Scientific foundation of Jain Darshan

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The purpose of Scientific investigations is to search for truth, or what we call as the laws that govern various natural or physical processes based on observations, theorization, prediction and verification. The same is the purpose of all philosophies. Darshan is different from philosophy, in the sense that although purpose is the same, i.e. search for truth, it is based on what the Omniscients (Tirthankaras) 'saw' during their meditation and expressed it in terms of certain laws that govern both, the physical and the non-physical i.e. living processes. The goals of both, science and Jain darshan, being the same, albeit different approaches. The knowledge of Omniscients is believed to be flawless, perfect and complete whereas scientific knowledge is progressive, and hypothetical, subject to continuous modification. Yet, the laws enunciated by Jain darshan and physics should have much in common. A study of modern physics and Jain concepts show that this is indeed true and we demonstrate it here by a few examples. Before we come to specific laws, some general points, which are common to both Jainism re-enunciated by Tirthankar Mahavir, about 2600 years ago, and physics, formulated during the past 5 centuries or so, may be noted: Both are founded on the premise that there is no God the creator, everything occurs according to certain laws and hence there are no coincidences, no miracles, and no lawlessness.

Some of the fundamental laws of physics are causality, law of conservation, and at quantum level, we have principles of complementarity, uncertainty, entanglement etc. Although they are called by different names, we find that the same principles form the backbone of Jain thought.This comparison is shown in Table 1 below.

Table 1. Some basic common laws in science and Jainism

Scientific concepts (applicable to material world)	Jain concepts (applicable to both non-living and living beings)
Causality	Karmavād
Complementarity, Indescribabilty	*Anantadharmitā avyaktavyatā*
Uncertainty	*Anekantavād, Syādvād, Nayavād, Saptabhangi*
Law of conservation	Eternal nature of dravyās
Determinism	*Niyativād*
Entanglement	*parasparopagraho Jivānām*

These cocnepts have been discussed in detail elsewhere[1].We briefly discuss them here one by one.

1. Causality: Causality asserts that nothing happens by itself; there is an underlying cause responsible for every event and there is no action without a commensurate effect. All physical changes are based on this law; Newton's two laws of motion can

[1] Jainism (A scientific synthesis) by Narendra Bhandari, 2nd edition(2022) Prakrit Bharati Academy, Jaipur.

be cited as an example: (i) A body at rest remains in that state, till it is acted upon by a force, and (ii) accleration is proportional to the force applied.

The karmavād of Jain philosophy defines it as action-effect relationship (*kārya-kāran sambandh*), but it is not only applicable in physical domain, but also in the subtle psychological domain, wherein thought and speech also has an effect, as in the case of living systems.Thus the scope of karmavād is much broader, covering both physical and living systems.The individual's activities are responsible for the person's binding of karmas with *ātmā*, and thus extend to the spiritual domain also.

2. Complementarity: In physics, every substance has multiple properties, as illustrated by wave-particle duality. According to this concept manifestation of a particle such as electron or photon, which sometimes behaves as a wave, like ripples when a pebble is thrown in a pond of water, and sometimes as a particle, like a grain of sand.Waves and particles are generally considered to be opposite in nature but according to physics, they are the two aspects of one and the same thing, which we are not able to describe completely.They are complementary in nature , enabling us to better undertand their true nature.This is demonstrated by the famous 'Double Slit' experiment, where a photon either shows a spot or an interference pattern consisting of alternating dark and bright lines, on the screen, depending on the observational set up . De Broglie quantitatively showed that the wavelength is inversely proprtional to mass and velocityof a moving particle and Schrödinger developed its mathematical theory. Simply speaking, smaller the particle, bigger is the wave. In Jain philosophy, this is defined as Anekāntavād (multiplicity of modes) or *anantadharmitā*. Recently, it has been shown[2] that *anantadharmitā* is the root cause of the enormous physical, chemical and biological diversity in the universe. Anekāntavād essentially means that Everything (Y) in this universe is made of two components, one is the essence (E) and the other is the mode M (*paryāya*), which changes with time. Mathematically, this can be stated as Y=E+M(t). The modes keeps on changing all the time, is transient but the essence remains the same, always, eternal, permanent, indestructible, unchanging.

   Indescribabilty is one of the states, as envisaged in quantum physics and also of *saptabhangi*[3], based on three basic states (existence, non-existence, and indescibable state), and combinations thereof, as will be explained below.

3. Uncertainty: Applicable to everything in micro-domain, Heisenberg's principle of Unceratinty, named after its discoverer, the backbone of quantum physics, states that "One can not know all the aspects of a thing precisely, at any time". It is also the foundational principle of Jain darshan, comprising of *anantadharmitā*, *Sydāvād*, and Nayav*ā*d. The three principles (vād) refer, respectively, to continuously changing state of any object (*paryāya*), the knowledge about it, and the viewpoint (or frame of mind) of the observer.

   This concept of *Nayavād* leads to seven states of existence, or *saptabhangi* as it is called , including the state which is indescribable. Indescribability is also the basic tenet of quantum physics[3].

4. Law of conservation:Law of conservation is the foundation of chemistry and physics and is the basic foundation of alll mathematical theories. Nature can not create anythings out of nothing. Amount of chemicals partaking in any chemical reaction are always conserved; nothing gets destroyed or created. In physics, mass and energy, and charge etc. are conserved in all interactions. Law of conservation of momentum

[2] In Press.

[3] Haldane, J.B.S (1957) The Indian Journal of Statistics,18,195.

is a basic law of motion, enunciated as Newton's first law of motion. In quantum mechanics even the quantum numbers of particles are conserved in all the interactions. Similarly, in Jain darshan, even while the modes are changing, the essence (E, discussed above) is never created or destroyed. This has given rise to the concept of eternal nature of *ātmā* and to the concept of rebirth. In biological sciences, Even the Universe or Loka, though continuosly changing in form of the contents, is considered to be eternal, uncreated, beginningless and without end. The universe with its six reals (*dravyas)*, was always there and will always continue to exist, may be in some other form.As far as biological sciences are concerned, the growth of the body and multiplicity of reproduction seem to contradict the law of conservation, but it is only apparently so; In reality, the material required for the growth of the body is attributed to the chemicals consumed from the surroundings. One plant producing many seeds, and ultimately reproducing many plants does not contradict the law of conservation, and to explain this phenomena, infinite numbers of ātmās in the universe have been invoked, giving rise to the Jain theory of *shrishtivād*.

5. Determinism: The physics is broadly divided into two domains: classical and quantum.The classical domain, is applicable to gross matter (bādar), macro bodies, larger than molecules, whereas quantum physics is applicable to subtle (sukshma), micro-domain of sub-atomic particles.The classical domain is deterministic, whereas the quantum domain is probabilistic and the result is unpredictable. In case of *Jivas*, the evolution of consciousness is attributed to self-effort (*purushārtha*) and probabilstic choice of selection from various options or 'free will' plays an imprtant role.
6. Entanglement: Current cosmological models imply that everything in the universe is multiply connected and nothing exists in isolation, as an independent entity, be it a physical object or a living being. Jain Darshan states it more succintly, in the sutra *Parasparopagraho jivānām*. This is the foundational principle of Jain darshan. and can be extended to non-living objects as well, by modifying to*: Parasparopagraho jivānām-ajivānām*. Actually, entanglement describes the principle more profoundly than interdependence, because, any activity, howsoever insignificant, effects everything else and the universe is like a cobweb; one can not get out of entanglement, even if one wants to. Eddington put it very aptly: "when an electron vibrates, the whole Universe shakes". Entanglement was originally used for two elementary particles produced simultaneously in the same interaction, because it was found that they do not behave independent of each other but the behaviour of one depends on the other, no matter how far they are. Over the years, it's sphere of application has enlarged substantially and it's implications have become more profound.Ultimately we come to the conclusion that all the souls, though independent they are as far as their karmas, state of enlightenment etc are concerned, are entangled with each other.

Thus we see that many basic laws of physics, chemistry, biology and mathematics and Jain Darshan are identical; Only the scope of Jain darshan is wider in the sense that it extends to living entities as well.

Besides the laws which govern all the processes occurring in the universe, there is much common between nature of things in modern physics and Jain darshan.We illustrate it by discussing the nature of matter, since matter (*pudgal*) is taken to be real and eternal, in both science and Jain philosophy. The matter is considered to be of three types: Luminous matter, that we see and interact with, Dark Matter, that can not be seen, and inferred by it's

effect, and Dark energy, a form of matter responsible for expansion of the universe. Likewise Jain darshan considers matter of three types, distinguished by its interactive and Touch (*sparsh*) properties. There is 8 Touch interactive matter, 4 Touch non-interactive, invisible matter, and the 2 Touch Paramānu's, or quantum of matter, out of which all the matter is made[4].

Albeit these basic similarities between concepts in science and Jain Darshan, as discussed above, there are a large number of disagreements, that remain to be resolved. These relate to geography, astronomy, and the nature and shape of universe. In biological scineces,Darwinian evolution is another case of an important disagreement.The descripancies, such as in Big Bang theory in modern cosmology, supported by many observations, and Steady State theory in Jain cosmology may be partly due to misinterpretation of Jain sutras, as discussed elsewhere[5].

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[4] Proceedings of Jain Academy of Scholars, 4, chapter 8, (2024).

[5] Proceedings of Jain Academy of Scholars (loka issue), 2, (2022).