

# Theory of Matter in Jain philosophy

*Narendra Bhandari*

Jain Academy of Scholars  
804 Yash Aqua, Vijay Char Rasta, Ahmedabad, 380009, India  
<nnbhandari@yahoo.com>

## **Abstract:**

Jain philosophers, over two and a half millennia ago, formulated an elaborate theory of formation of material structures in the universe, starting with the smallest, dimensionless, indivisible, invisible, and massless paramānus. We show in this article that there are six types of primary paramānus. Taking clues from the Jain scriptures, we can infer that their combination lead to formation of 24 types of secondary, unobservable particles, mutually interacting and combining between themselves, ultimately resulting in the ordinary visible matter. Thus we have three generations of particles (termed *pudgal*), called 2T (paramānus), 4T (invisible aggregates) and 8T (visible luminous matter). Possible roles of these three types of matter in physical, chemical, biological, psychological and spiritual processes are reinterpreted based on Jain texts.

By combination, they form 23 distinct types of coarse functional aggregates (*varagana*) that result in all the unobservable matter in the universe and eventually form, by aggregation, the ordinary matter we can observe. The secondary 4T particles and their larger aggregates, because of peculiar properties of a few massless, chargeless, super conducting, superfluid (superfluid), and non-interacting particles, partake in biological and psychological processes (*mano vargana*, *bhasha vargana*), which are usually ignored in the currently accepted physical models of particles, Viz, the Standard Model of Particle Physics (SMPP). Several similarities between Jain model of particle physics (JMPP) and SMPP appear to exist.

Another breakthrough in Indian concepts of particle physics came from the work of Annie Beasant and colleagues (ABC), who, over a 100 years ago, postulated a mechanism for appearance of the 'ultimate particles' in physical plane, they call anu from an astral plane where 'Koilon' are formed. In order to get a complete picture, we make an attempt to synthesise JMPP and ABC mechanisms and connect and compare it with SMPP.

In this article, we are concerned with the scientific validity of some of the predictions of the above two models rather than the mechanisms by which these results were obtained. The analysis provides a new insight into both, the material and life processes, occurring in the universe.

## **Introduction**

Maharshi Kañāda (also known as Kashyap), founder of the Vaisheshika school of philosophy, was born around 2300 BCE, and is credited with the earliest concept of atomic theory of matter, much before John Dalton, in England, proposed his atomic theory in the 18<sup>th</sup> century. Kañāda proposed that all matter is made of an ultimate, indivisible particle, known as Kañā after him, which is also called anu or paramānus in different Indian philosophies. Jain philosophy

discusses paramānus and its properties in great detail and gives a theory describing formation of matter using various types of *Varganas*.

The paramānus are considered to be the primary, smallest, indivisible particles and are dimensionless, to quote the Jain Agams (Bhagvati sutra), "with no middle, no top, no bottom and no sides" out of which all the matter of the universe is formed. Paramānus do not occupy any space, nor do they obstruct other paramānus or other particles in sharing the same space. This is sometimes interpreted to imply that a paramānus is not a particle, *per se*, but just a 'bundle' of energy (Kachhara, 2014; Kachhara and Jain, 2017; Bhandari, 2015). Consequently infinite number of paramānus can exist in a single space unit, defined as *pradesha*, as it is termed in Jain philosophy, without occupying it or causing obstruction to other coexisting paramānus. This kind of description is given in Tattvartha sutra (Acharya Umaswati, Ca. 2nd century, acharya Akalanka), Bhagvati Sutra and Sarvartha Siddhi (Acharya Pujoyapad, 6<sup>th</sup> century) and other texts. Although paramānus are much finer (subtle) than all the known particles (e.g. photons, electrons or neutrinos, etc.) and are different in their characteristics, this behaviour of non-interference with other particles occupying the same space (termed as *apratighati*), is therefore likened to the behaviour of bosons. Photons, the particles of light, the force carriers of electromagnetic force, for example, follow Bose statistics, in contrast to fermions (e.g. electrons), which occupy space, and one cannot have two identical fermions in the same space at the same time, according to Pauli's Exclusion Principle.

**1. Paramānus as seeds of *Pudgals*:** According to the Jain philosophy, all matter in the universe is made of paramānus, arising from their combination and break up (Muni Mahendra Kumar, 2010). All material particles are termed as *Pudgal* (*pud*-which 'are produced' and '*gal*' which dissolves). Thus *pudgal* defines the basic transient nature of matter that it is all the time being produced and dissolves. In this sense, a paramānus, strictly following the law of conservation, because it can never be created or destroyed, but is transformed into aggregates by combining with other paramānus by phenomena akin to fusion, combination or aggregation, losing its individual, independent identity and regains its individual identity by phenomena akin to fission (break up, spallation or disaggregation). Therefore paramānus is not what we know as 'matter' but all the matter is made of paramānus. In other words, every paramānus is eternal, never gets destroyed, only becomes part of an aggregate and loses its identity as an independent paramānus and regains its identity when aggregates disintegrate. The whole loka (universe) is fully packed with paramānus i.e. there are infinite number of paramānus in the loka and each of its *pradesha* (unit space) is full of paramānus. The types of energy a paramānus possesses, is clearly defined in Jain texts. They have thermal and electrical energy, the two properties classified as 'Touch (*sparsh*)' properties, in Jain Science. i.e. they can be sensed by touch. Paramānus are ascribed several properties like optical (colour) property, taste and smell, similar to the sensory faculties living beings possess. We may note that this hypothesis may explain that the bodies of living beings develop various sensory organs because paramānus have these innate qualities, but this is not a topic of discussion in this article.

Furthermore, the Jain philosophy mentions five types of colours (*Varna*), 5 types of tastes (*Ras*) and 2 types of smells (*Gandha*) as primary properties of paramānus. The five colours (C) are black, blue, yellow, red, and white, the five types of tastes (Ta) are sweet, bitter, pungent, sour and astringent, the two types of odours or smells (S) are good smell and bad smell, making in all 50 major types and their infinite shades or grades in between.

What is important here is that Jain science mentions additional eight types of touch (T) senses (cold, hot, smooth, rough, light, heavy, soft and hard), that matter possesses, but as far as paramānus are concerned, they have all the above primary colours, smells, tastes but only two types of touch properties (thermal and electrical). The thermal and electrical properties are scientifically well understood, at least as they are applicable to the familiar luminous matter. Thermal energy enable particles to have many types of motions, such as spin, vibration, oscillation, wobble, irregular or regular linear motion, etc. and enable them to undergo processes such as excitation, collisions and penetration in other matter. The electric properties, on the other hand, enable them to attract or repel each other and play a role in forming aggregates (like atoms, compounds, molecules etc.) by electric bonds. Selection rules for aggregation and disaggregation of paramānus are clearly defined in Jain texts (Chaitanya Prajna, 2018), as will be described later in sections 8 and 9.

In order to enable us to compare the results of Jain model (JMPP) with Standard model (SMPP), we first summarise the main features of SMPP.

**2. Standard Model of Particle Physics:** An atomic nucleus consists of protons and neutrons which in turn are made of quarks, which are 6 in number. Besides, there are six leptons e.g. electrons, neutrinos etc. and six particles which serve as force carriers. These force carriers: photons for electromagnetic force;  $W^\pm$  and  $Z^0$  for weak nuclear force; and gluons for strong nuclear force are Bosonic in character. In weak interactions,  $W^\pm$  and  $Z^0$  bosons interact with each other, as well as with all quarks and leptons.

There are three generations of Quarks, leptons and Force carriers

**First generation :** Quarks: down and up quarks  
Leptons: electron ( $e$ ) and its neutrino ( $\nu_e$ )

**Second generation :** Quarks: strange and charm quarks  
Leptons: mu meson ( $\mu$ ) and its neutrino ( $\nu_\mu$ )

**Third generation :** Quarks: bottom and top quarks  
Leptons: Tau ( $\tau$ ) and its associated neutrino ( $\nu_\tau$ ).

These six quarks come in three colors<sup>1</sup> (red, blue and yellow) making them 18 in all. The 18 quarks<sup>2</sup> and the 6 leptons (together with their anti- particles) sum up to 48. Gluons act as carriers of strong nuclear force and there are eight of them. Adding to these, the carriers of electromagnetic force, i. e. photons,  $W^\pm$  bosons and  $Z^0$ , the total number becomes 60. To this may be added Higgs Boson, responsible for giving mass to various particles and graviton, the anticipated carrier of gravitational field, not yet discovered. These sixty two particles, and the accompanying 4 forces (strong nuclear, weak nuclear, electromagnetic and the gravitation) are the building blocks from which the whole material universe can be made.

The SMPP is based on three generation of particles: quarks, leptons and force carriers.

---

<sup>1</sup> These colors are literally not optical colors but actually used to distinguishes three types of quarks by arbitrarily assigning different colors to them.

<sup>2</sup> Up' does not really mean up in the literal sense nor 'bottom' means bottom but these are just names indicating that they are different from each other. Similarly gluons have flavor representing an attribute.

6 quarks [up, down, strange, charm, bottom, top] in 3 colours red, blue and green = 18

6 leptons (e,  $\nu_e$ ;  $\mu$ ,  $\nu_\mu$ ,  $\tau$ ,  $\nu_\tau$ ) =6

24x antiparticles=48

Gluons=8, photons,  $W^\pm, Z^0$ , =12=Total 60

+ Higgs boson, and graviton=62

By continuous disintegration of matter, SMPP has gradually come down to molecules, atoms and elementary particles like quarks but it is not yet known if quarks can be further broken down to sub quarks or other smaller particles. The characteristic properties of various particles up to quark and lepton level, which are real, have been studied well using scientific techniques and particle accelerators like Large Hadron Collider at CERN, Geneva. These particles are known to obey all the laws of physics, including the Special Theory of Relativity, which stipulates that matter cannot travel with speeds faster than light. But, besides these particles, there may exist virtual particles like tachyons, proposed by George Sudarshan, which move with velocity greater than that of light. We will return to this question again in section 3.

The Jain model, on the other hand, starts with the ultimate level of form-less paramānus and builds up several types of particles by their integration, but falls much short of forming subquarks or quarks. Thus a huge gap exists between JMPP and SMPPP. If we can form the 62 particles of SMPP, mentioned above, starting with paramānus, then we can bridge this gap and integrate JMPP with SMPP in a unified theory of particles which can explain not only physical but psychological phenomena, as well. It is therefore desirable to discuss the salient features of the Jain model here.

**3. Jain Model of Particle Physics:** We follow the Jain text Sarvartha Siddhi and list here a few relevant concepts of Jain model.

1. JMPP divides all elementary particles in coarse (*badar*) and subtle (*sukshma*) forms. The size of *sukshma* (subtle) and *badar* (gross) particles is much finer compared to macro and micro (super-atomic and sub-atomic) domains in physics, which follow classical and quantum mechanics respectively.
2. JMPP divides all matter (pudgal) in three categories 2T, 4T and 8T. The 8T matter is what is known as the visible, interacting, luminous matter in physics, made of baryons, leptons etc., out of which all material universe we see, i.e. Galaxies, stars, planets and our bodies are made of, but 2T and 4T matter does not interact with the luminous matter and hence is not amenable to experimental investigation. These forms of matter will be discussed in more detail shortly.
3. In Jain model, besides the rules of aggregation and disaggregation, there is the concept of *varaganas*, or aggregates which acquire special properties and consequently can give rise to, not only the material universe, but also all the mental and psychical faculties of living beings, like thought (*mano-varagana*), speech (*bhasha-varagana*), breath (*swachhosvas varagana*) etc.
4. The visible matter is assigned eight types of touch senses (cold, hot, smooth, rough, light, heavy, soft and hard),

We first discuss the notion of eight touch (8T) sense qualities. Eight properties make little sense, because in reality each pair of property (e.g. cold and hot) is actually only one property

(thermal), i.e. cold and hot represent the same quality at different levels on thermal energy scale. Cold (*Thanda*) for someone can be hot (*Garam*) for somebody else; it is a subjective choice; neither a calibration scale is given in the scriptures, nor the zero (normal) is defined above which a *pudgal* (paramānus) should be considered hot and below which it can be considered cold. The same is true for other pairs of properties. ‘Smooth (*snigdha*)’ and ‘Rough (*ruksha*)’ are manifestation of the same property having different degree of the same quality. Some scholars have taken this property to be the electric charge: *Snigdha* is taken as positive and *ruksha* as negative, because electricity (*vidyut*) was known at that time as, for example, mentioned in Sarvartha Siddhi. The same, according to traditional Jain scholars, holds for ‘light (*halka*)’ and ‘heavy (*bhari*)’ and ‘soft’ (*mridu*) and ‘hard (*kathor*)’.

We therefore rationalise these 8 properties mentioned in Jain canons in terms of the four well understood properties of matter: thermal, electrical, viscosity and mass and then we determine a scale for them in the following manner.

It is known from our current scientific understanding that matter behaves differently only in two temperature states: absolute zero Kelvin, and anything above 0 K. The behaviour of matter at 0 Kelvin abruptly acquires new properties of superconductivity, superfluidity, superconducting ness etc. resulting in new forms of matter like Bose Einstein condensates, whereas at all temperatures above 0 K, the behaviour remains qualitatively similar, though its behaviour (phase, mobility, etc.) may vary quantitatively. We take this behaviour to imply that cold, mentioned in scriptures means temperatures at absolute zero and hot means anything above zero Kelvin.

Similarly, smooth and rough are two names of the same property in which the behaviour of matter is fundamentally similar. We therefore presume smooth and rough implies smooth and rough passage through other matter. We know from our current understanding of charged and neutral particles through matter that a particle with no charge (neutral) has a relatively smooth passage through matter compared to a charged ion (positive or negative) which interacts and loses energy by ionisation while passing through any matter. A positive or negative ion will find it rough to pass through a certain material and will meet with resistance, compared to a neutral particle. Furthermore the behaviour of charged particles, that is rate of energy loss, is identical as far as its interaction with matter is concerned, irrespective of its charge. We thus take ‘smooth’ as neutral and ‘rough’ as positively or negatively charged. Thus in this category three types of particles: neutral, positively charged and negatively charged, should be considered.

We now turn to properties mentioned as light and heavy. It again makes no sense because these two represent the same property of mass. Therefore like many other scholars we also take light to represent mass-less and heavy to represent particles with mass which we call masscon (using ‘con’, which means ‘with’ in Italian). Thus there are two types of particles, without mass (massless) and with mass (masscon).

The fourth property is mentioned as soft and hard. This seems to refer to the property of viscosity; soft means free of viscosity or friction, and hard being viscous. Following arguments similar to those mentioned above, soft can be taken as superfluidity and hard as viscous respectively. In this way all these eight touch properties defined in Jain canons can be grouped into four properties: thermal, electrical, mass and viscosity. Thus we can infer that the 8 properties of touch are actually as follows:

1. Thermal property: matter at 0 degree Kelvin and matter at any other temperature above 0K..
2. Electrical property: neutral, positively and negatively charged.
3. Mass: mass-less and masscon properties.
4. Viscous properties that is, superfluid (superfluid) and viscous fluid.

Thus the 8 touch properties are reduced to four properties with 9 classes of particles:

1. Two thermal classes (0 K, >0 K]. We can call paramānus at 0 K, devoid of any kinetic motion i.e. superconducting or superconducting and >0 K, where they acquire some kind of kinetic motion.
2. Three electrical classes (neutral, +, - charged],
3. Two classes having property related to Mass (massless, Masscon) and
4. Two viscosity classes (superfluid, viscous).

Taking this view, we find that there can be a minimum of  $5C \times 5Ta \times 2S \times 9T = 450$  types of Paramānus. With various sub grades and shades of these properties, actually paramānus of infinite types may exist within these 450 categories. Touch (electric, thermal, mass, and viscosity) are basic properties of matter which determine its physical behaviour, under the influence of the forces of nature (gravitation, electromagnetism, motion, interaction etc.) whereas optical, smell and taste properties are only identifying properties to distinguish between them and do not influence their behaviour in physical processes.

We therefore further classify paramānus in 6 groups which determine their behaviour, since Paramānus can have only 2 properties, that is, thermal and electrical. We thus have in all six major or basic types of Paramānus, three being super conducting and superfluid (at 0 K) and the other three at higher temperatures (>0 K), being, resistive and mobile due to thermal energy.

we call these Type A matter (*pudgal*).

### **3(i) properties of particles of type A (2T) matter.**

1. Superconducting, superfluid, superconducting and neutral;
2. Superconducting, superfluid, superconducting and positive;
3. Superconducting, superfluid, superconducting and negative;
4. Mobile and neutral;
5. mobile and positive;
6. mobile and negative.

These six types of paramānus can perform specific functions, because of their special properties and take part in certain physical and psychological processes. According to scriptures, these six types (1 to 6) of 2T paramānus, which are having only thermal and electrical properties, can mutually combine to form bigger aggregates and in the process acquire the additional properties of mass and viscosity, becoming 4-Touch particles of various types. These four touch particles possess one each of the permissible properties out of thermal, electrical, mass and viscosity, giving rise to the following 24 subtypes. We call them type B matter.

### **3(ii). Properties of particles of type B (4T)matter :**

In this group there are 12 massless types (#7 to 18) and 12 having mass (masscon) type (#19 to 30).

7. Superconducting, neutral, superfluid, massless:
8. Superconducting, positive, superfluid, massless,
9. Superconducting, negative, superfluid, massless
10. Mobile, neutral, superfluid, massless
11. Mobile, negative, superfluid, massless,
12. Mobile, positive, superfluid, massless
13. Mobile, neutral, viscous, massless
14. Mobile, negative, viscous, massless
15. Mobile, positive, viscous, massless
16. Superconducting, neutral, viscous, massless
17. Superconducting, negative, viscous, massless,
18. Superconducting, positive, viscous, massless
19. Superconducting, neutral, superfluid, masscon
20. Superconducting, positive, superfluid, masscon
21. Superconducting, negative, superfluid, masscon
22. Mobile, neutral, superfluid, masscon
23. Mobile, negative, superfluid, masscon,
24. Mobile, positive, superfluid, masscon
25. Mobile, neutral, viscous, masscon
26. Mobile, negative, viscous, masscon
27. Mobile, positive, viscous, masscon
28. Superconducting, neutral, viscous, masscon
29. Superconducting, negative, viscous, masscon
30. Superconducting, positive, viscous, masscon

We have to bear in mind that salvation (*Moksha*) and Karmavad (Causality) are two fundamental doctrines of Jain philosophy in the spiritual, psychological and physical domains and all the theories of cosmology, matter, motion etc were developed to understand the mechanisms of these processes. If we want to understand the processes in terms of physical models, we are familiar with, these 8 massless, charged (+/-) particles can possibly function like *karmanus* responsible for 4 *Ghati* karmas, (positive *karmanus* for *bandh* and – *karmanus* for *nirjara*), get bound to the soul by a force (A-K<sup>3</sup> or Atma-Karma force) and get neutralised or detached when they combine with negative *karmanus*. The four neutral (#19, 22, 25 and 28)<sup>4</sup>, massless particles can possibly be responsible for 4 Aghati karmas, which are responsible for life span (Ayush karma), personality (naam karma), social status (Gotra karma), and physical tolerance (*vedaniya* karma).

**3 (iii) Type C matter:** Under suitable conditions and following the rules discussed later in section 8, these 4T particles can interact with each other and combine to form the 8T matter, we call luminous, common familiar matter, acquiring physical properties, such as mass and viscosity. Thus the eight touch (8T) matter can go to any temperature including absolute zero Kelvin, and thus can possess many kinds of thermal motions

---

<sup>3</sup> Karmavad is an essential doctrine of Jain philosophy. We have to invoke a force which is both attractive and repulsive required to associate or bind (*bandh*) or dissociate (*nirjara*) *karmanus* with the soul.

<sup>4</sup> Some of the 4T matter which acquire mass (masscon) and develop gravitational properties possibly can be the non, or weakly -interacting, dark matter (WIMPS e.g.) and can explain the existence of galactic halo, and the massless 4T matter disperses throughout the universe.

or be superconducting, can be superconducting or have resistance, can have mass or be massless, can have viscosity or be a superfluid, can be + or - ly

---

charged or be neutral, and can convert from one form to another by mutual interaction. For example a neutral atom can be ionised and become positive or negatively charged. A massless particle can acquire mass, by interaction with Higgs field or vice versa.

Thus we have the primary A class- 6 types ( #1 to 6) of two touch (2T) paramānus, and secondary B class (24 types (#7 to 30) of 4T psychological matter, which can further combine to form 8T, tertiary, C Class matter which can have all these 8 properties and is responsible for the visible universe.

Now let us consider, for example, class B, particle #7. It is unique in the sense that it is massless, chargeless, superfluid, and resistance less and does not interact with ordinary matter. It can go anywhere in any medium, without any hinderance. Such particles can play important roles in many psychological processes as will be discussed in section 5.

**4. Interactive properties: Intra- and inter-class interactions and formation of new aggregates :** To summarise the above discussion, we thus have, in all, 3 classes of matter with 30 A and B types of subtle, non-interactive particles in the universe, in addition to the familiar C class matter which are amenable to scientific investigations. The difference between these three classes, besides their innate properties, is their mutual interactions and interconversion from one type to another by aggregation and disintegration. Each of them (# 1 to 30) interact only with particle o-f their own class (intra-class interactions) and make *skandhas* but they do not interact with pudgals of other classes (no inter-class interactions). By mutual, intra-class interactions, they sequentially produce particles of the higher class (A to B and B to C). and the higher class *pudgals* disintegrate and produce a *pudgal* of lower class (C to B and B to A). Thus the invisible, 2 touch paramānus will interact with other 2 touch pudgals to form skandhas and 4 touch aggregates will interact with 4 touch matter and form the visible 8 touch matter which will interact with other 8 touch matter to combine and make larger aggregates and structures we see in the visible universe.

Thus in the processes of aggregation (or fusion) and disaggregation (or fission or spallation) matter of other categories is produced. Thus, for example, 2 touch material can give rise to 4 touch material by aggregation and, by further combination to 8 touch material (and vice versa by disintegration), and in the process, they acquire or lose properties of mass, viscosity, friction etc. and give rise to a large variety of matter with diverse properties. In such processes, bosons (Type A matter, such as paramānus) can be converted into Fermions (type C matter) by aggregation.

**5. Types of matter :** It is clear from the above discussion that JMPP postulates three types of matter: 2T, 4T and 8T. The 2T and 4T matter is non-interactive and have special properties as described above, which can play a role in psychological and spiritual processes and 8T matter is akin to the luminous matter which is the subject matter of Standard model, now in vogue. Because of its bosonic nature, 2T matter may be a force carrier. We will try, in section 6, to relate it to Fohat, the life force postulated by Annie Besant and colleagues (1919) in their concepts of 'Occult chemistry'. The non-interactive properties of 2T matter make it a possible candidate for Dark Energy, especially in view of the fact that there may exist a repulsive force between individual paramānus (see section 8). Likewise, because of its non-interactive properties, 4T matter is a possible candidate for Dark matter, as will be discussed in section 9. Some of the 4T particles, because of their special properties, i.e. they are massless, superfluid,



non-viscous, superconducting, and electrically neutral, can partake in psychological phenomena and give rise to many types of subtle bodies of living beings, postulated in Jain philosophy. The SMPP is confined to only physical processes but JMPP has much larger scope in the sense that it includes psychological and spiritual phenomena of living beings. Some typical examples of such phenomena are given in Table 1. Thus some 4T matter can act as Karmanus, or carriers of karmas, and get associated with or dissociated from ātmā, one of the basic spiritual concept related to rebirth in Jain philosophy.

**Table 1: Examples of some Phenomena in which 2T and 4T matter can play a role**

- Aura, Biophoton, Leshya
- Karman sharir of various types, karmanus
- Karma Bandh: (Ghati and Aghati)
- Kashay (emotions)
- Mind, memory, subconscious and superconscious mind
- Gyan: Mati (innate knowledge), Avadhi (Clairvoyance), Manaha paryav (Telepathy)
- Tejas sharir (Astral body), communication between astral and physical body)
- Vaikrayik sharir (transformation body)
- Aharak sharir (conscious body)
- Labdhis (Supernatural powers)
- Tachyons (Particles moving with super luminous speed, proposed by George Sudarshan)
- Dark Matter
- Dark Energy
- æther

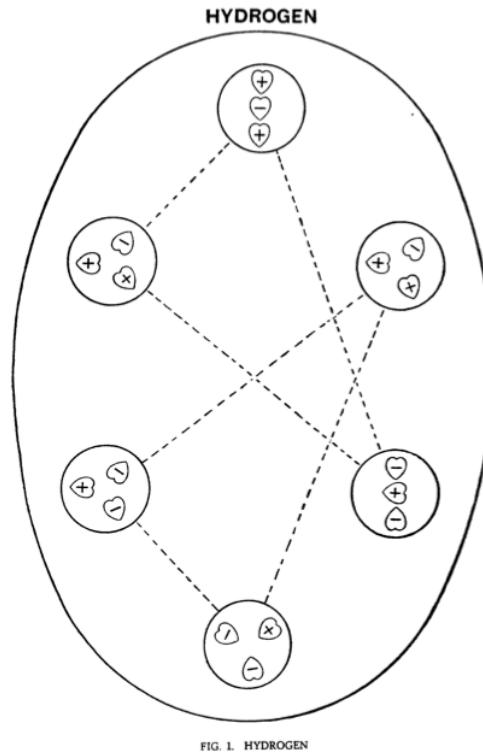
**6. Appearance of Paramānus (or Anu-s) in the physical world: clues from the Occult chemistry :** Jain philosophy starts with ‘paramānus’ as the basic building blocks of matter of which the whole physical universe is made of, but ABC go a step before, and propose that the ultimate particles, they call ‘Anu-s’<sup>5</sup> arise from Koilon.

Annie Besant and colleagues (ABC,1919) have proposed that there is a hidden, invisible, more fundamental plane of existence which governs all the physical processes in the universe. Without going into their methodology<sup>6</sup>, we would like to point out that many of their predictions (ABC, 1895-1935), such as the existence of isotopes of various elements, existence of Kr-81 (a radioactive isotope of krypton), quark and possibly sub-quark structure of protons, not known in 1907 when the book on Occult chemistry was first written, were confirmed, as scientific studies progressed and experiments were conducted, during the following decades (Pokharna et al., 2018, 2019, 2020 a,b; Phillips, 1995). These are strong proofs of the correctness of their observations and methodology and prompts us to describe their model, so that it’s validity can be scientifically examined.

---

<sup>5</sup> It may be noted that paramānus of JMPP and Anu-s of ABC are the same particles, given different names by their proposers. Koilons are different from Anu-s, a kind of virtual particles.

<sup>6</sup> The technique used by ABC is Anima siddhi, in which the conscious (Aharak) body of the observer, takes an extremely small (sub atomic) form and can visualise the structure and dynamics of objects at subatomic level.

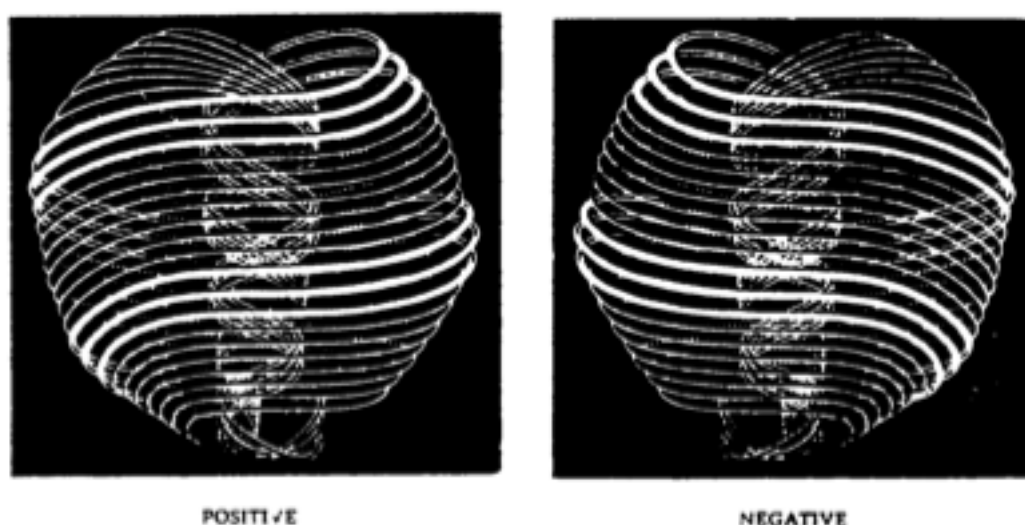


**Figure 1: The structure of hydrogen atom (proton) consisting of 6 quarks, in 2 pairs of 3 interconnected quarks. The positive and negative symbols are to distinguish two types of particles, rotating clock wise and anti-clockwise respectively, discussed in Figure 2, and do not represent electric charge.**

**7. The Particle model of Besant et al. (1919):** The ABC model postulates two planes of existence: One plane of existence, with which we are familiar is our physical, material, visible world and the other, not yet scientifically investigated, is the Astral, invisible world, which continuously provides the motive force for all events in the physical plane. Since several predictions of ABC have turned out to be correct, as mentioned above, there may be a grain of truth in this model, which can be established by a scientific study. According to ABC, both the planes, the material and the astral planes of existence, are in continuous interaction with each other, primarily through a 'life force' called 'Fohat', which pours Anu-s from astral plane, the 4th dimensional space, into our physical plane and then sucks them back out. Thus Fohat not only pours anu-s into the physical world but in a complementary process, pushes them back into the astral plane, vanishing from the physical world. The Anu-s which the force brings in, to distinguish them, are identified as male (marked as +) and those through which anu-s disappear, are termed female (marked as -). All Anu-s so far observed are of one or the other of these two types as shown in Figure 1, in which the structure of hydrogen atom with 6 particles, each consisting of 3 possible anu-s (Phillips, 1995), as 'seen' by ABC are sketched.

All things physical are made of anu, even though it is inconceivably tenuous and not like matter, at all. Its shape is a slightly flattened sphere with a small depression at the point where a force seems to flow in. This force has a field which surrounds each Anu. By means of this force, the astral plane governs all the processes in the physical universe. The flow is persistent; if it were to stop, even for an instant, the physical world will disappear. The Fohat is the physical basis of this universe.

ABC call Fohat as a life force, a force which produces all the forces of the physical plane by differentiation. We know now that there are at least four forces which govern all the processes in the physical world: The strong nuclear, the weak nuclear, the electromagnetic and the gravitation. These four forces originate due to differentiation of this Life force, Fohat. When Fohat digs a hole in the fabric of space, the apparent void must be filled with substance of some kind and Anu appears to fill this void. The force of flow coming out of this hole creates whorls of various types and at various scales which give rise to the known physical properties of matter like electric charge, sound, light, heat etc. For example it gives rise to the 7 colours of the spectrum (VIBGYOR), give out the 7 sounds of natural scale; respond in a variety of ways to physical vibrations, moving, flashing, and pulsating.



**Figure 2: Schematic diagram of Male (positive) and Female (negative), spinning and gyrating Anu-s, with various types of spirallie are shown here (taken from Occult Chemistry of Annie Besant et al., 1919).**

Every anu moves incessantly; its motion can be resolved in three components: spin around its axis, motion of its axis along a small circle and it has a regular pulsation: a contraction and expansion. When a force is brought to act upon it, it dances up and down, flings itself wildly from side to side, and undergoes rapid gyrations and vibrates as a whole. When its frequency resonates with any colour, it starts glowing in that colour. An electric current brought to bear upon a group of anu-s checks their motion and slows them down, and they get aligned and join each other in parallel lines, so as to form a kind of structure.

Let us now discuss how the anu-s are created and what they actually are, according to ABC. All the space, we take as empty, is actually filled with a substance called æther which is absolutely superfluid (superfluid) and massless. We can say that the space is densely packed with massless and superfluid particles. The ultimate atoms of matter (anu-s) are thought to float on this æther and their vibrations produce light, heat and electricity, i.e. anus have thermal and electric properties and are coloured. In other words vibrations of dimensionless, massless, superfluid anu-s produce light, heat and electricity. This is the *mulaprakriti* or innate quality of anu. An anu, or a group of anu-s have a boundary, spherical in shape, but the boundary does not have a wall like structure. The properties of two entities, Anu and æther, need to be understood clearly. We described some features of Anu-s above, so let us take up the question of æther now.

All space is filled with æther in all the three dimensions. The æther is a substance which is absolutely superfluid, i.e. a superfluid, massless and It is invisible, being infinitely tenuous, thinner than the thinnest gas, and, at the same time, packed so thickly that it is denser than the densest substance. The anu (or paramānus of Jain physics) float on this æther, which continuously vibrates producing light, heat and electricity. It is known that kinetic energy can be converted into thermal energy, or can give rise to optical phenomena but electrical charge can be produced from appropriate vibrations, is not understood scientifically. Koilons are a kind of bubbles in this æther. Anu is not Koilon but the absence of Koilon. We can understand it just as we understand electron-hole pair; removal or absence of electron in a substrate creates a hole, which also acts like a particle, opposite of electron. Thus æther which is supposed to be empty space is made of massless, superfluid, tenuous yet densely packed material, Koilons. And anu of which matter is made of, is actually the absence of Koilon; Koilon appears to be filling all space homogeneously, dancing with a variety of motions, such as vibrations, spin, revolutions, gyrations etc. The whole point is that what we call matters is not Koilon but the absence of Koilon. So we must modify our ideas of matter and space. Emptiness (æther) is solid, although we cannot observe it and solid (Koilon) is empty or void in this solid emptiness.

Describing the properties of Koilons, ABC writes that Koilons do not resemble bubbles floating in the air which consists of a thin film of water separating the air within them from the air outside so that the film has both an outer and inner surface. Their analogy is rather like bubbles that we see in water which have only one surface, that of the water, which is pushed back by the contained air. The bubbles are not water but are spots from which water is absent so these units are not Koilon but the absence of Koilon, the only spots where it is not specks of nothingness floating in it. Then ABC introduces the concept of 'Logos'. Logos breathes (*prān*) into space and fills it with these bubbles. It is absolute void; the tremendous force that can blow bubbles (*prān*) in a material of infinite density is the creative power of the Logos. Infinitesimal bubbles are the holes which Logos digs into space. the Logos himself fills them and holds them in existence against the pressure of this force. These are the blocks of the universe and everything we call matter are these holes. Worlds are gradually built up but always out of this selfsame material which to us seems nothingness, *shunya*, or absolute vacuum. The coil in which all these bubbles are formed represent a part of the luminiferous æther. Whether it is actually the bearer of the vibration of light and heat through interplanetary or interstellar space is yet undetermined. This æther has some quality which enables it to transmit at a certain definite velocity, what is commonly called the speed of light.

The existence of æther was disproved by the experiment of Michelson and Morley, performed around 1885, in their famous interference experiment involving motion of earth in this stream of æther around the Sun. However, if the æther is (i) made of non-luminous matter or has strange, non-material properties mentioned by ABC or (ii) is made of non-interacting matter, such as 2T or 4T matter, described in section 3 above, or (iii) is static, it would not have been detected by the Michelson-Morley experiment. Thus the Michelson-Morley experiment must be re-evaluated in view of the theory of ABC or Jain model of Particle physics.

**8. Rules of combination of paramānus and their consequences :** The rules of combinations and dissociation of paramnus are described in Jain Agamas. Many texts such as Bhagavati sutra, Prajnapana sutra, Uttaradhyayan sutra, Tattvartgha sutra and Sarvartha siddhi discuss these rules, but serious differences between them have crept in over the ages, as some of these texts were lost and rewritten later by memory. Bhagvati sutra, Prajnapana and Uttaradhyayan have given identical rules and hence we believe that they may be describing the correct laws

of combination. We therefore confine to them and summarise these rules in Table 2 (see Samani Chaitanya Prajna (2017), for a summary). These rules allow us to understand some properties of 2T and 4T matter.

Sr. No.	Degree of two Paramānus	Similar quality or charge(S&R)	Dissimilar quality or charge(S&R)
1.	1+1	No	No
2.	1+2	No	No
3.	1+3	Yes	No
4.	1+4	Yes	No
5.	2+2	Yes	Yes
6.	2+3	Yes	Yes
7.	2+4	Yes	Yes
8.	2+5 to infinite	Yes	Yes

These rules of combination of paramānus show that

[1] a paramānus cannot combine with another paramānus, or an aggregate of two paramānus, whether they have similar or opposite electric charges (Row 1, 2, Table 2) . We can imagine that since these paramānus are massless, dimensionless and are devoid of any nucleus, the gravitational and nuclear forces do not operate on them. It is clear then, that not only paramnus with similar charges and neutrals do not combine with each other but even paramānus with opposite charges do not combine, in spite of electromagnetic force of attraction. We can understand this only if a repulsive force, greater than the electromagnetic attraction exists between two paramānus. Since all the space is initially packed with paramānus, as, for example, in the Hot Big Bang Theory of Universe, the force of repulsion will be huge and may result in Inflation ( see for eaxmple Rangarajan, 2017). As the paramanus combine to form 2T matter, which in turn combines to produce 4T and then 8T matter, a kind of equilibrium will be quickly established between the density of 2T, 4T and 8T matter. This repulsive force between paramānus may be responsible for the early inflation, as stated above, and later gradual expansion of the universe, as postulated in the Big Bang theory. We thus propose that the repulsive force between paramānus gives a viable mechanism of early inflation, followed by slow expansion of the universe, a role played by Dark Energy in the Big Bang theory. Whether the Dark energy is the repulsive force between the paramānus, is a matter of further investigation.

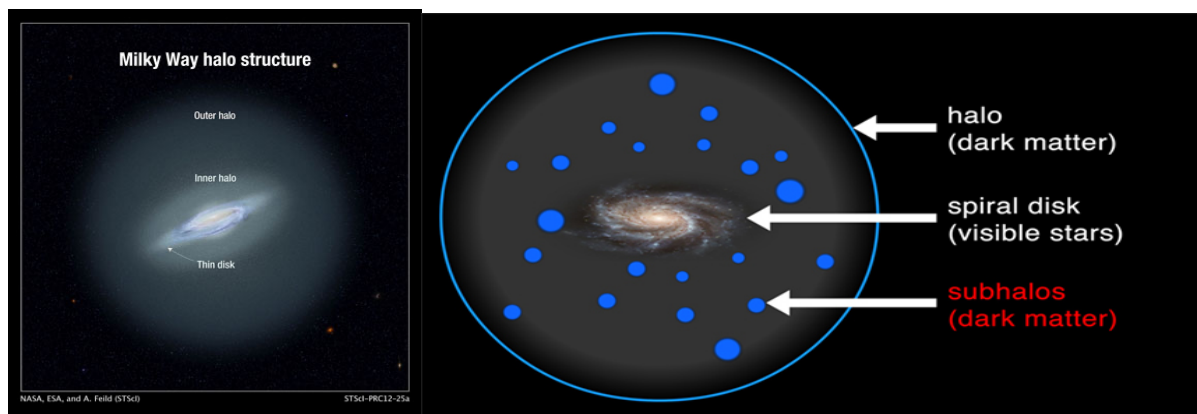
[2] Paramānus or their aggregates can combine with another aggregate with 3, 4....., paramānus, if they have similar charges, but not if they have dissimilar charge (row 3, 4, Table 1).

[3] An aggregate having 2 paramānus can combine with another aggregate with >2 paramānus (row 5, 6, 7, 8..) whether they have odd or even or similar or dissimilar charges.

In JMPP, the 4T matter does not interact with the familiar luminous (8T) matter. As discussed in section 3 (ii), 4T matter is at least of two types : massless and mascon. The Masscon matter appears to be akin to Dark matter, which is responsible for stability of the galaxy and forms the halo of the galaxies, as shown in Fig 3. On the left is shown the halo structure of our Milky Way galaxy together with sub-halos on the right.

Interesting as these analogies of JMPP with SMPP are, we would like to emphasise that these propositions of 2T being Dark Energy and 4T being Dark matter are merely proposals which need to be worked out in detail to establish.

We now turn to some other consequences of aggregation of 4T and 8T matter. In JMPP, the useful aggregates are called varganas.



**Figure 3. Left: Structure of the galactic halo around our Milky way galaxy: The galaxy is immersed in a spherical halo which is thought to be made of weakly or non-interacting Dark Matter, which according to the arguments given in this paper is made of 4 Touch matter. It has an inner halo and an outer halo. (Source Google/NASA). Right Halos and sub-halos after Fielder, et. al, 2014.**

**9. Varganas :** In the Jain model of particle physics, the whole space is tightly packed with the paramānus (type A matter, or what ABC call Anu) mentioned above. Paramānus combine with each other and form varganas of various types. Vargana is essentially a cluster of paramānus, which, upon combination, develop certain additional properties. In practice, there would be infinite types of varganas as different types and numbers of paramānus combine. According to Bhagwati sutra (Bhagwai, Acharya Tulsi and Acharya Mahapragna), eight types of varganas are important to understand all physical and biological processes. Gommattasar (Acharya Nemichandra Siddhant Chakravarti) gives 23 types of varganas responsible for all physical, physiological and psychical processes going on in the universe. We discuss only 13 of them which are relevant for the present discussion; the role of the other 10 are not clearly specified in the scriptures<sup>7</sup>. Limited number (2 or more) of paramānus combine and form Aṇu vargana, Sankhyataṇu (numerable) vargana, Asankhyataṇu (innumerable) vargana, Anantaṇu (infinite) varganas. They further combine and form various bodies of living beings, including their gross physical (*Audarak*) body, tejas body, and Karman body as also the transitory ‘conscious body’ and protean ‘vaikraiyyik body’. According to Jain system of living beings, the gross physical body of a living being is supported by Tejas body (astral body) which in turn is

<sup>7</sup> These Anu-s are aggregates of Paramānus, not to be compared with ( primary or subtle ) Anu-s of Besant et al,(1919) which are actually Paramānus. The use of the same terms for different particles must be resolved to avoid confusion.

controlled by the Karman body (causal body), the root body attached to the soul, responsible for birth/ rebirth of a living being. On further aggregation, the aggregates acquire the quality of speech (*Bhasha Vargana*), mind (psychic body, *manovargana*) and breathin (*swachossvas varagana, prān*) . These aggregates are thus responsible for biological and mental functions. These are all formed by the 4-touch matter (type B matter) discussed above. Thence begins the physical bodies of plants, formed from 8 touch (type C matter). The first one to form is *Pratyek sharir vargana*, used for forming immobile life forms (e.g. plants), Badar (gross) nigodh vargana, *Sukshma nigodh vargana* and *Mahaskandha vargana*, responsible for large physical structures.

The sequential aggregation of these varagnas are shown below:

1. Aṇu vargana
2. Sankhyataṇu (numerable) vargana
3. Asankhyataṇu (innumerable) vargana
4. Anantaṇu (infinite) vargana
5. Ahara vargana (for audarik (gross body), vaikriyic (protean body) and aharaca (migratory or conscious ) bodies
- 6 Tejas vargana (for acquiring Tejas i.e. energy body)
7. swachhosavas vargana (for bioenergy of the body which controls respiration and other vital functions (pran), like heart beat)
8. Bhasha vargana (for faculty of speech)
9. Mano vargana (psychological functions, such as thought, memory )
10. Karmana vargana ( affects the purity of soul, responsible for rebirth),
- 11 Pratyek sharir vargana, used for making immobile life forms ( e.g. plants)
12. Badar nigodh vargana (gross primary life forms)
13. Sukshma nigodh vargana: Audarik, tejas & karman bodies of sukshma nigodh jiva (subtle primary life forms)
14. Mahaskandha vargana: all large structures of matter is made of this vargana.

Paramānus combine mutually by laws enunciated in table 1, and form anu vargana (1) but remain non-functional till the aggregates acquire large enough size and acquire gross properties. This happens when the number of paramānus is really large, countable, innumerable and infinite (2,3 and 4 *varganas* respectively). Then they become useful in forming various bodies (5,6,10) and physiological functions like breathing, speech and mind (7,8, and 9th varagna ). With the 11th vargana, the plant nuclei can be formed and 12 and 13 *varganas* gives rise to nigodh jiva, badar and sukshma.

The JMPP does not mention the mechanism of formation of all these aggregates, but taking clues from modern physics (SMPP), they must be facilitated by the four known forces of nature, the strong nuclear, the weak nuclear, the electromagnetic and the gravitational forces. As mentioned above the electric and thermal properties exist in paramānus (Type A matter), and additionally viscous and gravitational (mass) properties exist in type B matter and all these properties coexist in the familiar luminous matter.

One more force must be postulated to facilitate the interaction mechanism of type B matter and soul, i.e. *karman sharir*: We call this A-K (atma-Karma) force, which is innate in the soul (Atma), and is responsible for attracting and shedding the 4 touch Karman varganas (made of the type B matter). It is of both types, attractive and repulsive. Thus we end up with 6 forces in nature, a subject of further investigation: The Fohat, a life force, responsible for exchange of matter between astral plane and physical plane, as discussed above in sections 5 and 7. In case

of atma, this force of existence is called jivatva shakti, but it exists in all the six dravyas of the universe, by which they always exist, can never be destroyed and it gives rise to what is known as the law of conservation in physics. The second, we call A-K force, responsible for birth and death of living beings, by which Karmanus are attracted or repelled by the Atma (soul), and the four well established forces in modern physics (strong nuclear, weak nuclear, electromagnetic and gravity).

All these varganas<sup>1</sup> are subtle and exist all over loka although any type of vargana can change into another type. The *karman*, *bhasha* and *mano varganas* are made of four touch amatter only (cold, hot, positive and negative), and exist in subtle form. The swasochhavas varganas exist both as four-touch (subtle) and eight touch (gross) varganas (Kachhara, 2014). The audarik, vaikriya, aharaka and tejas varganas are supposed to exist as gross aggregates having attributes of eight- touch (including light, heavy, soft and hard touch matter).

## Summary

The Jain philosophy has given much thought to the content and processes in the Loka (universe) and has developed an elaborate theory of material and life processes. Their theory of matter, starts with the basic primary particles called paramānus which, by aggregation, form a series of aggregate particles required for all the physical, psychic and spiritual processes in the universe. Three types of matter are generated in this process which are called 2T, 4T and 8T matters. All the matter is further divided into two groups subtle (*sukshma*) and gross (*badar*). The rules of aggregation of various types of particles are described and some of their relevant properties are summarised in this article.

Comparison of the Jain theory (JMPP) with the modern Standard Model of Particle Physics (SMPP) gives some insight into various aspects of matter, although the latter is limited to only physical processes. JMPP and SMPP, seem to be complementary to each other in the sense that JMPP builds the universe starting from smallest particles and SMPP breaks large structures to go down to the minutest, quark or sub-quark level. Several similarities between the two are summarised in this article. It is shown that properties of 2T matter are akin to Dark Energy, that of 4T matter to Dark Matter and 8T matter to the luminous, visible matter in the universe. It is pointed out that some concepts of JMPP are worth scientific investigation for a better understanding of our universe. The scope of Jain model of Particle Physics is much wider than that of Standard model, because it explains not only physical processes but also psychological and spiritual processes. Some of these concepts are worth further investigation by scientific techniques.

**Acknowledgements:** I dedicate this article to Munishri Mahendra Kumarji on his 86<sup>th</sup> birthday, for his continuing inspiration and guidance. I thank Dr S. S. Pokharna for many insightful suggestions, specially related to the model of Annie Besant and colleagues and to Drs. S. Mohanty and N. L. Kachhara for useful comments.

## References

Āchārya Tulsi and Āchārya Mahāprajna (Editor), “Bhagwai”, 5.154.1;25.350., Jain Vishva Bharati Institute, Ladnun.

Ācārya Pūjyapāda “Sarvārthasiddhi”, Bhartiya Jnanapith, 5.14, 5.16.



Ācārya Umāswāti, “Tattvārtha Sūtra”, Hindu Vishva Vidyalaya, 5.33., 5.34-37.

Ācārya Akalaṅka, Tattvārtha Rājavārtika, Bhartiya Jnanapith, 5.37.2.499-500.

Āchārya Nemichandra Siddhānt Chakravarti, “Gommatsāra Jīvakānda”, Bhartiya Jnanapith, 594-595.

Besant, A. & Leadbeater, C.W. (1919), “Occult Chemistry (3<sup>rd</sup> edition), Chapter 1, Adyar, India, Theosophical Publishing House.

Bhandari, N. Jainism: The Eternal and Universal Path to Enlightenment (A scientific Synthesis) pp 184, Prakrit Bharti Institute, Jaipur.

Fielder, C.E. Yao-Yuan Mao, Andrew R. Zentner, Jeffrey A. Newman, Hao-Yi Wu, Risa Wechsler (2014) Illuminating Dark Matter Halo Density Profiles Without Subhaloes, doi.org/q 10.1093/mnras/stz

Kachhāra, N.L., “Jain Metaphysics and Science: A Comparison”, Prakrit Bharati Academy, p. 109-158.

Kachhāra, N.L. (2014), “Scientific Explorations of Jain Doctrines”, Part 1, Motilal Banarsidass, Delhi.

Kachhara N.L. and Jain Raj mal (2017) Concepts of matter in Jain Philosophy and Modern Science, In Scientific Perspectives of Jainism, Samani Chaitanya Prajna, Narendra Bhandari and N.L.Kachhara,(Eds), Jain Vishva Bharti Institute, Ladnun. 415-436.

Mahendra Kumar, Muni, “The Enigma of the Universe”, Jain Vishva Bharati University, 2010, pp 381-387

Philips, Stephen M., “Extrasensory Perception of Subatomic particles 1. Historical Evidence”, Journal of Scientific Exploration, Vol. 9, No. 4, 1995

Pokharna S.S., Bhandari Narendra, Samani Chaitanya Prajna (2018) Jainism and the Theory of Everything (TOE), ISJS Transactions. A Quarterly Refereed Online Research Journal on Jainism, VOL.2, NO.2, April-June, 2018, pp. 1-11.

Pokharna, S.S., Narendra Bhandari, Manohar Lal Kalra, Rajmal Jain, Samani Chaitanya Prajna and Jagat Singh Pokharna (2019) Quantitative Evidence of quarks, sub-quarks, dark matter and dark energy seen by Besant and coworkers through clairvoyance supported by TDVP model, paper presented at the 33<sup>rd</sup> Gujarat Science Congress held at L J Institute of Applied Sciences from February 2-3, 2019, Program and Abstracts, B-48, pp. 72.

Pokharna, S. S. , Narendra Bhandari, M.L. Kalra, Rajmal Jain, Samani Chaitanya Prajna and J. S. Pokharna, (2020 a) Clairvoyant ‘seeing’ of Quarks and their structures in agreement with 9-Dimensional TDVP scientific model, Paper presented at the Annual Meeting of the Gujarat Science Academy, Feb, 2020.

Pokharna,S.S. , Narendra Bhandari, Manohar Lal Kalra, Rajmal Jain and Samani Chaitanya Prajna (2020 b) Quark structure seen through Clairvoyance confirmed by nine dimensional space, time and consciousness model, presented as a poster paper in 107<sup>th</sup>

Indian Science Congress organized at Bangalore. Abstract is available in Physical Sciences section.

Rangarajan, R. (2017) Cosmology, The story of our Universe, In Scientific Perspectives of Jainism, Samani Chaitanya Prajna, Narendra Bhandari and N.L.Kachhara,(Eds), Jain Vishva Bharti Institute, Ladnun. 447-460.

Samani Chaitanya Prajna (2017) Scientific Visions of Lord Mahavira , kindle edition, Jain vishva Bharati Institute, Ladnun. 278 pages.