

Concept of living beings, consciousness and soul-matter interactions in Jain philosophy

Surendra Singh Pokharna¹ and Narendra Bhandari² and Narayan Lal Kachhara³ and Chaitanya Prajna⁴

Bhagawan Mahavira International Research Center*
For Scientific Research and Innovative Studies in Social Sciences
Ladnun (Rajasthan), India

Abstract

The Jain philosophy has been developed around the core concept of *atmavad*, i.e. existence of soul, which is eternal, ever existing, omniscient, all powerful and omnipotent. It has infinite knowledge, infinite institution, infinite bliss, and infinite power. A term *Pudgalis* used for matter which can clearly distinguish soul from matter. However, matter is completely different from the soul, but is somehow associated with it from an infinite past and can explain many properties of the worldly soul. Actually matter obstructs the true properties of the soul. This type of fine matter is known as karma. They have developed a very exhaustive model for soul-matter interaction with eight different types of karmas. The salient features of Jain philosophy, which defines Moksha as the ultimate goal, are described. The procedures for purification of soul, which has to pass through 14 stages of spiritual evolution are described. There is much emphasis on *Jnan* (knowledge), meditation, penances and self discipline. An attempt is also made to compare some of these features with the modern scientific models like quantum field theory including possibility of information being stored in the Planck Polygons. Finally their principle of spiritual evolution is compared with the Darwin's principle of evolution.

1. Introduction

Atmavad or concept of soul is the core principle of Jainism around which the Jain philosophy has been developed. The other Jaina principles which include *Lokavad*, *Karmavad* and *Kriyavad* have been developed from this basic concept. Consciousness is the identifying property of the soul and the living universe is the consequence of interaction of soul with matter. Jainism is a non-absolutist philosophy which emphasizes that there is no absolute, complete or one truth to explain any object or process (Bhandari, 2016). *Anekantavad* (multiplicity of modes) and *Syadavad* (uncertainty and incompleteness) are highlighted to express this basic concept.

We describe the general concept of Universe as mentioned in Jain scriptures, according to which the Universe consists of six 'substances' (*dravyas*) which are required to form the universe. It includes matter also. However, the definition of matter in Jainism is quite interesting and can throw new light on the controversy about difference between soul and matter. Jainism propounds that every event in the Universe, concerning both living and non-living, occurs according to certain laws and this philosophy has dispensed with the need of God as the Creator of the universe or any such super power.

As per Jainism, a pure soul has infinite knowledge, infinite intuition, infinite bliss, and infinite power. Matter actually is held responsible for obstructing these true attributes of the pure soul. A typical type of matter is associated with the soul from an infinite past, which is known as *karma*. Thus in Jainism karma does not mean action but is a type of fine matter. Eight different types of karmas are defined along with 158 sub categories which obstruct the innate nature of soul and are also believed to explain all attributes of all living beings in the world. The process of spiritual evolution is therefore designed to preach a set of processes through which old karmas are removed and flow of new karmas towards a body is minimized and ultimately stopped. It may

take not just one life but several lives. Fourteen stages are defined through which one has to pass through before acquiring the pure soul.

There are many interesting concepts in Jainism which can throw new light towards understanding of the problem of consciousness and its relation with matter and other substances present in the world. They talk of quantization of space, time, matter and even soul. They also describe details of living beings known as *Nigods*, which are extremely small in size and which are present in all parts of the Universe. They also talk of living beings present in all earthly substances, water, air, fire and plants. Finally five different types of bodies are defined along with their functions which human beings and some animals can possess. They include astral bodies along with *karman sharir* which goes with the soul after one's death.

We then try to understand these phenomena in terms of some theories of modern physics, like quantum mechanism, and physics of condensed matter. It is argued that closer examination of these ideas of Jainism, in context of modern science, may provide new avenues of thought to understand the concept of consciousness and soul in the modern context also. (Chaitanya Prajna, Bhandari, and Kachhara, 2016, provides latest collection of excellent work done in the field of science and Jainism)

2. Jain concept of the Universe and its constituents

According to Jainism, the universe or *Loka* is finite and is immersed in infinite Alokakash. Lokakash assumed to be consisting of six distinct substances (*dravyas*). Thus Jain Universe is a hexa-Dravya component (Hexa D) model, in stark contrast with Monism (*advaitavad*: biocentrism or materialism) and *dvaitavad* (duality).

In this concept (Hexa D), these dravyas are: *Atma* (soul) *Pudgalastikaya* (Matter), *Akashastikaya* (Space), *Dharmastikaya* (Medium of motion), *Adharmastikaya* (Medium of rest), and *Kāla* (Time). *Jivastikaya* (living beings) are a result of interaction of soul with matter. The Universe is interplay between them, whereas the other substances (*dravyas*) facilitate these interactions. They form a total system in themselves being regulated by some well defined set of laws. Jainism does not believe in any super natural power or God for regulating this Universe. The need for six eternal *dravyas* (and not just one or two as propounded by some other philosophies) emerge from certain scientific logic and principles. Eternal nature of *dravyas* is a consequence of the laws of conservations i.e. nothing can be produced from nothing. Space is needed for *dravyas* to exist. Parameters of motion are conserved in all phenomena, requiring a medium of motion. Certain innate properties of each dravya are immutable and not inter-convertible in to other properties e.g. consciousness can not be converted in to material properties and vice versa.

The medium of motion is interpreted as something which causes motion of matter and soul and can be taken as equivalent to hypothetical aether (for which no scientific evidence has been found), whereas medium of rest is responsible for position (stability) of matter and can be interpreted as inertia. Matter and soul are defined as two absolutely different and independent substances, and one cannot emerge from the other. Space is defined as a 'substance', essentially void, which offers place to all other *dravyas* and contains all the above substances. A few different concepts of time are found in Jain texts. One of the concepts of Time treats it as a substance which acts on other substances, continuously but passively. Acting on soul it gives rise to phenomena of "Becoming", i.e. birth and death. Acting on matter it gives rise to its transformation (*parinaman*); These six *dravyas* are coexistent with *Loka* (Universe). The Alokakash has only one dravya i.e. space.

There is a concept of quantization of space, time and soul in Jainism. Space, is assumed to have smallest indivisible unit called *pradesha* (like quanta), which is not further divisible. These *Pradesh as* are extremely small in size, presumably much smaller than Planck length. Similarly Time, which is linear, consists of the quantum of time and the smallest unit time is 'Samaya', again very small in magnitude. As far as a soul

or Atma is concerned, Jain texts (Thanang/Agamas) declares that there is only one soul. It consists of innumerable, indivisible parts, called *Atmapradeshas*. This explains how a single Ātmā pervades the whole body of an organism, big and small and its *atmapradeshas* exist in each of its living cells. This concept of *Atmapradesha* puts a lower limit on the size of a living body, because any living body must have at least a unit *atmapradesha* and occupy at least one *pradesha* of space.

3. Properties of Soul in Jainism

The properties of soul are described in great detail in Jain scriptures. A pure soul has infinite properties, which are called innate powers. Samayasara, (Kachhara 2014) a highly respected ancient Jain text, has listed forty seven characteristics of a soul. In the most simplified form, a pure soul is characterized by four prime properties, which are infinite knowledge, infinite power of awareness, infinite bliss and infinite potency. However a worldly soul is considered to be infected by matter which subdues these “four infinities” to different extent. The matter which infects the soul is called karma and is believed to be consisting of subtle particles, called karman *vargana* (also called *karmanus*). In Jainism, karma does not mean activity but is a category of subtle matter which obstructs the purity of the soul and inhibits the manifestation of true characteristics of a soul. Jains therefore believe that the same soul 'substance' exists in all living beings. An impure soul of a smallest living being can evolve and become a pure soul. Because of this parity Jains strictly believe in the principle of non-violence for all living beings in the world.

Characteristics of a pure consciousness (soul) as defined in Jain religion



Figure 1. The four prime characteristics of a soul.

Kundkundacharya in his magnum opus Samayasara, one of the most authentic text, has defined all the powers of the soul. All pure souls, when unattached with *karmanu* or matter particles, are identical and possess infinite consciousness (*chetana*), infinite knowledge (*jnan*), infinite potency (*virya*) and infinite bliss (*ananda*) (Figure 1), besides many other qualities or powers. Ātmā is *Anādi* (i.e. it has been in existence since time without beginning), *Anant* (without an end), *Amurta* (formless), *Avināshî* (indestructible), *Anantapradeshî* (infinite or immeasurably large in expanse), *Akhand*(indivisible), (unbonded), *nirapeksha* (absolute, without any attachment), *swāshrit* (self-supporting i.e. independent), *achal* (motionless or vibration free), *nisang* (without company, alone and independent), *jnāpak jyotirmātra* (*self-illuminating*). It is not affected by time i.e. does not undergo the process of aging, has the property of timelessness (*Akāl*). By virtue of its power of indivisibility i.e. *akhandatva*, it is *ati-sukshma* (smaller than the smallest). In addition to these qualities ātmā has some 'ordinary' properties as well; like it has *astitva* (existence), *dravyatva*, *vastutva*, *prameyatva*, *aguru-laghutva*, etc. (Kachhara,2014; Bhandari, 2015) It is the considered to be the knower who can perceive

without the help of sense organs; i.e. it is super-sensuous (*atīndriya*). In the pure state *âtma* is free. Ten of the main properties are described below. Thus all living beings have pure, identical souls, which are defiled by material *karmanus* to different extent, giving rise to different species. Every living being has a potential of attaining pure state of soul and is sacred to the same extent. Here we discuss some characteristics of souls. (Aacharya Nanesh 2008).

(1) Soul has activity of consciousness (*Upayoga*):

The most important property of soul is its conscious activities. This is defined as *Upayog*. Knowledge and awareness (perception) are the primary *upayog* of soul power. Although a pure soul has other characteristics but infinite knowledge (omniscience) has been regarded as the prime characteristic of the soul. Kundakunda (Mehta 1980) has stated that although from the empirical point of view there is a difference between the soul and knowledge yet from the transcendental point of view it is sufficient to say that the soul is the power of knowing and nothing else. He further states that there is no difference between the knower and his knowledge. From an empirical point of view an omniscient (*Kevali*) perceives and knows the whole of reality and from the transcendental point of view he perceives and knows the self. It has a capability of perception and cognition. It has structural as well as functional attributes (Kachhara 2014).

According to Jainism, phenomena of telepathy and clairvoyance (Mehta 1998, 2002) are examples of direct, supersensory knowledge. In the modern science these faculties are not recognized as they are not observed consistently in scientific experiments and do not follow the repeatability criteria of space-time invariance. However, one should realize that these two paranormal faculties are properties of living systems which are open and irreversible with memory. Hence even at fundamental level, it will not be appropriate to assume that these phenomena should follow the rigid conditions of spatial-temporal invariance and criteria of repeatability. We feel that these phenomena can exist and they need not follow the criteria of physical processes.

(2) Soul always exists (it is eternal) but shows different modes or characters (*Parinami Nitya*):

A soul has permanent status i.e. it is never born nor does it ever die. However, it shows different modes (*pariyāya*) or characters at different times but its inner existence or essence continues and is eternal.

(3) Soul is formless (*Amurta*):

It does not have any physical form, it takes the form of the body it occupies. It is non-corporeal and has no colour, taste, is neither cold nor hot, neither male nor female etc. Thus it does not have any property of matter. It may be mentioned that one of the authors (SSP) has proposed that a pure soul may be an entity for which causality is neither obeyed nor violated (Appendix 6 in Pokharna 2016).

(4) Soul enjoys pleasure and also suffers as it goes through the consequences of its actions and thoughts (*Karta and Sakshat Bhokta*):

Actually soul exercises its choice in taking actions. It is the soul which has intelligence, it is the soul which is conscious of itself and also conscious of its surroundings and it is the soul which has to bear the fruits of its actions, good and bad.

(5) Soul has innumerable indivisible parts known as *atmapradeshas*:

Every soul is made up of innumerable (*AsankhyatPradesha*) *atmapradeshas*.

(6) Soul has a property of expansion and contraction in its *pradesha* (*Atma pradesha me Sankoch aur Vistara ka guna*):

The *atma-pradesha* have a property of expansion and contraction. In principle the flexibility is so much so that for a very small sized living being, it can occupy just one *Pradesha* of space whereas, if required, it can expand to occupy the whole universe (*Lokakasha*).

(7) It has exactly the same shape as the body which it occupies (*Swadeh Parima*):

Each living being has a unique soul. Its shape is exactly the same as the body which it occupies. Thus an elephant will have a bigger size of soul and an ant will have a smaller size. But the number of *atmapradesha* (the number of smallest partitions) are the same in both the cases. Actually soul has a property through which its *pradesha* can contract or expand to occupy the whole body. Here the body size would mean all types of bodies which a person or any living being can have (see section 9 below describing five types of bodies). A comparison with a flame of a lamp is given to describe this character, which fills the room with light, no matter what its size is. Otherwise the two souls are exactly the same in their powers. It is mixed up with matter like milk and water, but each of them maintains different identities.

(8) Invisible and mixed up with matter from infinite past (*Pudgalic Adrashta-van*):

The association between soul and matter has existed since beginning-less past. Through spiritual practices, however, the matter can be slowly removed and the soul can be eventually made completely free from matter, i.e. in a pure state.

(9) It affects matter and in turn is affected by matter (*Parasparprabhav*):

Because of its property of interaction with matter, the soul can affect the matter and in turn can be affected by matter.

(10) It is neither small nor big.

Soul in association with matter (karmas) is neither very small nor it is very large in size. It is almost equal to the size of the body of the living being.

4. Definition of matter in Jainism may help in better understanding of the difference between soul and matter

These days a lot of discussion is going on whether soul or consciousness is derived from matter as some kind of emergent property or is it totally different from matter (Shanta 2015). Hence our first topic of discussion concerns with the definition of matter as given in Jain philosophy. It states that the Universe is driven by some rules and it exists since eternity i.e. beginning less time in the past and will continue forever, i.e. in future infinitely. The definition of matter is very interesting and may be useful in the context of distinguishing soul from matter. The term used to describe matter is *pudgal*. The word *pudgal* is made up of two parts: *pud* means to combine and *gal* means to dissociate. So all matter is made of paramoult and is a consequence of aggregation and dissociation. If we look at chemical reactions or the process of making mixtures and compounds or even at radioactive elements, then this definition holds quite well, because in all these cases, process of making and breaking, or formation and dissolution are going on at all levels. But this property is not present in case of other substances of nature like soul, space, time, medium of motion and medium of

rest. Now this definition of matter will not work for a field, which is generally treated as continuous. Hence this definition of matter in Jainism can provide new avenue of thought to distinguish soul from matter.

5. Karma Theory, Soul-Matter association in Jainism:

As explained above the karma matter is responsible for the disorder present in the worldly souls. Due to the presence of different types or karmas in varying quantities, different characteristics are manifested in the worldly souls i.e. by different living beings. (Mehta 1998, 2002, Kachhara 2014, Bhandari 2015 and Mardia and Aidan 2015)

At every moment, an empirical soul is attracting karma matter by his thoughts and actions through mind, speech and body. This matter in the form of karma remains latent (in memory) in the empirical soul for some time, which is determined by the passions at the time of arrival of new matter. Passions in turn are determined by karmas which are already accumulated. Karmas are defined by the following four parameters: (A) Nature, (B) Number, (C) Lifetime and (D) Intensity

(A).Nature

There are innumerable types of karmas. Their function is to create delusion and obscure the innate powers of the soul, e.g. knowledge, awareness, bliss etc. and some physical aspects of the body mentioned above. They can be classified in eight major types, listed below. Important sub types of karmas in each category are mentioned in parentheses.

Knowledge obscuring karmas (5)

Awareness obscuring karmas(9)

Feeling producing karmas(2)

Age determining karmas(4)

Belief and conduct producing karmas (28)

Body determining karmas (103)

Status determining karmas (2)

Power hindering karmas (5)

Each one of these is held responsible for different types of disorders present in the empirical soul and impedes the manifestation of true nature of the soul. Jainism claims that all properties of worldly living beings can be explained in terms of these 8 karmas and their sub categories.

(B). Number

The number of karmas changes from one animate to another, and in a being, they vary from time to time, depending on one's mental state and state of spiritual evolution. The relative quantities of karmas are acquired by the following rule: The age determining karma receives the smallest part; a greater portion goes to the body determining and status determining ones, both of which obtain an equal portion. More than that goes to the knowledge obscuring, awareness obscuring and power hindering karmas each of which gets an equal portion. Still a larger part goes to the belief and conduct obscuring karmas and the greatest of all goes to the feeling producing karmas. This number determines the properties of different animate beings.

(C). Life Time

The lifetime of the incoming karmas depends upon their interaction with karmas already present which actually determine one's passions. This lifetime is then determined by karma-karma interaction.

(D). Intensity

Karmanus, being pure matter, is neutral. The various effects on matter in life are manifested because of its association with the soul. The effect the karmas depends upon the passions of the empirical soul at the time of bonding of karma.

Depending on the acquired karmas, their nature, intensity, etc. every being is at a particular spiritual stage. Fourteen spiritual stages known as Gunasthānas have been recognized in karma theory through which the soul passes, starting from a state of highest perversion (called *mithayatva*), to the absolute pure state (omniscience). These transitions in states have been nicely explained in terms of karmas and their mutual interaction and will be described later.

6. Some interesting concepts about living beings in Jainism:

6.1. Earthly substances, water, air, fire and vegetation all have life and have consciousness.

All types of living beings can be divided into six categories which are (i) Earthy bodied (*pruthvikaya*), (ii) water bodied (*apakaya*), (iii) air bodied (*vayukaya*), (iv) fire bodied (*tejas or agni kaya*), (v) plant kingdom (*vanaspati kaya*) and (vi) living beings that can move by own self (*trasa kaya*). Here *kaya* means body. Alternatively, living beings are also divided in two categories, stationary (*sthavar*) and moveable (*trasa*). All the living beings falling in the first five categories are of stationary type. These five life types have single sense of touch only (*Ekendriya Jiva*). The one sense jivas can be *sukshma*, micro-size, or *badar*, large size. In case of micro-size, innumerable large number of beings can be there on a single grain of soil or a drop of water, a small amount of air or a small spark of fire or a small plant species. Earth-bodied substances (*Pruthvi-kaya*) include silica, pebbles, gravels, sand, salt, iron, copper, gold, and also other minerals like diamond, sapphire etc. According to Jainism, these living beings are alive till they are separated from their sources by processing, by which *sachitta* matter is converted into *achitta* matter. Such earth bodied beings have sensations like other living beings e.g. respiration, pain, grief, excitement, consciousness, metabolism, fatigue, aging, death etc. Their physiological and metabolic activities cannot be seen. All ten types of instincts i.e. food, fear, sex, possession, anger, pride, greed, deceit, inherence, and collective action are believed to be possessed by plant bodied beings.

Micro-size immobile beings are available in all parts of the universe, that is they can be found on all planets, stars, galaxies etc. They are not visible to the eyes. They are so small that they can penetrate even the hardest rocks and freely go from one side of the rock to the other. No power of the world or any weapon can destroy them.

When scientists are looking for difference between consciousness/soul and matter that is whether they are two independent entities or the consciousness is an emergent property of matter then these ideas can provide new avenues of thought.

6.2. Nigodas are extremely small living beings with one sense and are present in all parts of the Universe:

There is another important concept described in Jainism, which will be of much interest to the scientists. It concerns with a category of living beings known as Nigodas. The small *nigodas* can not be perceived by ordinary sensory organs. And are known only to the enlightened souls (*kevali*). They are so small that they can penetrate rocks. Also they cannot be killed by anyone in the world. The smallest, most primitive, living beings, known as "*Nigodas*", are present throughout the Universe. A topic under discussion these days is whether the virus and bacteria are like *nigodas* or *nigodas* are still much finer in size. (Kachhara 2014)

Finally Jainism defines two types of living beings from the point of view of motion. These two types are called as '*Sthavar*' (stationary that is motion-less) and '*Tras*' (mobile), meaning those which can move from one place to another by themselves. Very old fossils show that *sthavartypes* of living beings existed in the pre-Cambrian era (>540 million years ago) and mobile animals emerged only recently, compared to the geologic and fossil history of the Earth, which is 3.8 billion years old.

7. Procedures for spiritual evolution in Jainism:

It is due to karma that souls continuously take birth in the world again and again. The direction of evolution should therefore be towards a goal of liberalizing the soul from all material attachment, that is, all karmas. A full fledged system of *Navatatva* (Nine fundamental truths) has been developed in Jainism to explain the process of reducing the karmas. As one's soul evolves, the magnitude of karmas decreases. It appears that the larger the number of karmas associated with a soul, larger will be the entropy or disorder.

Rules have been developed to practically implement these concepts in daily life. Five main principles of Jainism known as *Mahavratas* viz. *Satya* (pursuit of truth), *Ahimsa* (Nonviolence), *Aprigraha* (Minimizing material possessions), *Asteya* (Non-stealing) and *Brahamacharya* (Celibacy) have been propounded for a disciplined life which will help in going up the ladder of spiritual evolution. (Aacharya Nanesh 2008, Mehta 2002)

To distinguish true knowledge from false knowledge, a concept of three jewels is defined known as *samyaka jnan* (right knowledge), *samyaka darshan* (right vision) and *samayaka charitra* (right conduct). Another important concept developed is of three yogas: *Manha* (through mind), *Vachan* (through communication) and *Kaya* (through physical body), and three *karans*, that is bad actions should not be carried out by oneself, should not be got done by others and should not be encouraged or supported if somebody else is doing it. Several sub categories of concepts are given to handle this process in minutest possible details with very extensive description.

7.1. The Jain concept of evolution of soul through fourteen spiritual stages with increasing purity, knowledge and order:

The principle of evolution of soul by reducing the amount and type of karma matter associated with it through rigorous spiritual practices is very fascinating. Jains therefore believe that the same soul 'substance' exists in all living beings. An impure soul of a smallest living being can evolve and become a pure soul. Because of this parity Jains strictly believe in the principle of non-violence for all living beings in the world. All life is sacred and mutually interdependent. This is enshrined in the famous Jain principle of "*Parasparopagraho Jivanam*". Thus, in all their activities, Jains go beyond the famous slogan "Live and Let Live" and follow the principle of "let others live", without worrying about their own life. This expresses the spirit of Jain philosophy quite well. This is compared with the Darwin's principle of evolution which is summarized by the rule "Survival of the fittest".

The path of evolution of soul in Jainism is described through fourteen spiritual stages, through which one has to pass before getting liberated, that is getting transformed from an impure soul to a pure soul. These fourteen stages or phases are called fourteen Gunasthānas. They are given in Table 1.

Table 1. Different stage of consciousness as discussed in Jainism (Kachhara, 2014)

Kindly note the sequence from bottom to top showing direction of evolution.

| stages | Name of stage | Degree of knowledge or order (14th stage is a pure soul) |
|--------|------------------------|--|
| 14 | Ayogikevali | Liberated souls |
| 13 | Sayogikevali | Dynamic Omniscient State |
| 12 | Kshinamohniyakashaya | CSR (Complete Self-restraint) with eliminated passions |
| 11 | Upshantmohniyakashaya | CSR with suppressed passions |
| 10 | SukshmaSampraya | CSR with subtle passions |
| 09 | Anivratti Karan | CSR with uniformly mild volition |
| 08 | Apurva Karan | CSR with unprecedented volition |
| 07 | ApramatSanyat | Careless-free Self-restraint (CSR) |
| 06 | PramattaSayant | EWV with Careless Self-restraint |
| 05 | Virtavirat (Deshvirat) | EWV with partial Self-restraint |
| 04 | AviratSamyagdrishti | Non-restrained Enlightened World View (EWV) |
| 03 | Mishra | Mixture of Deluded and Enlightened World view |
| 02 | Sasadan | Lingering Enlightened World View |
| 01 | Mithyatva | Deluded World View (non-believer in existence of soul) |

Guna means characteristics and *sthān* means a position or state. It is interesting to note that the Jain *acharyas* have gone into great depths to describe these fourteen stages (Kachhara 2014). They are being described through twenty nine parameters. The logic used in taking up so many parameters is highly impressive and there are several subcategories including these twenty nine categories. An excellent description is given about the movement of a worldly soul from one birth to another and so on. With each stage of development, the knowledge content of soul goes up. A state of highest orderliness is defined as a pure soul, towards which, everyone must strive to evolve.

8. Need to distinguish between Darwin's principle of evolution and Spiritual principle of evolution:

There is lot of discussion on the paper by Bhakti Niskam Shanta Swami on Darwin's principle of evolution. He also talks of another type of evolution which, according to Jainism and Hinduism, can be termed as evolution of consciousness (soul). As per Jainism, it is accompanied by reduction in quantity of karma matter associated with the soul and increase in the manifested knowledge (*jnana*) of the soul. The number 14 of Gunasthāna is incidentally the same as the number of *lokas* mentioned by Hameroff and Deepak Chopra in their paper entitled "The quantum soul: A scientific hypothesis". It appears that these stages may correspond to some information layers or stages of consciousness separated by certain gaps. Such ideas of Jains may be similar to the ideas proposed by the above authors that space-time geometry can contain the information and it can go to the deepest possible layers and even up to a Planck's polygon through spin foams of quantum gravity as discussed later. This analogy requires further exploration.

9. Concept of Five different types of bodies which may be useful in understanding the way soul interacts with matter and migrates after death to another body on rebirth:

In Jainism, five different types of bodies are defined which living beings can possess (Aacharya Nanesh 2008). They are as follows.

Audaric body -The physical body that is visible. At the time of death, the soul leaves this body behind. This body dissociates after death.

Tejas body -This body is responsible for digestion, metabolism, energy etc. in the *Audaric* body. This body is responsible for sending major substances derived from food to various parts of the *Audaric* body. At the time of death, it accompanies the soul and helps to create a new *Audaric* body for the soul.

Aaharak body -This body is possessed only by some special souls. This body is made from auspicious matter, innocent but useful for executing some tasks. *Aaharak* body is very small in size. Through such bodies, soul can travel to distant places in the universe.

Vaikriya body -This body can change shape and size; it can be very small or very large in size, very thin or very thick etc. It does not contain blood, flesh or bones. It cannot rot nor it can be dissociated. The heavenly beings and hellish beings possess this type of body by birth. Some human beings do have the capability to develop such bodies using powers of some *mantras* and super natural powers (*labdhies*) etc.

Karmic/Causal body: The karmic matter that covers the soul is called karmic body. At the time of death, this body accompanies the soul and determines the next *yonis*. The karmic body along with *tejas* body forms the basis of the other new *audaric* body on rebirth.

This concept can help in understanding the movement of soul from one place to another and from one birth to another.

10. Comparison with the modern scientific theories

Having described some important features of Jain philosophy, dealing with soul, matter and their interactions, we now make an attempt to understand some of these in terms of modern scientific theories so that we can place them on some logical footing. For this purpose, we make use of some concepts in Quantum mechanics, Quantum Field theory (QFT), Condensed matter physics etc. It is interesting to note that this model of soul-matter interaction of Jains is, in many respects, analogous to the models developed in QFT.

10.1 Analogies with Quantum Field Theory: Quantum field theory (QFT) has been developed to explain the quantum aspects of fields. Thus quantum electrodynamics was developed to explain the particle aspects of light and these particles are known as photons. It is extensively used in particle physics to derive properties of particles. In these theories, a vacuum state is visualized with highest state of order over which there are what are known as elementary excitations, which are nothing but particles. This concept has also been used to explain the properties of condensed matter like superfluids and superconductors. Different properties of systems originate from the type of elementary excitations. The interaction among various excitations causes scattering among them. The relative number of various elementary excitations present in a system are a function of temperature. These excitations determine the disorder in the state of these systems, say thermal and acoustic properties of the superfluids and superconductors at different temperatures (Khalatnikov, 1962, Hugenhold and Pines, 1962, Pokharna 1977 and Pokharna 2015). The concept of elementary excitations can also explain the phenomena of phase transitions in these systems. Different phases of helium are explained through the concept of elementary excitations. Thus phonons, rotons and vortices determine the properties of superfluid helium at different temperatures and determine propagation of sound and its attenuation in liquid helium. If the temperature is absolute zero then helium liquid is in a perfectly ordered state with no excitations and total superfluid state. Similarly in case of superconductors, there is a superconducting

state with very high order at absolute zero temperature with total resistance free flow of current and there are elementary excitations over it in the form of Cooper Pairs in the minimum energy state. At higher temperature some resistance starts developing.

Karmas seem to behave in the same way. Just as a particular state an excitation stays only for some definite time, karmas also have a definite life time. The intensity of experience by the soul is analogous to the energies of excitations in QFT, which show different properties. We feel that there is an interesting analogy between the karma theory of Jains and the quantum field theory used to study phenomena at low temperature like superconductivity and superfluidity. Thus a perfectly ordered pure soul is analogous to a perfectly ordered ground state which is free from any elementary excitations. The elementary excitations then correspond to Karmas. (See Table 2 for details)

Table 2. Analogy between quantum field theory and soul-karma theory of Jainism

| SN | Parameters of Quantum Field Theory | Parameters of Jain theory of soul and karmas |
|----|---|---|
| 1 | Highly ordered vacuum state | Perfectly ordered soul with four infinites and without matter |
| 2 | Elementary excitations | Material karmas |
| 3 | Phonon, Rotons, Cooper pairs determining the properties of normal fluid | Knowledge, intuition, power, and bliss obscuring karmas |
| 4 | Phase transitions | Gunasthanas |

10.2 Concept of soul and possibility of information through spin foam in Planck polygons.

The concept that the soul is made of innumerable atma pradeshas is quite analogous to the concept of space-time geometry with Planck's Polygon in particular developed by Penrose and Hameroff using quantum gravity based considerations. They extended Einstein's general theory of relativity, in which matter is essentially space-time curvature, to the Planck scale (length as 10^{-33} cm and time as 10^{-43} seconds), the most basic level of the universe, with coarseness, irregularity, and information. Actually loop quantum gravity depicts space-time geometry as quantized into volume pixels, that is Planck scale polygons whose edges may be considered as irreducible spin whose lengths also vary but average 10^{-33} cm. Planck volumes evolve and change with time, conveying information as a 3-dimensional spider web of spin. In their model, Planck's polygon is proposed as the smallest indivisible unit of space-time geometry with spin-foam like structures which are dynamic and can contain information. The concept of contraction and expansion of atmapradesha is then similar to the vibration like characteristics, conceptualized through spin foams in these Planck's polygons (Hameroff 2013).

10.3 Transmigration of soul with Karman sharira

The karmanus, which are attached to worldly souls, are material particles and are subject to physical laws. The Karman sharira accompanies the soul from one birth to another and is the determinant factor for the next yoni or species in which the birth will take place. This is a mysterious process and not understood so far. The point to emphasis upon is that what form of matter could correspond to the karman sharira discussed in Jainism.

11. Discussion and conclusions:

In this paper, we have tried to briefly describe the concept of soul and consciousness as discussed in Jainism. We can highlight the main summary of this paper in what follows:

(a). The Jain concept of soul as an entity (different from matter) is the main attribute of all living beings. In a state of purity, it has infinite knowledge, infinite institution, infinite bliss and infinite power.

(b). For a worldly soul it is always found in association with matter, which is termed as karma in Jainism. Thus in Jainism, karma does not mean action but it means a fine variety of matter. Eight different types of these karmas and their 158 subcategories can explain many attributes of living beings in the Universe.

(c). A pure soul has ten basic characteristics which can explain many aspects of living beings.

(d). Jain concept of soul-karma interaction looks somewhat analogous to the idea of elementary excitations developed using quantum field theory to understand the properties of condensed matter in physics like superfluid helium and superconductivity.

(e). Jain concept of soul also appears to have some commonalities found in the Penrose model of quantum gravity in general and the similarity of the idea of Pradesh (smallest partition of soul) with the Planck's polygon which can possess information through the spin foams.

(f). Five different types of bodies described in Jainism can provide new concepts of soul-matter interaction and new forms of matter, not yet found in the modern science.

(g). Nigoda is treated as the smallest type of living being which is not visible to the ordinary living beings. But it is spread almost all over the Universe. This could be a new concept for the modern science.

(h). Another interesting aspect of Jainism is to recognize that Earthly bodies, water, air, fire and plant kingdom possess life and consciousness.

(i). This paper clearly shows some interesting ideas about soul and matter in Jainism which should be further explored in a multidisciplinary style with Jain scholars and scientists learning from each other. This approach can help in better understanding of the subject of soul, consciousness and matter

12. Acknowledgement:

One of us (SSP) is very happy to thank Prof. H. Froehlich, Prof. B. D. Josephson, Late Prof. E. P. Wigner, Prof. E. C. G. Sudarshan, Prof. K. P. Sinha, Late Prof. D. S. Kothari, Prof. M.V. Murthy, Late Dr. U. N. Upadhyay, Prof. Rajmal Jain, Prof. Paras Mul Agrawal, Dr. Sudhir Shah for interesting correspondence and discussions. SSP is also grateful to his parents Shriman Balwant Singhji Sahab Pokharna and mother Shrimati Lahar Kunwarji Pokharna along with his elder brother Shri Jagat Singhji Pokharna. We acknowledge several Jain and Hindu Sadhus and Sadhvis for encouragement and for clarifying many concepts.

References:

Aacharya Shri Nanesh (Nana Lalji Maharasahab), 2008, Jin Dhammo, Akhil Bhartiya Sadhumargi Jain Shrivak Sangh, Bikaner (India), 202-209. (In Hindi)

Beliaev S T (1962) Application of the methods of quantum field theory to a system of Bosons (pp. 313), and Energy Spectrum of a non-ideal Bose gas, (pp. 323) in The many body problem, edited by David Pines, Benjamin, New York.

Bhakti Niskama Shanta (2015) Life and consciousness—The Vedāntic view, Communicative and Integrative Biology Vol. 8, Issue 5, e1085138.1-11 (electronic version)

Bhandari Narendra (2015) Jainism: The eternal and Universal Path to Enlightenment (A Scientific synthesis), PrakritBharti Academy, Jaipur, India

Bhandari, N. (2016) The enigma of Truth, Proceedings of the International Conference on Science and Jain Philosophy, held at IIT, January 8-10, Bombay Mumbai (submitted).

Chaitnya Prajna, Narayan LalKachhara and NarendraBhandari (2016) Scientific Perspectives of Jainism, Proceedings of a two day conference organized by Bhagwan Mahaveer International Center for Scientific Research and Social Innovative Studies, Jain VishwaBharti, Ladnun, Rajasthan, India (in press).

Desai Kumarpal (2014) Jainism: The cosmic vision, Shri Mumbai Jain YuvakSangh, Mumbai, India

Hameroff Stuart (2012) consciousness, Neurobiology and Quantum Mechanics: The case for a connection, in Exploring Frontiers of the Mind-Brain Relationship, Mindfulness in Behavioral Health, by A Moreira-Almedia and Santss F S (eds), Springer Science+Business Media, chapter 6

Hughenhold N M and Pines D (1962) Ground State Energy and excitation spectrum of a system of interacting bosons, pp. 332 in) in The many body problem, edited by David Pines, Benjamin, New York.

Jainism (General Books on Jainism) see the link www.jainlibrary.org/english.php

Kachhara N L (2014) Scientific Explorations of Jain Doctrine, Part 1 and 2, MotilalBanarasidas Publishers Pvt. Ltd. Delhi, India

Khaltnikova I M (1965) Theory of Superfluidity, Benjamin, New York

MardiaKanti V and Rankin Aidan D (2013) Living Jainism: An Ethical Science, Mantra Books, Winchester UK and Washington, USA

Mehta Mohan Lal (1998) Jain Philosophy: An Introduction, BhartiyaVidyaBhawan, Race Course Road, Bangalore 560 001

Mehta Mohan Lal (2002) Jain Psychology: An Introduction, ParashvanathVidyapeeth, Varanasi 221005, India

Pokharna Surendra Singh (1977) Study of the effect of the phonon and roton interactions on the transport and thermodynamic properties of liquid helium, A Ph d thesis approved by the University of Udaipur, Rajasthan, India

Pokharna Surendra Singh (2015) Quantum Field Theory Like Model of Consciousness and Matter in Jainism, Proceedings of International Conference on Quantum Mechanics and Quantum Consciousness, being organized by Amal Jyothi college of Engineering, Kottayam, Kerala, India from January 6-9, 2015, pp 93-101.

Stuart Hameroff and Roger Penrose (2014) Consciousness in the universe: A review of the 'Orch OR' theory, Physics of Life Reviews 11 (014) 39-78

Stuart Hameroff and Deepak Chopra (2011) The "Quantum Soul" a scientific hypothesis, Chapter 5 in Exploring Frontiers of the Mind-Brain Relationship, Eds: A Moreira-Almeida and F Santana Santos, Springer.

VishrutvibhaSadhviji (2016), Atamabad (Hindi), Jain VishwaBharti,Ladnun (JVBI), Rajasthan, India, for an excellent description of soul in Jainism.

Link 1

<http://www.hindustantimes.com/health-and-fitness/how-pesticides-use-have-led-to-high-cases-of-cancer-in-punjab/story-Kkt6ocFttvZ5SlCzo260qL.html>

Appendix 1. An introduction to Jainism:

Jainism is one of the oldest religions in the world. Jains traditionally trace their history through a succession of twenty-four propagators of their faith known as *Tirthankara* with Ādinātha, being the first and Mahāvīra (6th century BCE), the last. For long periods of time Jainism was the state religion of Indian kingdoms and widely adopted in the Indian subcontinent.

The word Jainism is derived from a Sanskrit verb *Jina* which means *to conqueror*. It refers to a battle with the passions and bodily pleasures that the *Jaina* ascetics undertake. Those who win this battle are termed as *Jina*. The term *Jaina* is thus used to refer to laymen and ascetics of this tradition alike.

Jainism, prescribes a path of non-violence towards all living beings and emphasizes spiritual independence and equality between all forms of life. The essence of Jainism is concern for the welfare of every being in the universe. Practitioners believe that non-violence and self-control are the means by which they can obtain liberation.

Jains believe in the notion that truth and reality are perceived differently from diverse points of view. This doctrine is formally called *anekantavada*. According to it, human beings are limited in their perception and knowledge about the reality. They can thus have only partial and contextual information. Philosophical and theological disputes arise only because of the partial knowledge of human beings. The Jain doctrine stresses on the existence of soul. According to Jainism, every living being is a soul and have a separate existence from the body that houses it. This soul undergoes a cycle of reincarnations, till it becomes pure and attains Moksha. Jainism postulates the existence of fine particles of matter called *karma*. These karmic particles stick to the soul on account of the soul's interaction with the karmas and it is through this *karma* that the soul is reincarnated and experiences pleasure and pain.

Just like Vedas are scriptures of Hindus, Aagams are scriptures of Jains which are forty two in number.

(See Kachhara, Mardia and Rankin, Bhandari, Kumar Pal Desai and www.jainlibrary.org/english.php) for excellent digital source of books on Jainism.

-
1. Former Scientist, Indian Space Research organization, Ahmedabad.
 2. Honorary Senior Professor, Physical Research Laboratory, Ahmedabad.
 3. Ex-Principal, Motilal Nehru Regional Engineering College, Allahabad.
 4. Executive Director, BhagwanMahaveer International Research Center, Jain VishwaBharati Institute, Ladnun (Rajasthan).

* Email: sspokharna15@yahoo.com; nmbhandari@yahoo.com; nlkachhara@yahoo.com and pragya108@gmail.com