and the Zero are some of the categories metaphysician use to describe Ultimate Reality. In Vedantic Philosophy, Brahman is the ultimate Reality which is Purna, Being, Fullness, the One. In Madhyamika Buddhism, Ultimate Reality is Sunya, Nothingess, Void. Scholarly studies generally maintain that (i) Purna and Sunya are ultimately the same or (b) they are different. Without taking sides on these positions I would like to point the criss-crossing of the concepts and arguments used in both these schools in their conceptions of ultimate reality. (e.g. both Brahman and Sunya are infinite, unknowable, silence, Brahman is advaita and Sunya is advaya).

It seems to me whether one accepts Sunya or Purna as ultimate reality is dependent on whether one is a tough-minded or tender-minded philosopher. Consider the following popular example. Suppose we have before us a glass half-filled with water. How do we describe the glass and the water? We can say "the glass is half empty" or "the glass is half full". Tough minded philosophers describe the glass as "half empty", and tender-minded philosophers describe it as "half full".

National Scholars

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He was instrumental in setting up a unique Dept., the Dept. of Laboratory Medicine at AIIMS in 1988. He pioneered the three-year MD course in Laboratory Medicine at AIIMS since 1977, which is, in fact, for the first time in the Nation. Since 1985 he has been engaged in developing a Science for Consciousness. He coined the term and concept of Supracortical Consciousness in 1985 within the Akhanda Worldview encompassing a system of multiple universe(s), the Multiversity.

He has authored four important books, Frontiers of Research for Human Biologists (1985), Dynamic Web of Supracortical Consciousness (1987), Conquering the Brain (1995) and The Millennium Bridge (2000). In 1999, he was invited as an observer from India by Vatican's Pontifical Academy of Science. Following 2000, he contributed several lengthy papers on science for consciousness in Philosophical Volumes, Scientific Journals, Science and Spiritual Quest books (all are freely downloadable from the 'Latest news/Paper' page of his website). His latest endeavor is on developing (i) Science of Information, with its mechanics, its travel from Beyond Planck's scale of nature, geometry, information-split phenomenon with delivery of information-based energy, which he presented in TSC-2013 and published as a chapter in a book Brain Mind Cosmos, edited by Dr. Deepak Chopra, and (ii) Science of Life and the way it connects Mind and Consciousness, published (2014) in the Polish Academy Journal Dialogue and Universalism. Interested people can view his website on consciousness, http//www.akmukhopadhyayconsciousness.com

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CRITIQUE OF METAPHYSICAL VIEWS AND ESSENTIALISM: A PARALLEL BETWEEN NAGARJUNA AND QUANTUM PHYSICS

In this paper of mine, I have tried to develop a parallel between Nāgārjuna and Quantum Physics. The subject matter of such parallel is their anti-metaphysical and anti-essentialist views Buddhism ,as a philosophy , developed out of 'a deep and basic existential concern'. Gautam Buddha, its founder, did not pay attention to Metaphysical speculations. His aim was therapeutic rather than doctrinal. The same tendency is visible in Mādhyamika Śunyavāda of Nāgārjuna. In this system every single metaphysical view is submitted to a procedure of Prāsangika or reduction and absurdum, which tends to show that any 'view' is, in fact, only partial and self contradictory. Whatever is 'real' cannot be captured by reasoning or any metaphysical theory 'expressed in words or symbols'. Dialectic is nothing but the consciousness of the antinomical conflict of reason.

Like Śunyavāda of Nāgārjuna, Quantum physics is also persistently averse to metaphysical interpretations. Bohr and Heisenberg's initial remarks that 'no unified picture of the atomic and subatomic domain can be derived from any realistic interpretation'. According to these founding fathers of quantum mechanics, their theory is 'no description, no 'view' of the micro world, but rather a mathematical symbolism intended to predict probabilistically the outcome of experiments performed at micro-scale using microscopic devices'. Recent developments in theoretical and experimental researches have strengthened the anti-metaphysical reading of quantum physics.

Further, in my paper, I have tried to analyze the possible consequences of such anti-metaphysical attitude of modern science on human life.

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QUANTUM REALITY AND THEORY OF SHUNYA

According to the traditional Indian philosophy as reflected in *Upanisad*s , all objects or incidents relating to the material or phenomenal world being mutable, are regarded as unreal (*asat*) as opposed to the only Real (*sat*) termed the One in the *Rigveda*, *Brahman* in the *Upanisads.* According to *Nāgārjuna*'s Philosophy as presented in the *Mahāprjñā Pāramitā Śāstra*, all elements, physical as well as mental, are impermanent and so, they are non-substantial (*śūnya*) and not unconditioned. The ultimate reality, called the *svabhava-śūnyatā dharma* or the eternal *dharmalakaa* does not come from anywhere nor does it go any where; in it there is neither birth nor extinction and therefore reminds us the Absolute of the *Rigveda* or *atman of Upanisad* (*na jāyate mriyate vā vipaścinnāyakutaścinna babhūva kaścit | ajo nitya śāśvatoya*verse I. ii. 18, *Kathopanisad*). This Absolute, together with all the animates and in-animates in the material or the phenomenal world gives rise to the Concept of the single whole term the *Brahman,* This is in essence, the doctrine termed the *Viśia Advaitavāda* expounded by *Rāmānuja* (c. 12 th century A.D.) in his *Shrībhāsya* based on of *Brhamasūtra*'s commentary written by *Bodhāyana.* This unified entirety is the 'Quantum Reality' from Indian metaphysical stand point. This is supported by the *Nāsadīyasūkta* in the *Rigveda*, followed by the *Sisūkta* in the *Veda*, in all ancient *Upanisad*s and also by Lord *Buddha* in the *Aggañña Sutta. Brahman* has been described as *Śūnya*, the space unlimited *sarvatatparamaśūnya na paraparamātpara* 1st line of the verse 10, *Tejavindūpanisad*). This idea has later been reflected as *Śūnya Brahma* or *Śūnya Purua* in the *Jagannātha* or in the *Mahimā* cult in *Odisa.* Starting with concept of void-ness mentioned as '*vyoma*' and '*tucchaya*' in the *Rigveda* and the roundness of the Universe as mentioned in *Śatapathabrāhmaa* (middle of the 7 th century B.C), ancient India adopted a small circle as a symbol to denote void.

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Archan S. Majumdar is a Theoretical Physicist who is presently Senior Professor at the S. N. Bose National Centre for Basic Sciences, Kolkata. He obtained his PhD degree from the University of Delhi in 1995. His research interests belong to the dual fields of: (a) Gravitation and Cosmology, and (b) Quantum Information Science. He has authored more than a hundred research publications, review articles and edited volumes in these fields. In the course of his research career, Prof. Majumdar has guided the PhD thesis of ten students and has obtained several research grants for projects awarded by agencies such as the Department of Science & Technology, Govt. of India. He has organized National and International Conferences and given more than fifty invited talks in International Workshops including visits to many labs such as Hitachi Advanced Laboratory, Tokyo, Clarendon Labs, Oxford Uk, Oklahoma Univ., USA, Univ. Sydney, Australia, Freie Univ. Berlin, Germany, Paris Tech., France, KIAST, Seoul, Korea, ICTP, Trieste, Italy, BMSTU Moscow, Russia, Univ. Suzhou, China, etc., as well as all major physical science research institutions in India. Science outreach is another significant interest of Prof. Majumdar, wherein the spread and awareness of science and scientific culture is organized among scholars of other communities.

GLIMPSES OF SUNYATA THROUGH QUANTUM ENTANGLEMENT

Quantum mechanics is the most successful scientific theory of the physical world at the micro level. Key elements of this theory include the uncertainty principle, wave-particle duality and the superposition postulate. All of these lead to the loss of individuation and identity of elementary particles which are the constituents of all objects and building blocks of the physical world we inhabit. The features of quantum theory endow quantum reality with the essential properties of vagueness or emptiness. At the heart of the quantum world lies the counterintuitive characteristic of quantum entanglement which has in recent times lead to tremendous technological prospects in the fields of quantum information and communication through novel notions and protocols such as quantum computation, quantum cryptography and quantum teleportation. More importantly, understanding of the foundational concepts of quantum entanglement has revolutionized our world view of quantum reality and nonlocality. It has indeed brought principles of physical science closer to the ancient spiritual realm of Sunyata. The philosophy of Sunyata as expounded in much details in Mahayana Buddhism, and also referred to in Advaita Vedanta and other Indian sects of Hinduism, convey the central theme that everything in existence is empty or void of inherent self-nature. Based on this central theme, an intricate stucture of reality was developed, for example, the Catuscoti logic of Buddhism which describes reality from the point of views of substantialism, subjectivism, holism and instrumentalism. In the present talk we show how quantum information science developed using concepts of quantum entanglement can offer some insight into the above theme of Sunyata.

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SUBJECTIVE EVOLUTION OF CONSCIOUSNESS IN MODERN SCIENCE AND VEDĀNTIC PHILOSOPHY: PARTICULATE CONCEPT TO QUANTUM MECHANICS IN MODERN SCIENCE AND ŚŪNYAVĀD TO ACINTYA-BHEDĀBHEDA-TATTVA IN VEDĀNTA

How the universe came to be what it is now is a key philosophical question. The hypothesis that it came from Nothing or śūnya (as proposed by Stephen Hawking, among others), proves to be dissembling, since the quantum vacuum can hardly be considered a void (śūnya). In modern science, it is generally assumed that matter existed before the universe came to be. Modern science hypothesizes that the manifestation of life on Earth is nothing but a mere increment in the complexity of matter — and hence is an outcome of evolution of matter (chemical evolution) following the Big Bang. After the manifestation of life, modern science believed that chemical evolution transformed itself into biological evolution, which then had caused the entire biodiversity on our planet. In the framework of materialism, the major attention is to find general organizational laws stimulated by physical sciences, ignoring the uniqueness of Life. The main goal of materialism is to reduce consciousness to natural processes, which in turn can be translated into the language of math, physics and chemistry. Following this approach, scientists have made several attempts to deny the living organism of its veracity as an immortal soul, in favor of genes, molecules, atoms and so on. However, advancement in various fields of biology has repeatedly given rise to questions against such a denial and has supplied more and more evidence against the completely misleading ideological imposition that living entities are particular states of matter.

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QUANTUM MECHANICS SHOWS THE LIMITS OF NAIVE REALISM

The ancient Indic philosophy of Vedanta harmonizes the truth as the original Organic Whole (purna). The non-dual truth of Reality is seen by different sages as Brahman, Paramatma and Bhagavan according to the development of their inner spiritual life. Thus, the personal conception of reality is the higher vision. Modern science has also accepted a more subjective conception of reality due to the progress in quantum physics. Thus science is undergoing a process of self critique due to its own progress. The role of the observer is found to have a significance that was not found in the classical physics. Although QM is not a science of life, it has given some hints that we cannot consider reality in the sense of naïve realism. The subject contributes to the object as much as the object contributes to the subject. The objects cannot be thought of as existing independently of the observer. Therefore the focus of science should be to study this relation between the subject and the object in everything. In this sense QM is advancement over conventional science. Further life process is essentially an organism and the parts are never independent of the whole. The parts are the inseparable members of the whole. The logic of life presents us a higher category in nature than physics and chemistry. Logic of machines, physics and chemistry does not lead to living processes. Kant said, "There will never be a Newton for the blade of grass." In this way even the insignificant blade of grass is teaching the scientists the lesson of humility. The insignificant grass can do what all the scientists in the world in their chemical laboratories cannot do.

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Debajyoti Gangopadhyay studied Pure Physics at the Universities of Calcutta and Baroda (M S University). He was employed as Assistant Professor in Annada College' Vinoba Bhave University, Hazaribag. He had been engaged during the last 10 years or so to figure out some 'meaningful' overlap between the foundational issues in Physics and Philosophy in its Eastern and Western versions. He describes this attempt as a journey through the uncertain border of our belief committed differently to 'Tradition' and 'Modernity'. With this aim in view, with a few of his colleagues, he had initiated in collaboration with Nava Nalanda Mahavihara, Nalanda, a process of engaging the traditional Indian Philosophers of different schools in a series of Dialogs with scientists. These Nalanda-based attempts had been eventually shaped into an autonomous Forum devoted to different aspects of interdisciplinary studies.

HOW A PHYSICS WOULD LOOK LIKE IF BASED ON THE METAPHYSICS OF SUNYAVADA!

In my paper I shall be dwelling on following points:-

1. Prolegomena to a Science Philosophy Dialog

1.1: The Question which is yet to be answered decisively/ addressed properly!

2: Numerous 'Answers' attempted ever since -
Different Answers/ (Hindu) responses so far proposed, can also be seen as different programs of epistemic extensions-

2.1: The responses can be differentiated typically in terms of two variants of claims.

3. Looking for the third alternative framework to answer the question of epistemic extension!

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In 1988, Geshe Dorji Damdul joined the Institute of Buddhist Dialectics, Dharamsala for formal studies in Buddhist logic, philosophy and epistemology. After 15 years of study in Buddhist philosophy he finished his Geshe Lharampa Degree (Ph.D.) in 2002 from Drepung Loseling Monastic University. He joined Gyudmed Tantric College for a year for Tantric studies.

In 2003, the Office of H.H. the Dalai Lama sent him to Cambridge University, England for Proficiency English studies. He was a visiting fellow at Girton College, Cambridge University.

He is appointed as the official translator to H.H. the Dalai Lama since 2005. At the same time he is involved in doing written translations of many texts from Tibetan into English such as Arya Nagarjuna's "Mulamadyamikakarika" (Fundamental Wisdom of the Middle Way), Acharya Shantideva's "Bodhicaryavatara" (Wisdom Chapter).

He has been appointed as the Director of Tibet House, Cultural Center of H.H. the Dalai Lama, New Delhi in March 2011.

ONTOLOGICAL REALITY IN QUANTUM PHYSICS AND BUDDHIST PHILOSOPHY OF ULTIMATE REALITY

Penultimate reality connotes untainted nature of phenomena by the stains of subjective influence. Since the time of Shakyamuni Buddha and Arya Nagarjuna, quest for the ultimate ontology led to the discovery of plethora of layers of reality detached from the influence of mere belief. The many facets of Quantum Physics, such as quantum entanglement, quantum vacuum, uncertainty, randomness, observer dependency and wave particle duality all point to the great complementarity of the two traditions – Quantum Mechanics and Buddhist philosophy. Buddhist philosophy, while probing into the deeper reality of the world, realizes the play of conventionality of dependent origination in the flux-fabric of illusion while precisely not defying the efficacy of functional world. Arya Nagarjuna said in Mulamadhyamakakarika, that only when sees the emptiness in the light of its true insight of dependent origination, can one see the nuance of emptiness to be in stark contrast with nihilism.This legacy of wisdom has greatly profound implication in elevating an individual from the worst of the pains and stress of life. One with exposure to the two traditions, can have a great advantage of gaining deeper insight into both the traditions. It is not a good idea to rashly leap to the conclusion that the two thoughts merge identically. Further enquiry is required to explore areas where the two overlap and where the two diverge keeping in mind that Quantum Physics is still in its phase of development.

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Ven. Professor Geshe Ngawang Samten (b. 1956) is presently the Vice Chancellor of Central University of Tibetan Studies, Sarnath, Varanasi, and has been Professor of Indian Buddhist Philosophy at the University before assuming the office. He is educated both in the modern system as well as in the traditional Tibetan monastic system. He has important publications to his credit, as a definitive critical edition of *Ratnavali* with its commentary; Tibetan edition of *Abhidhammathasamgaho*; Sanskrit and Tibetan versions of the *Pindikrita* and the *Pancakrama* of Nagarjuna; *Manjusri*, an illustrated monograph on Tibetan Buddhist scroll paintings, and co-authored *The Ocean of Reasoning*, an annotated English translation of the commentary on Nagarjuna's *Mulamadhyamaka Karika* by the Tibetan master-philosopher Tsong-Kha-Pa. He has scores of papers in various learned anthologies published in India and abroad. He has been Visiting Professor in various Universities and colleges in USA and Australia. He is on numerous bodies of Universities and other academic organizations within and outside India, and expert committees of the Ministries of Government of India. In 2009, he was decorated with ***Padma Shri*** by the President of India in recognition of his distinguished services in the fields of education and literature.

EMPTINESS: THE REALITY OF EXISTENCE OF ALL PHENOMENA

Emptiness is the most important factor in the Madhyamika philosophy. The concept of emptiness is based on Prajñāpāramitā sūtras taught by the Buddha Shakyamuni at Gridhrakuta in Rajgrih. Acharya Nagarjuna articulated the philosophical contents of the sutra in his several works, among which the treatises of Six Reasoning are the prominent ones.

The Madhyamikas argue against the view of the realists that there is nothing really ontologically out there. Everything is merely designated by conceptual thought and verbal language. However, this view is not nihilistic as charged by the realists. In the view of this school, things exist conventionally simply because they are empty of essence.

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Parameswaran Murthiyedath is a graduate in Mechanical Engineering and had a career in engineering until retirement. Though hailing from Kerala and a family background in Vedas and Yajnas; his interest has been primarily in engineering and science. Since retirement from active service, he has developed an active interest in Indian traditions and subjects relating to Geometry. His first effort in this particular area of study started with the documentation of a class of performing theatres attached to the Kerala temples, called "Kuthampalams". Since then, his works include a book titled "Natyaman Dapa & Kuthampalams", a book with Kendra Sangitha Nataka Akademi, New Delhi", and a Malayalam publication on the geometry of the Yajna space and its elements as practiced in the "Athirathra" of Kerala. He has interpreted the four Shulbasutras of Baudhayana, Apastamba, Manava and Katyayana, which remains in the manuscript form. His attentions were then turned to the Vedas, i.e, Rigveda and Atharvaveda. His book "Vedic Cosmology" is under publication by MLBD, New Delhi. Over the years he has developed an approach of studying the Vedas in terms of the physical manifestation of the universe and as a consequence, the scientific principles and the philosophical principles that could be gathered. Geometry of the time and space is found to be an all important element in such a study.

SHUNYATA & NON-EXISTENCE

This paper will greatly endeavor to bring forward the Vedic concepts of `emptiness' and at the same time would not greatly dwell on the shunyata concept of Buddhism nor dwell on the quantum theories of modern science. The Vedas spoke of the universal truths of creation and existence insisting on a divine participation in all levels of physical manifestations. The sages preferred to refer to the primordial state with such terms as asat and aja (referring to an un-born state), at the same time endeavoring to qualify this primordial state with whatever concepts that could be ascribed to it. However, from no segments of the Vedas, a concept of -`something' getting manifested from `nothing' - could be deduced. In the process of such descriptions the Vedas had talked about the state of `existence' and the state of `non-existence' as the inevitable realities of the universe. However, though the state of non-existence could not be taken as shunyata, either as a principle or as a physical state, something almost equivalent to shunyata could be discerned from the description of physical events that had taken place in the formation of the universe; as narrated by the sages.

This paper will therefore, bring out some details of the subject of asat and aja and to the nature of the primordial state. The Vedas had said that along with creating objects of the universe, repeated evacuations had also taken place; thus several instances of emptiness getting positioned. This presentation will further bring out some details of the geometrical concepts of the universe in terms of the inseparable space and time, which would be found required even in the subject of "shunyata", when the physical state of manifestations would get examined.

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QUANTUM REALITY AND THE CONCEPTS OF INFINITY, INFINITESIMAL AND ZERO IN MATHEMATICAL AND VEDIC SCIENCES

Absolute reality in Nature has two aspects of its existence — one is only realizable and the other is describable with an element of realization.The objective sciences while follow the second route to understand the absolute reality, the subjective sciences, on the other hand, go mostly by the former. It will be argued in this paper that the quantum reality, manifesting through the subjects of mechanics of microscopic systems and quantum field theory, is not the final step in approaching the absolute reality. Like other cases in the history, it only offers a rung in the ladder and that too strictly in the domain of analytical description vs. accurate measurement. The understanding of quantum reality, in fact, brings in the concepts of infinity (ananta), infinitesimal and zero (shunya). Further, these concepts while are necessary in precise mathematical terms in objective sciences, in philosophical terms in Vedic (subjective) sciences, however, these concepts are found to have much deeper meanings. Some mathematical tools for this purpose are pin-pointed here which can act as a guide for analytical studies of these concepts in Vedic literature.

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R. Srikanth studied Chemical Engg. (B.Tech.) from BITS, Pilani, Rajasthan. He obtained his PhD in 1999 for studies on the Solar chromosphere in Ca II K line. Through the next two years, in addition to studies on the fractal dimension and time dependence of the Solar supergranulation pattern, he worked on some problems in the foundations of quantum mechanics, in specific, the delayed choice experiment and aspects of multipartite nonsignaling correlations. After a stint as Postdoc in the Center for Theoretical Studies, Indian Institute of Science (IISc), Bangalore, and then in the Light and Matter Physics (LAMP) Group, Raman Research Institute, Bangalore, he joined as faculty fellow at the Poornaprajna Institute of Scientific Research (PPISR) in 2006, becoming an Assistant Professor there in 2010. Over the postdoctoral years, his academic focus broadened to topics in quantum information theory, mainly quantum cryptography and quantum information processing under noisy conditions. So far, he has guided three students for PhD in these areas. Earlier this year, he completed a 3-year project in quantum foundations/information theory, supported by the Dept. Of Science and Technology – Science & Engg. Research Board (DST-SERB), India. He has published 65 papers in peer-reviewed international journals, and presented over 40 invited talks.

QUANTUM REALITY AND THE THEORY OF SHUNYA

The metaphysical concept of Shunya is close to the concept of AkAsha in Yoga or Vedanta. It represents the fifth element, sometimes called ether or quintessence, lying beyond the four basic elements of Earth (prithvI), Water (Ap), Fire (agni) and Air (vAyu). Contrary to popular philosophical expositions, in Yoga/Vedanta these concepts do not refer to the physical elements. Instead, they symbolize stages in the densification of Transcendental Consciousness, whereby "first causes" in the form of wispy fluctuations in Prakriti (Primordial Nature) condense initially to subtle Thought forms, symbolized by akasha, before eventually manifesting as physical laws, symbolized by the element Earth.

The talk will argue that the concept of shunya is not so much intended for detailed analysis, as to indicate that there is an indefinite regression of ever subtler causes underlying physical laws, until the chain recedes beyond the limits of the Knowable, symbolized by the element Air, into an unknowable and undifferentiated blur, which evokes the sense of a void, or shunya. Thus, shUnya/AkAsha should be identified with the fundamental undecidability in the causal regression, rather than with the quantum vacuum or a phase of matter. The talk will further attempt to identify this undecidability with Gödel incompleteness and connect it to Turing jumps and the hyperarithmetic hierarchy. Finally, the question of how such insights could have arisen through meditative or yogic techniques in the pre-scientific era, will be addressed.

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QUANTUM VACUUM AND BEYOND: AN EXEGESIS IN THE LIGHT OF THE CONCEPT OF SHUNYA

The Quantum Field Theory (QFT) has unmasked a nature of Reality which is radically different from general human perception. According to QFT, the fundamental particles, which are the basic building-blocks of the physical universe, are the not the primary reality. These particles are simply the excitations of their respective underlying quantum fields, which constitute the primary reality. The ground state of a quantum field is the vacuum.

The concept of void or vacuum is a cardinal concept in Indian tradition.The void or emptiness is denoted by the term Shunya. The word Shunya has been derived from 'Suna' which means' to grow' or 'to swell'. Though it generally denotes void, yet, in some places, it is also used as a synonym of 'Purna'; and therefore, it has also been identified with the concept of Infinity.

As the theory of Shunya evolved as a universal philosophical doctrine, it can comfortably be applied to shed new light on the unexplained issues of the quantum vacuum, which is considered to be the primary reality of the physical universe. The paper explores some novel dimensions of quantum reality in the light of the theory of Shunya. But Reality is not exhausted within the purview of physics, and hence, there is dire need to discover other dimensions of Reality transcending the physical vacuum. The philosophy of Shunya is a wonderful theory which provides us a framework of knowledge useful to have an import of the Absolute Reality and its manifestations as different modes of existence. The paper also aims at utilizing the theory of Shunya to inquire into the Reality beyond the physical vacuum.

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VEDANTIC AND QUANTUM REALITY: PHILOSOPHICAL PERSPECTIVE

The term 'physics' is derived from the Greek word 'physis', meaning 'to discover the essential nature or real constitution of things'. Hence 'physics' originally stands for the science of endeavour for seeing the essential nature of reality. Classical physics which deals with the notion of absolute space and time, the elementary solid particles, the strictly causal nature of physical phenomena and the idea of an objective description of nature has travelled a long way to the state of Quantum physics where foundations of classical concepts have been shaken and new concepts, very much close to Vedantic conclusions, have emerged.

Science is a systematic enterprise that organizes knowledge in the form of testable explanations and predictions about the reality. Vedanta or Upanisad, experimental in nature, claims to contain the concluding interpretation of the reality on the basis of realization or sakshatkara. The Vedantic seers or rishi (who realizes the true nature of reality) have been occupying the same authentic position in the Indian tradition as that of scientists in Western scientific traditions. This is validated by the similar statements of quantum physicists and Upanisadic/Vedantic seers. The similarity of statements lies in the experiment of scientists and experience of Vedantins as expressed by Fritjof Capra, the celebrated author of The Tao of Physics, "The firm basis of knowledge on experience in Eastern mysticism suggests a parallel to the firm basis of scientific knowledge on experiment." (Flamingo, London, 3rd Edition, 1991, pp.42)

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In order to broaden his academic horizon and expand insightful paradigms, Dr. Rana has done field work at different archaeological sites in Thailand, Cambodia, Vietnam, the Philippines, Pakistan, Malaysia, Sri Lanka, China etc. in search of tangible as well as intangible Buddhist heritage. In 2015, Dr. Rana was sent to Medan and Jakarta as expert of Buddhism during the Buddha Carika Exhibition organised by Ministry of Culture, Government of India, Embassy of India in Jakarta and Nava Nalanda Mahavihara. Dr. Rana has also been associated as a member with various professional academic bodies of eminence such as SSEASR, ICAPS, ISBS, IOC, IHC, IPC BLIA etc.

LOGICAL INTERFACE BETWEEN QUANTUM PHYSICS AND SHUNYATĀ

The world is searching or a new way and means to reinterpret science and philosophy in the 21st Century. The search for commonality and distinction between science and philosophy is a burning topic among scholars in the world today.

Quantum Physics suggests that physical quantities like energy, momentum and so on can have only certain discrete or discontinuous values. It says that one can never see something behaving as a wave and a particle at the same time. This fact is known as complementarity. According to Quantum Physics, one cannot observe wave and particle in a single measurement. For example, in some types of experiments, an electron acts like a wave, in others it acts like a particle. It will never act like a wave and particle at the same time. The difficulty for common sense comes in trying to reconcile the wave behavior at one time with the behavior at another.

The main aspect of quantum theory that can be compared with Madhyamika Philosophy can be illustrated in this way: in quantum theory, the observer does not play a purely passive role. Whether an electron behaves as a wave or a particle depends on the type of experiment being done and it is the observer who decides what sort of experiment to conduct. This is called "Participatory Universe." Madhyamika Philosophy has its own version of the "Participatory Universe". In line with the general principle of dependent origination, subject and object, knower and known, observer and observed, exist only in relation to each other. Neither has an independent "objective existence."

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HOW THE PANCHAKOSHA MODEL OF EXPERIENCE FITS THE UNDERSTANDING OF SHUNYA, AND HOW IT HELPS EXPLAIN QUANTUM REALITY

The Vedic system explains the structure of human subjectivity through the idea that human experience is based on various properties and levels of the mind with separate abilities and roles to play in the human make-up, namely Manas, Buddhi, Ahamkara and the Chitta that constitutes the underlying driving force. These are regarded as linked to various independent vehicles for conscious experience that exist apart from the gross physical body, and which are open to the cognition and action of yogis whose abilities have developed through prolonged practice of deep meditation. Subtle bodies go under the general classification of Sukshma and Karana shariras. The Mana and Vijnana mayokoshas are generally translated as 'subtle' (Sukshma), while the Anandmay-kosha is considered 'causal' (Karana).

The talk will discuss that these bodies function on a kind of information different from that of gross senses – physical, digital / entropy information, and point to a different kind of reality prevailing at subtle levels of experience. In particular, the information types can be classified through the approach of Shiksha, which states that there are four levels of verbal expression, physical through sound, mental, ideational and transcendental. These correspond to digital; experience information; integrated, higher order experience information; and totality information. Only quantum reality and its extensions can model these, and only yoga, in the fullest sense of the word as the eight-limbed practice of Ashtangayoga as laid out by Maharishi Patanjali, or its equivalents such as Islam's Chist, can provide subjective confirmation of the existence of these states.

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BEYOND VEDANTA: SPECULATION OF A QUANTUM REALIST

Hindus consider Vedanta as the ultimate knowledge of reality whose emphasis is on human behavior. Sciences also determine reality that is evidence based but is not restricted to human behavior. Vedanta and Sciences should, therefore, have overlapping region and convergence of their worldviews. We got a glimpse of overlapping region by identifying Brahma and Jagat, respectively, with quantum and classical versions of reality. The convergence in their worldviews will, probably, require Vedanta to come out of its mold and to interact with scientific thinking and biological data. There appear some contact points between Sciences and Vedanta that can catalyze interaction, trigger the evolution of Vedanta and drag their neighborhood into the overlapping region. These points are from relativity theory and quantum field theory and unexplained holistic features of living systems.

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QUANTUM THEORY SELF AND IN SUNYA

'Sunya' is the Indic symbol that bridges the Brahman of Vedanta and the material universe. Sunya denotes void as well as finite space. Aryabhatta employs 'Sunya' to denote number zero. 'Sunya' or 'nothing' is something that cannot be defined; yet it cannot be denied, like the Brahman in Vedanta. While Vedanta denotes Brahman as formless energy or consciousness, Quantum Scientist defines the universe as an inseperable web of vibrating energy patterns in which no single particle has reality independent of the entirety. The entirety includes the observer too. Rishi Grtamada declares that 'the entire universe is nested together like a web' (Yajurveda 8.32), This is the non-locality of the Quantum world. Our consciousness has emerged from Cosmic Consciousness and becomes a part of the Universal Whole, however separated in space. This is epitomized in the very first verse of Kenopanishad. At the Quantum level of Reality, the demarcation between the realms of phenomena seems to blur. There is obviously only one alternative viz: the unification of mind and consciousness. Quantum Vacuum (QV), Brahman and Sunya (void) are all indescribable entities. 'All latencies can be destroyed with the weapon of 'Sunya Bhava''(devikalottaram). Quantum Scientist tells us that the only universal language is that which can be at the level of Gauge-Bosons. Can human mind be trained to transmit and receive at the level of QV? Probably the answer lies in the development of our consciousness through the practice of Yoga and meditation or the practice of inward-journey, advised by Sri Ramana Maharshi.

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WHOLENESS (PURNATA) AND CONSCIOUSNESS IN THE UPANISHADS

The culminating point of the discoveries of the Upanishadic Rishis, lie in the inclusion of all experiences in consciousness, but maintaining it as beyond and untouched by these. In various terms and expressions, we find this nature of consciousness, depicted in the length and breadth of the Upanisadic literature in the context of discussing the nature of reality. The Self is the key concept in the Upanishads. We find the frequently occurring refrain, 'yoevamveda' -- 'he knows this'. The remarkable note of Upanisadic Psychology is the conception of self as the pure subject, which never becomes an object. It is endowed with all psychic faculties, usually attributed to mind in mainstream psychology. When in the western theories, mind is considered to be the seat of psychic faculties, Upanisadic philosophers identify mind itself to a psychic and material faculty. Consciousness is that which is beyond mind and its functions. The Upanishads give clear and distinct description for mind and its functions, its relation to the individual, and the nature of self-knowledge, and through this process discusses the nature of reality. This lecture will discuss the concept of wholeness and its relation to consciousness, specifically in the Upanishads.

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His main field of interests includes Foundations of Quantum Theory, Theoretical Astrophysics, Brain Function Modeling and higher order cognitive activities. He published more than one hundred fifty papers in various peer-reviewed international journals, twelve monographs and edited volumes published by Kluwer Academic Publishers, World Scientific, Singapore and others. Now he is working as member of editorial boards of various international journals and editor of e-book series.

INTRINSIC PROPERTY, QUANTUM VACUUM AND SHUNYATA

In modern physics the properties like charge, spin etc. of elementary entities like electron, proton, photon etc are considered to be "intrinsic properties" of the entity. Intrinsic properties are those properties that a thing have, irrespective of whether or not there are other contingent things. In Buddhist philosophy especially in "madhyamik philosophy" no such concept of "intrinsic property" or svabhava exists. The problem of origin of the universe baffled the scientists and philosophers for many centuries. Within the framework of General Theory of Relativity as discovered by Einstein, the origin and structure of the universe were discussed in a comprehensive manner. According to the recent formulation of cosmology (i.e. the origin and structure of the universe), the universe originates from the fluctuations of the Quantum Vacuum. Vacuum in Modern Physics is not exactly nothing, but rather a "something called nothing", meaning that it is replete with activity governed by the principle of quantum theory. From philosophical perspective what is significant is the division of creative conceptions into those which assume that the Universe arose from "nothingness" in the strong ontological meaning of the word vs. those which lead to the conclusion that it was originated from a certain "poorer" physical reality, usually called "quantum vacuum" or space-time endowed with fluctuation. This vacuum or ontologically speaking a substratum exists which is devoid of any matter but full of activities or full of potentialities. Special theory of relativity is based on two axioms one of which is the speed of light taken as constant and maximum.

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IS NAGARJUNA'S *áunyav¡da* COMPLIMENTARY TO QUANTUM FIELD THEORY?

During the colonial and post - colonial period philosophers in India were found making desperate attempts to depict Indian philosophy as something at par with European philosophy, especially with the one evolved out from modernity. Barring the merit that such attempts made Indian philosophers view their own tradition critically, it only helped accelerate the fall of genuine philosophizing in this land, the community kept itself busy trying to match up all that they had with ideas that came from the West, which they took to be the standard or marker of true philosophy. Among these attempts one was to draw a parallel between Indian idealist theories of consciousness and some of the theories in contemporary Physics, especially the Quantum theory. Even as I agree with Sundar Sarukkai in principle regarding his views about modern science particularly Quantum theory, there remains a strong feeling that if one is willing to conceive theoretical exercises, be it philosophy or science, as belonging to one single clan, there is a bright possibility to find some of our ancient theories as being complementary to many theories in modern science. Buddhist Sunyavada propounded by Nagarjuna seem to be a bright example for this. The present paper argues that Nagarjuna's thesis should be identified as an attempt to provide theoretical explanation to the question why metaphysical realism fails, more than that it provides an alternative to metaphysical realism in conceiving reality.

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QUANTUM REALITY AND CONCEPT OF SHUNNYA: NEED FOR AN INTEGRATING APPROACH.

Quantum physics used for microscopic particles of matter like electrons and light show that they behave both like wave and particle, the two contradictory aspects in classical physics. Also quantum field theory used to explain properties of elementary particles, necessitated the introduction of vacuum states with no particle but huge energy in flat space-time domain. But the curved space-time indicates a different scenario. Here one observes a vacuum state in one reference frame but shows a state with particles, when looked from a different reference frame. Quantum field theory to explain superfluidity and superconductivity shows a need to introduce a vacuum state with an order and elementary excitations. David Bohm's concept of explicate and implicate orders in quantum physics to explain hidden variables brought a new dimension to look at the reality. This implicate order looks like another type of vacuum state. Prof. Adrain Klein from Israel has developed a model for sub quantum physics (domain below the Planck level) and found that this domain does not have any matter, it just has information. This can be again treated as some kind of vacuum state. We find similar concepts in Jainism involving their theory of karma and their concept of two parts of the Universe. One finds a similar concept known as "Form and Emptiness" by Acharya Shri Nagarjuna of Buddhist tradition. Finally it is suggested that Jain theory of anekantvada (multiple truths) should be taken seriously by scientists.

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He has made major contributions in resolving the controversies involving Popper's experiment, Protective measurements and Afshar experiment. He has made path-breaking contribution to the issue of wave-particle duality, by finding new duality relation for 3-slit and n-slit interference. His work on ghost interference has led to a better understanding of the subject.

EMERGENT REALITY IN QUANTUM TO CLASSICAL TRANSITION

The very fact that a quantum measurement changes the quantum state of a system in an uncontrollable way implies that the measurement does not reveal the objective reality that existed before the measurement. We argue that the nature of certain special quantum states that emerge due to decoherent interaction with the enviornment is such that one can measure the expectation value of any observable of the system in a single measurement. This can be done even when such states are a priori unknown. The possibility of measuring the expectation value of any observable, without any prior knowledge of the state, points to the objective reality of such states.

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CELLULAR ENTITY AND CONSCIOUSNESS

In traditional materialism kinds of known that are perceived and processed through sensory organs leads in to idea of physics and metaphysics: metaphysics might deal with consciousness whereas physics would lead man's mind in to matter and energy. However, in this approach limitation of thought process may either meet a road block or randomly aggregated knowledge in regard to the material world ultimately seems senseless. On the contrary, reversing the thought process and assuming that mind, matter, space, self and agent, all are manifestations of consciousness through energy phenomenon radically may declare one learned or peaceful.

As one realizes, the degree of consciousness that is progressive and variable through evolution through virus-bacteria-single cell-plant-animal-human evolutionary system, one might ask whether there is existence of "single cell mind" from which a single cell organism has evolved, much later only the single cell had to be multi-cellular organism by repeated duplication. However, during this period of development, the cell for the first time had to develop communication to another cell. It is thus necessary to compare the characteristic trait of a single cell with that of a human: the traits like mortality, propagation, classification, transformation, motility, interaction and disease susceptibility are uniformly conserved and intact between them. One could then rationalize if human cells undergo both survival and death like human, single cell might have "mind substitute". In this context, the concept of evolutionary variable, progressive, consciousness among different species becomes irrelevant as any single cell from any species actually behave in the same way with all the above described traits.

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QUANTUM REALITY AND THEORY OF SHUNYA

High energy physics and quantum information have a strong overlap with foundations of Physics which, in turn, provokes searching quesions of metaphysical nature. Of special interest are those that dwell on the meaning of objective reality, the nature of ultimate reality and the concept of an observer. These issues are also central to all schools of philosophy in India.

In this talk, I will attempt to compare and contrast the concepts of reality and observer in Indian philosophy and physics, taking care to point out misleading superficial similarities and also deep connections.

INDIAN COUNCIL FOR CULTURAL RELATIONS

The Indian Council for Cultural Relations (ICCR) is an autonomous organization mandated to foster, revive, strengthen and promote cultural relations between India and other countries. It was established in year 1950 by India's first Minister of Education, Maulana Abul Kalam Azad.

ICCR is about a communion of cultures and a creative dialogue with other nations. To facilitate this interaction with world cultures, the Council has strived to articulate and demonstrate the diversity and richness of the cultures of India. The Council prides itself in being an eminent institution engaged in cultural diplomacy and one of the principal sponsors of intellectual & academic exchanges between India and partner countries.

ICCR's major activities involve promotion of culture and intellectual exchange between India and other countries. These include promotion of performing arts, visual arts, crafts, knowledge, education, literature, language, yoga, cuisine... both in their classical and contemporary forms and adopting all measures to promote the cultural relations. Headquartered in New Delhi, through its 37 Culture Centres abroad and 20 Regional Offices within the country ICCR functions as an interface between the countries abroad and various parts of the country. Through 5000 plus scholarships disbursed per annum to the foreign students and with around 100 Indian chairs in various universities all over the world, ICCR is actively involved in knowledge and education exchange. With the help of empaneled experts, artists and scholars in the fields of arts, yoga, language, education, literature the organization is involved in promotion and exchange of culture. ICCR is an important partner in the Cultural Exchange Programmes with countries abroad being collectively executed by the Government of India Ministries of External Affairs, Culture, Ayush, Overseas Affairs, Tourism and Human Resource Development.

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INDIAN COUNCIL OF PHILOSOPHICAL RESEARCH

The Indian Council of Philosophical Research (ICPR) has been set up by the Ministry of Education, Government of India, registered as a Society and was functioning with effect from July 1981. The main objective of the Council has been to promote research in Philosophy in the country. This objective is taken up through various activities, namely, reviewing the progress of research in philosophy, giving financial assistance to institutions engaged in Philosophy, and providing technical assistance or guidance in Philosophy, coordinating research activities in Philosophy and taking all such measures for the promotion of Philosophy or allied disciplines. Another objective is to encourage interdisciplinary research with direct philosophical relevance and Applied Philosophy and Cross Cultural Studies.

The Council has a Fellowship programme under which it awards Fellowships of different categories to assist scholars in engaging in research on full time basis on themes on contemporary relevance and on the thrust areas in Philosophy. Several Projects including translation works are undertaken by eminent scholars to work in Indian Philosophy and other related areas and ICPR provides grants for this. In order to provide opportunity to scholars to express their views and interact with other scholars, ICPR organizes National and International Seminars by giving grants to various Indian Universities and Institutions to deliberate on various themes related to traditional as well as current topics in philosophy. For training young scholars and teachers of philosophy, Workshops on Indian texts are taken up for indepth study. Lectures of very distinguished scholars are organized at different Universities for the benefit for philosophical academia.

The Council has a full-fledged publication programme wherein quality works of renowned scholars are taken up. It also publishes a Journal, JICPR which contains research papers of high quality in field of philosophy and interdisciplinary study by scholars from India or abroad. Besides, all these there are programmes where collaborations with other countries take place by deputing Indian Philosophers/scholars to disseminate the vast Indian culture and tradition around the globe and to learn from scholars from abroad in intercollaborative research activities. The Council has an Academic Centre at Lucknow with a unique library which has a huge collection of about 35,000 books exclusively in philosophy and around 100 journals. Scholars come throughout the year to make best use of the library and the Academic Centre.

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भारतीय सांस्कृतिक सम्बंध परिषद्

भारतीय सांस्कृतिक सम्बंध परिषद् (भा.सां.सं.प.) की स्थापना स्वतंत्र भारत के प्रथम शिक्षामंत्री मौलाना अबुल कलाम आज़ाद द्वारा 9 अप्रैल, 1950 को की गई। परिषद् का उद्देश्य भारत के विदेशी सांस्कृतिक संबंधों से संबंधित नीतियां और कार्यक्रम तैयार करना और उनके कार्यान्वयन में भागीदारी करना; भारत और अन्य देशों के बीच सांस्कृतिक सम्बंधों और पारस्परिक समझ को बढ़ाना और मजबूत करना; अन्य देशों और लोगों के साथ सांस्कृतिक आदान–प्रदान को बढ़ावा देना; संस्कृति के क्षेत्रों में राष्ट्रीय और अन्तरराष्ट्रीय संगठनों से सम्बंध स्थापित करना और उन्हें विकसित करना; और ऐसे कदम उठाना है जो इन उद्देश्यों को आगे बढ़ाने के लिए आवश्यक हों। भा.सां.सं.प. का सम्बंध संस्कृतियों के समन्वय, अन्य देशों के साथ रचनात्मक संवाद से है। विश्व की संस्कृतियों के साथ इस पारस्परिक विचार–विमर्श को सुगम बनाने के लिए परिषद् देश में और विश्व के अन्य देशों के साथ भारत की संस्कृतियों की विविधता और समृद्धि को व्यक्त और प्रदर्शित करने का प्रयास करती है। परिषद् सांस्कृतिक कूटनीति में लगे रहने और भारत एवं अन्य सहभागी देशों के बीच बौद्धिक आदान–प्रदान को प्रायोजित करने वाली पूर्व–प्रतिष्ठित संस्था होने पर स्वयं को गौरान्वित महसूस करती है। परिषद् का यह संकल्प है कि आने वाले वर्षों में भारत की महान सांस्कृतिक और शैक्षिक प्रफुल्लता के प्रतीक को बनाए रखे।

भारतीय सांस्कृतिक सम्बंध परिषद्

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