



Physics in context of Indian Literature

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Abstract: The ancient Indian literature is the powerhouse of the scientific knowledge. This knowledge covers all the disciplines of the modern period. This literature not only contains the practical information of the fields of astronomy, cosmology and health but also a variety of other disciplines such as psychology and philosophy. The resemblance with modern physics shows the utility of this knowledge. Many scientists of present time and of past have taken idea from this literature. This descriptive study to understand the contribution of ancient Indian literature in the development of Physics is carried out through the research based on the data from ancient Indian books, articles and web-based journals and websites.

Keywords: Science and technology, Vedic period, Physics, Universe, Scientists, Philosophers, Inventions and discoveries etc.

Introduction:

The one of the oldest academic discipline, Physics has been the backbone of the Natural Science through its contribution in various fields of technology and development. The advancements in Physics have enabled advances in technology of the modern times. It is only the matter of time that the current world is getting awared of the theories and concepts of Physics which are depicted and illustrated in the ancient Indian Literatures such as Vedas, Ramayana, Vishnu Purana, Srimad Bhagavata Gita, Mahabharata and many other books written by Indian *Rishis* such as Rishi Bhaskaracharya, Aryabhata, Rishi Kanaad, Rishi Kapil, Bharadwaja, Rishi Sushruta and many others. The theories of ancient Indian literature are used as base to explain many modern concepts such as Astronomy, Cosmology, weather forecast, Aviation, the theories related to origin of the universe and in other disciplines such as Chemistry, Mathematics etc. The Vedic science and Modern science are left with no differences apart from the difference of time only. The mantras in the Vedic texts are the formulas to understand the world. These mantras give the explanations of the various phenomena in a quite different way. For instance, the explanation of the idea of space is illustrated with the example of the pot. With the help of pot they explain the idea of existence of outer and inner space.

As stated in Srimad Bhagavata Gita (1.2.32): “The Lord as super soul pervades all things, just as fire permeates wood, and so He appears to be of many varieties, though He is the absolute one without a second.” This shows that the latent or obvious forms of all information in science are vast creations of Lord Krishna. For obvious reasons the mantras in Indian Literature which are written in Sanskrit language are considered as magics not as science. As pointed by Needham that in earliest phase, science was indistinguishable from magic which he called as ‘proto-science’ or ‘pre-science’.^[1] The phase of magic- scientific tradition has left its imprints even on the people of modern period where modern science has evolved. Earlier it was only the case with people in ancient and medieval periods because of the fact that it was crystallized around nucleus of primitive shamanism in the beginning.

Objectives:

The objective of the study is to seek the contribution of the Indian Literature in the development of Physics as the modern studies and the ancient ones are relevant in many aspects and the combine to give the best out of our shashtras and the technological expertise of today.

Method and Materials:

This study is a descriptive one in nature which is based on the secondary sources of knowledge from ancient Indian Literature. The data has been collected from various ancient books, articles, epics, websites and web based journals published at different times.

Results and Discussion

We discuss the origin of some of the theories and concepts of physics in ancient India. Some contributions of ancient India has been highlighted here.

- **Concept of Gravity and Laws of motion:** One of the most prominent mathematician and astronomer of 12th century, **Bhaskaracharya** was the first to give the principle of gravity in the book ‘Surya Siddhanta’ in 11th century. He wrote:

*“Madhye samantandasya bhugolo vyomni tishthati, bibhranah
paramam saktim brahmano dharanatmikam”*

[Surya Siddhanta 12th chapter Shloka-32]

means the spherical earth stands at its centre in space due to the dharanatmikam shakti which prevents earth from falling away and helps it to stand firm.

*“Aakarshhta shaktiska mahi taya yat svastham guru svabhimukham svasaktya,
aakarsyate tatpatativa bhati same samantat kva patatviyamkhe”*

[Siddhanta Shiromani, Bhuvanakosa, Shloka-6]

means every object falls on the ground due to earth's force of attraction. This force allows the sun, earth, moon and constellations to stay in the orbit.

Also Bhaskaracharya explained the gravitational force in his book '**Lilavati**'. This work was done 1200 years before Newton gave his law of gravitation.^[2] In the same fashion, the laws of motion were described by Rishi Kanaad in Vaisheshika Sutra in 600 BCE. He explained the relation between motion and force.^{[3]&[4]}

- **Origin of the universe:** The Big-Bang theory of creation of universe explains the origin of the universe. But in Purusa-sukta of Rigveda it is given that the creation of universe started from a cosmic nucleus often named as *hiranyagarbha* or golden egg.^[5] It is considered as the source of the existence of all planetary and massive entities.

*“Hiranyagarbhah samvartatagre bhootasya jatah patirek aasit, sadadhar
prithavim dhamutemam kasmayi devay havisha vidhem”*

[Rigveda 10.121]

means in the beginning of creation, Hiranyagarbha was born, when born, he was the only Lord of all created beings. He held together this earth and heaven. What other God shall we adore with our oblations?

Rishi Hiranyastupa Angirasa explained the battle between the two forces in the Hiranyagarbha, named *Indra* and *Vritra*. The *Indra* force expanding the Hiranyagarbha overpowers the *Vritra* (representing inertia) force resulting in *Brahmanda Vishphot* (Big Bang).^[6]

- **Solar System:** In Mahabharata while reciting Srimad Bhagvata Gita, Lord Krishna showed the solar system to Arjuna. He explained the existence of countless galaxies and uncountable stars of which the Sun is the one having nine planets revolving around it. Lord Krishna gave *divya drishti* to Arjuna so that he could observe at the scale of sub atomic trajectory. This is because of the limited capabilities of materialistic body and in the language of modern physics it could violate the uncertainty principle given by Heisenberg that observation of subatomic particles can alter the subatomic particle's trajectory.

Rishi Bhaskaracharya, in his book 'Sidhant Shiromani' gave the time period of revolution of earth around sun, i.e., 365.258756484 days.^[2] Brihath Sathaka gave the smallest unit of time (3×10^{-8} seconds) which is very surprisingly close to life time of some mesons and hyperons. As per Rigveda, the speed of light is calculated as 3×10^8 m/s and the age of universe is approximated as 8.64 billion years. These figures are very close to the modern day measured values.^[7] Ashish Manjramkar, coordinator of the exhibition on India's rich scientific heritage, stated, "*Very few of us know that speed of light was known to Indians in Vedic period. A shloka says that the speed of light is 2202 yojana per half nimish. Yojana is a unit of distance which equals to 9.06 miles and half a nimish (nimishardha) is one tenth of a second. The figure is very*

close to the modern measurement of speed of light”.^[2]

- **Quantum Physics:** In 20th century, Niels Bohr explained the atomic model and Erwin Schrodinger gave the famous Schrodinger equation of quantum mechanical wave function and its evolution with time. But before them in Vaisheshika Atomic theory proposed by Rishi Kanaad in 600 BCE explained Quantum Mechanics. According to it, each object can be reduced to finite number of atoms (*anu*). In the Vaisheshika sutra it is mentioned that Earth possesses colour, taste, smell and touch. Air possesses the touch. These characteristics are not in ether.^[8] This is the indication of elementary entities which are considered as these above mentioned qualities. The atomic theory in the Vaisheshika sutra has been proposed by Rishi Kanaad way back before it is given by John Dalton who is now known as the father of atomic theory.

Even the atom bomb invented by J. Robert Oppenheimer (who is known as the father of atom bomb) was based on the studies of Indian scriptures such as Puranas, Vedas and Srimad Bhagvata Gita. The study of Brahmashtra and other deadly weapons of the Mahabharata and Ramayana period was done by Oppenheimer.^[9] The destruction caused by these weapons can be seen with the application of atom bomb and the results from Hiroshima and Nagasaki. ‘Trinidi’ was the name of the team of scientists lead by Oppenheimer during the formation of atom bomb.

- **Frequency and nature of Sound:** The chanting of mantras at particular frequency generates positivity in the atmosphere and lead to emergence of energy. This secret is well known to the Indians since vedic age. Vedas give full explanation of how chanting mantras can resonate the frequency which triggers any form of energy.^[9]

According to Prasastapada, Sound is the quality of akasa which can be noticed by auditory organs. It is momentary and can be produced by contact, disjunction or by another sound. The sound is of two kinds *varna* and *dhvani*. The production of the *varna* is a result of the contact of the internal organ and self when influenced by memory. The moving air strikes the throat, producing a contact with the akasa which results in sound. Sounds are always produced in a series, like a series of ripples in water and when these waves reach the ear we hear them.^[10]

- **Electricity:** In the shlokas of ‘Agastha Sahita’ written by Agastha Rishi, the knowledge of electricity can be gained.

*“Samasthapyam mrinmayam patram tamrapatram susamskritam, chadayet
sikhigrivena cardrabhih kashthapamsubhih.*

*Dastalosto nidhatatva hparadaschditastatah, utpadayati tanmitram
samyogastramradastyoh.”*

means after placing eathen vessel and copper vessel securely, closing the vessels with copper sulphate and saw dust, lumps of gems generate electricity by the union of Copper and Zinc. Rishi Agastha explained the methodology for construction of electric battery. Along with this he also explained the splitting of water into hydrogen and oxygen.^[11]

- **The Aeronautic inventions:** In ‘Purana’, the greatness of Maharishi Bhardwaja is explained in which he showers the knowledge of aeronautic inventions and how spaceships and airplanes appear and disappear and travelled from one planet to another

in Mahabharata and Ramayana.^[12]

- **Missiles:** The inventor of missiles and most appreciated sage of India, Vishwamitra taught the functioning and working of missiles. The type of missiles having smoke, spark, fire and radiations which never fails to hit the target are explained by him.^[12]

Conclusion:

The hint of resemblance of the modern science and the knowledge from the ancient Indian literature shows that the unknown answers of the questions faced by the modern science can be found in Indian literature. The untouched knowledge of Vedas and Puranas can be used to invent many instruments and machines for the betterment of mankind. The development of technology can be sensed to be based on the hints of knowledge from the Indian literature. The role of this literature in development of future seems to be very crucial. As our country is the origin of this knowledge, we must utilize it more efficiently but it

has been the case that rest of world has been growing up with this knowledge while we are lagging behind even when everything is in our hands. Since the Big-Bang theory and Darwin's theory of evolution are justified with this knowledge, we can sense what it can help us to achieve.

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