

Modern physics and Jain philosophy

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Jain philosophy and scientific research, both are engaged in understanding the true nature of the universe and its constituents, i.e. what we can call the pursuit of Truth. Neither Jain philosophy nor modern science postulates an omnipotent and omnipresent “God”, the creator of the universe and both are based on certain laws which are responsible for all the processes in the universe. We find that these laws and principles, formulated during the past few centuries by scientific research and those enshrined in Jinvāni, thousands of years ago, are similar. Thus the Jain philosophy is deeply rooted in the laws of physics. In this article, we describe the common ground between Jain philosophy and modern physics from three perspectives: their approach, constituents of the universe and the underlying laws that govern all the processes in the universe.

1. Approach:

Scientific approach is based on observation of nature, systematising it, postulating certain hypothesis, prediction, verification and formulation of the underlying laws, in comparison, the great edifice of Jain philosophy has been built upon the teachings of omniscient Tirthankaras who, after purification of their body, mind and soul could, in meditative state, ‘SEE’ all the natural processes occurring in the universe follow certain laws and principles. Thus the methodology is different but the goal is the same.

Another difference is that scientific approach tries to explain what it observes, whereas Jain philosophy considers everything from two points of view: Things as they appear in practice, the apparent or practical manifestation, they call the *vyavahār naya* and things as they actually are, called the *nischaya naya* (definitive nature). Jain philosophy believes that things are not what one sees or is manifested but there is an ultimate, latent nature, not fully manifested. This is similar to the explicit, or enfolded order, as the physicist Bohm (1987) proposed, underlying the unfolded layers of implicit orders.

The third difference of approach arises from the fact that Tirthankaras saw the ultimate constituents of matter and soul and the way gross, visible things get built from these ultimate particles. For example in case of matter, it is Paramānus and in case of living beings it is Nigodh. Science on the other hand breaks down from the gross matter, the planets, rocks, minerals etc. to molecules, elements, atoms, quarks and so on, trying to arrive at the ultimate constituent of matter.

It is amazing that, in spite of these differences in approach, both, the scientific research and Jin vani have arrived at the same laws of physics, as we narrate below.

2. Basic Constituents (Reals) of the Universe

Physics recognizes matter (energy and matter being inter-convertible), space- time (3 dimensions of space and one of time) and four types of forces viz. gravitation, electromagnetism and strong and weak nuclear forces, and their fields, constituting the physical universe, which operate everywhere. In comparison, Jain philosophy states that, in addition to the living beings (jiva), the physical universe is composed of five ‘Reals’ (*dravyas*): *Ākāsh* (space), *Kāl* (time), *Pudgal* (matter), *dharmāstikāya* (responsible for motion), and *Adharmāstikāya* (responsible for inertia, or state of rest). Thus three *reals*: Space, time and matter are the same in the two approaches. It must be emphasised that, in spite of this apparent agreement, the scientific concepts of matter, space and time are different from Jain concepts of *Pudgal*, *Ākāsh* and *Kāl*. For one thing, in Jain philosophy, all *dravyas* are

independent, not influenced by the presence of the other or interfere with the other. From the definitive point of view, *Ākāśh* and *Kāl* are considered to be passive, not taking part in any activity, and not affected by each other or any other *dravyas*. As far as *Pudgal* is concerned, scientific theories are working on the proposition that, with increasing complexity, it can give rise to life, i.e. life has an abiotic origin, although this has not been proven experimentally and is theoretically improbable. On the other hand, Jain philosophy emphasises that *Jiva* (or soul) is an independent real; matter and life are not inter-convertible. From practical point of view, though, *kaal* exists in all the other 5 *dravyas*; affects *jiva* in giving rise to birth, aging and death; affects matter by causing its transformation (*parinaman*); gives rise to sequentiality or simultaneity in events occurring in *Aakash*; gives rise to motion due to *dharmāstikāya* and brings things to position of rest due to *adharmāstikāya*. The *Pudgal*, i.e. all matter is made of the finest, dimensionless, unbreakable *paramānus* (the ultimate atom), probably a quantum of energy, and all matter, except *paramānu*, are its aggregates. Similarly, Jain philosophy holds that *Ākash*, is not distorted by the presence of *pudgal*, unlike space of modern physics which is distorted by matter, and controls its speed as indicated by scientific theories, such as General Theory of Relativity.

Dharmāstikāya and *Adharmāstikāya*, traditionally known as mediums of motion and medium of rest, respectively are some what difficult to explain scientifically as Reals. But they ought to be two Reals, in view of the law of conservation of momentum and inertia, as stipulated in Newtons first law of motion. According to the experiments conducted by Michelson and Morley, in late 19th century, no evidence was found for existence of the medium of motion (postulated as the all pervading, stationary luminiferous aether, traditionally considered to be equivalent to *dharmāstikāya* in Jain philosophy, but this may just be due to the fact that aether is non-interacting, made of 2T matter, as discussed elsewhere (Bhandari, 2024) and summarised below.

2.1 Types of Matter

Jain philosophy talks of three (or more) types of matter, which are characterised by a quality of sense called Touch (*sparsh*). There are 2 Touch, 4 Touch and 8 Touch types of matter. *Paramānus* have 2 Touch properties: thermal (cold or Hot, i.e. at 0°K and other temperature; Bhandari, 2024) and electrical (positively or negatively charged or neutral), 4 Touch matter, additionally, are viscous (or frictionless) and massless or possess mass and 8 Touch matter have all these 8 properties. 2 Touch *pudgals* can be compared with Dark energy, 4 Touch with Dark matter and 8 Touch *pudgals* with Luminous matter, known in physics (Bhandari, 2024). 2 and 4 Touch matter do not interact with 8 Touch matter and therefore are sense imperceptible, whereas 8 Touch matter is the interacting, visible, familiar matter, of which everything we perceive is made of. The psychological processes are carried out through various types of 4 Touch matter. The sequential build up of the universe, through aggregation of 2 T, 4T to 8T matter, via *skandhas*, and various types of *varganās* (practically useful aggregates), are well described in Jain philosophy.

2.2 Behaviour of particles

Modern physics describes two types of elementary particles: Fermions and Bosons which follow different statistics. Fermions follow Pauli's exclusion principle, that two identical fermions cannot occupy the same space, whereas Bosons, named after S.N. Bose, state that any number of bosons can coexist in the same unit space (*pradesha*, in Jain science), without interfering with each other and are stated to be '*apratighāti*'. Thus the basic concepts of quantum physics, in units of space and time, i.e. *pradesha* and *kālānu* are well defined in Jain science.

Having discussed the 4 constituents of the universe accepted scientifically and 6 *dravyas* propounded by Jain philosophy, their similarities, differences and roles, we now discuss various laws of nature, which govern all the processes in the universe.

3. Laws governing Natural processes

According to modern physics the macro-world (coarser than a molecule) and the micro world (atomic and subatomic domain) are governed by classical and quantum mechanics respectively. The classical laws are deterministic and the quantum laws are probabilistic. Jain science describes some subtle constituents (e.g. *paramānus* and *Nigodhs*), which may belong to subquantum domain, which the scientific research is now trying to understand. Some of these aspects have been discussed in Bhandari (2015).

3.1 Law of Conservation

According to Jain philosophy Everything (Y) in the universe is made of two components, (i) Essence, E, which is eternal, without origination, everlasting and undestroyable, and (ii) Modes, M (*paryaya*), transient and everchanging [$Y=E+M(t)$]. Conservation of basic 'Essence (sat)' of some *dravyas* e.g. pudgal, even though they are continuously going through origination, sustenance (change of modes or form) and destruction ("*Utpād, Vyaya, Dhrauvya Yuktam Sat*", Tattvartha Sutra, 5.29a; see Tatia, 1994a) is the backbone of Jain philosophy. Nothing can cease to exist i.e. can be destroyed; it can only change its form. This leads to the concept of eternity in Jain philosophy, when one says, that the 6 *dravyas*, constituting the Loka and the Loka, itself, are eternal. Thus law of conservation of various *dravyas* is the fundamental law of Jain philosophy, as it is of modern physics and chemistry. Thus law of conservation was well known to Jains for thousands of years ago and was widely used for estimating several parameters of the universe.

3.2. Causality and Determinism

Nothing which happens in nature is arbitrary or random and every event is a consequence of some causative factor, operated according to certain laws. It implies that nothing happens without a cause i.e. every activity has an underlying cause and there is no cause without its accompanying effect. All the theories of science are based on this cause and action relationship, and this is also the fundamental law in Jain philosophy. This has led to determinism, which implies that the future is a product of the present conditions operated under the laws of nature. Thus knowing the present state, the past can be precisely determined and the future can be precisely predicted.

3.3 Quantum Principles

In quantum domain we come across many principles, like Wave-particle duality, Principle of complementarity, Uncertainty principle, Principle of symmetry, Exclusion principle, Entanglement to name a few.

3.1 Principle of complementarity and *anantdharmitā*

Matter, such as particles like electrons or photons, at quantum level, can manifest either as a particle or a wave. Wave and particle are the two modes of existence of reality. This dual nature of particles was experimentally shown by the double slit experiment. Known as the principle of complementarity, it enables us to understand the real nature of things. The principle of complementarity implies that opposite characteristics of an entity are actually complementary and together they describe an object more completely. This is similar to the Jain principle of *anantdharmitā*, that everything has infinite modes of existence. In fact, *anantadharmitā* goes much beyond duality, because it implies infinite modes of existence. Recently we have shown (Bhandari, 2025) that this property of *anantdharmitā* is very fundamental and the root cause of diversity of physical and living beings, we see in the universe. Without it the universe would be monotonous and monolithic, devoid of any physical or bio-diversity.

Anekanatavād is a unique principle of Jain philosophy, generally considered to be an umbrella term, which encompasses the doctrines of *anantadharmitā*, *Syādvād*, *saptabhaṅgi* and *Nayavād*. There is an element of subjectivity involved in the results of the Double slit experiment, which implies that one sees what one wants to see (e.g. particle or wave behaviour), an evidence that behavior of an inanimate particle, like a photon, changes when it is being observed. It implies that even inanimate particles possess a psyche. It is to be expected based on Jain philosophy, in which *maṇo-vargaṇā*, which controls the psychic phenomena, forms early in the sequence of aggregation and become part of the coarser *varagṇās*. Scientists do not agree with this interpretation but explain it on the basis of plurality of attributes.

3.2 Principle of Nayavād: Nayavād, simply defined is subjectivity. Every one sees a thing from his own perspective or his frame of mind at that moment. All such observations are true, albeit partially so, i.e they are incomplete but complementary to each other and all together, including opposing views makes us understand the nature of the object more completely

3.3 Principle of Syādvād and Sapatabhaṅgi: Syadvād is the principle of non-absolutism. It denies any one single, unique truth, as in ekantavād or monism. It is therefore advised to use *Syat* with every statement, lest it becomes false. *Saptabhaṅgi* or seven modes of existence defines various ways in which an object can exist; it may exist as we see it, may not exist as it appears, or may exist in an indescribable state and combinations thereof. Indescribability, i.e. a state which cannot be described in any way, in any language, or mathematically, could be one of the states. These seven modes are similar to the quantum mechanical solutions, as shown by S. Mookerjee, D.S.Kothari, P.C. Mahalanobis, J.B.S. Haldane and others (See Bhandari and Pokharna, 2017, for references and review).

3.4 Entanglement

Entanglement implies that behavior of particles, produced in a process, is inter-dependent, no matter how far separated they are. Briefly stated, no two particles, produced in a process are independent. This is enshrined, for Jivas, in the iconic principle of Jain darshan "*Parasparopagraho Jivānām*" In view of the understanding of modern physics, we can modify it to "*Parasparopagraho Jivānām-ajivānām*" This is consistent with a fundamental concept of modern cosmology which stipulates that everything in this universe is multiply connected, not independent of each other and has no isolated existence.

3.5 Principle of Symmetry

Everything in nature is symmetrical; all the living species, galaxies, planets, trees, minerals, molecules, atoms, crystals etc. are symmetrical in many respects. Nature loves symmetry and, therefore, symmetry has played a key role in understanding nature. There are many forms of symmetry, such as left- right (spatial) symmetry, mirror symmetry, time symmetry and so on. The conservation laws, on which both classical and quantum physics are based, are an outcome of the symmetry principle. In the Mendeleev's Periodic Table, elements are arranged in eight-fold symmetry. The 118 elements in this table can be arranged in the form of octets, their properties repeat after every eighth member. The elementary particles also behave in a similar manner. In fact, symmetry principle has been used as a powerful tool to predict the existence of many unknown particles, specially particle physicists like Gell-Mann used it in discovery of quarks. He arranged the elementary particles in the "eight-fold way" and was able to predict the existence of quark and eventually discover this smallest constituent of matter known today. It is now known that elementary particles, called hadrons, can be organized in octets (8) and decuplets (10) whereas leptons are organized in nonets (9).

6.3 Uncertainty principle

Measurements to quantify the state of a particle shows that, at any given instant of time, all the parameters cannot be measured precisely, i.e. without errors. If measurement of some physical quantity is made, then according to quantum physics, the state of the particle changes instantaneously into a different state. It is not because one cannot measure the parameters accurately because of the limitation of precision of the instruments or the technique employed but that the measurement cannot be made without changing the state of the particle. This principle is known as Heisenberg's Uncertainty principle. For example, both the parameters in the coupled pairs, known as conjugate variables, of energy (E) and time (t); position (x) and momentum (p); or angular momentum and angle, expressed as $\{E,t\}$; $\{x,p\}$; $\{j,\theta\}$ respectively, can only be known within some minimum uncertainty related to Planck's constant, which is very small (6.625×10^{-34} joule.sec). The magnitude of uncertainty, therefore, is also quite small, but none the less, has a finite value.

We thus see that the laws enunciated in Jain scriptures have much wider scope because Jainism covers both jiva and ajiva in comparison to the narrower scope of physics which deals only with material world. In Table 1, we summarise the basic laws which are common to physics and Jain philosophy.

Table 1. Some principles and laws common to both Science and Jain Darshan.

Science (material world)	Jain Darshan (living and non-living)
No God the Creator	No Omnipotent and Omnipresent God
Laws for every process in the universe	All processes are governed by certain laws
Law of Conservation	Eternal nature of all Reals in the universe
Causality, No miracles	Karmavād, No miracles
Determinism	Krambaddhaparyāy
Complementarity/Particle wave duality	Anantdharmitā
Entanglement	Parasparapagraho jivānām (Interdependence)
Uncertainty	Syādvād
Indescribability	Indescribability of Truth

Many laws and principles, as listed in Table 1 show conceptual agreement between Jain philosophy and science. Scientific theories are based on solid mathematical foundation whereas Jain concepts are qualitatively described. It may be noted that in spite of this general agreement, there are many aspects of cosmology, Evolution of species and some theories like rebirth, where there are many discrepancies between scientific understanding and Jain concepts. Some of these differences may be due to erroneous interpretation.

6. Conclusions

We may conclude by stating that many laws, doctrines and principle in modern physics and Jain philosophy are similar, although their scope is different. Science deals with the physical objects whereas Jain philosophy is mostly concerned with living species, specially the way human beings are affected. The common ground between modern science and Jain concepts opens up the possibility of better understanding of the universe and natural processes occurring therein.

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