**Concept of Matter in Jainism**

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**Matter in the Universe**

What we see and feel is not all that exists in the universe. Much more exists in the universe which is invisible and unobservable. Scientific studies have indicated three components: visible matter (~4%), Dark (weakly interacting matter : 21% ) and what is termed as Dark Energy. But this is not all. The finite Universe, or Loka, is surrounded by infinite space, or Aloka, according to Jain philosophy. Otherwise what is this universe expanding into? All space or every space point within the Loka is tightly packed with paramanus. Paramanus are unobservable and massless, dimensionless bosonic particles, so we do not see or feel them but the space is densely packed with them. They are unobservable because they have properties different from the observable matter, though the observable matter is ultimately made of them, by their aggregates. Paramanus are dynamic, have varied and complex types of motions and are charged, + or -, depending on their direction of spin. They have no mass, no shape, no dimension, no surface, no interaction with visible matter yet having interaction between themselves, and some scholars think that they are just quantum packets of energy. These properties will be described in detail later.

There is yet another class of matter according to Jain philosophy, again unobservable, massless, essentially made of paramanus yet non-interactive with visible matter. They have a few additional properties compared to paramanus. Karmanus belong to this class. Although they do not interact with visible matter, they do interact with themselves and with soul. Karmons (kashaya) are carrier glues through which karmanus develop attractive and repulsive interaction with the soul.

 Thus Jainism propounds three types of matter in the universe.

1. Paramanu:
2. Karmanu
3. Visible matter

None of this is dark matter since Dark Matter is invisible and has gravity.

Neither of them is Dark Energy because Dark energy is invisible and exerts repulsive pressure whereas Paramanus and Karmanus can not exert pressure: parmanus are bosonic and karmanus we do not know about.

If we then combine Jain concepts with Scientific inferences, we have five types of matter in all:

1. Parmanus
2. Karmanus
3. Dark energy
4. Dark Matter
5. Visible matter

A Paramanu is the building block of all matter we see in the universe. We discuss these classes of matter and their properties here, but before going into the details some principles which govern their properties must be described.

**Principles**

1.The properties which we come across in gross matter, such as their colour, taste, smell, and sensation of touch, must exist in their essence in Paramanu.

They can acquire diversity but their essence or quality can not be created by combination. So every paramanu must have at least one colour, one taste, one smell and one sensation of touch.

The quality that they will taste, smell, give sensation of touch and exhibit colours must be innate to the paramanu, though their large varieties, depending on combination parameters can be generated.

2.

**Forces:**

The four known forces, strong nuclear, electromagnetic, gravitation and weak nuclear must play their roles in building the universe by the the processes of aggregation and disintegration. A fifth force, both attractive and repulsive has to be hypothesised if the Karma body has to attach to the soul (attractive) and gets detached from the soul (repulsive).This is a vital source between living soul and nonliving pudgal.

We have to discuss the Jain theory without violating any physics principles.

1.Paramanu: In principle, 400 main varieties of paramanus, are theoretically possible if all these qualities are considered, depending on their colour (1/5), taste(1/5), smell (1/2) and touch (1/8), but in practice only two touch sensations are allowed so this variety reduces to 100. So beginning with these 100 varieties, we have to build every material structure in the universe.

The five colours are Black, blue, red, yellow and white. Here VIBGYOR colours are not recognised and white is not considered as a combination of VIBGYOR.

Tastes are sweet, bitter, pungent, sour and astringent- what our tongue is capable of distinguishing.

Smell is only of two types good and bad, although we (our nose) can distinguish a large types of smells.

Touch can be of 8 types: cold, hot, smooth (+), rough (-), light, heavy, soft and hard. These, in fact and in the modern form of expression, are only four properties, thermal, electric, mass, and structure. The assignment of smooth as positively charged and rough as negatively charged is a later, recent thought , proposed by acharyas who have studied physics. This may or may not be a valid assignment. We do not know if these names of classifications (hot, cold etc) should be taken literally or they are just names as quarks have been given names like up and down, red and blue, and beauty and charm etc, just to distinguish them from each other- though they are neither blue nor red; neither up nor down and neither beautiful nor charmimg.

Four qualities: cold, hot, smooth and rough are supposed to be primary; and the other four: light, heavy, soft and hard are secondary, supposed to emerge when paramanus form gross aggregates. At low temperatures (cold) negative paramanus combine to produce soft touch qualities, negatively charged paramanus soften up as they are cooled. and at high temperature, positive paramanus combine to produce hard quality, ie positively charged aggregates harden as they are heated up.

Although we consider hot and cold as the consequence of thermal property, two sides of the same coin, and so also light and heavy due to gravity (mass).

Since paramanu has no weight, these qualities of heavy and light do not exist.

Further the paramanu is dimensionless (shapeless), so quality of soft and heavy have no relevance in a paramanu.

Thus we are left with smooth which is considered to be positively charged and rough, negatively charged. Hot and Cold actually should be measured on a relative scale (room temperature?), but let us say that paramanu inherently has thermal and electric properties. Thermal due to its motion (kinetic temperature) and electric, we do not know how it arises.

Since a thing can not be hot and cold at the same time nor + and –ly charged at the same time, we are left with two types of paramanus as far as temperature and charge are concerned: either hot and +, or cold and - or hot and – and cold and +.

One possibility for paramanu being electrically charged is that if it is magnetic and rotating or moving in various fashions, a charge can arise. The question naturally arises: Is paramanu a magnetic monopole?? But any thing without magnetically aligned grains can not be magnetic?? In any case a dynamic charged paramanu will be accompanied by magnetism.

According to Jain philosophy (Bhagavai), a paramanu exhibits a large varieties of motions: spin, linear motion, vibration, oscillation, random motion, wobble, excitation, collision, penetration etc. Paramanu is a boson because infinite number of paramanus can occupy a unit space without any hindrance to other Paramanus. No wonder, this is because it has no dimensions. Since they can also be at rest or move with velocity much greater than that of light, they will be moving randomly in all space, all over the universe. It is said that a paramnu can move from one end of the universe to the other in one unit time (samaya), which is extremely minute, 10-∞ seconds

Two or more paramanus, can thus merge into each other, if permitted and not forbidden by their electric charges (opposite) and other rules, discussed later.

What is a paramanu? Is it a packet of energy?

What is a karmanu?

According to Jainism, it is pudgal (matter) but not the ordinary matter we are familiar with. It has the following properties:

1. It is made of massless particles. These particles are always present in the body. But they combine and form-may be compounds or molecules, which are only affected by the attractive and repulsive forces- described below.
2. These molecules and compounds bind with the soul; therefore there exists a particular attractive force between soul and these karmanu particles, not yet discovered by scientific experimentation or theory, but mentioned in Jain Agamas. This force of attraction depends on certain emotions (kashaya). Therefore it depends on chemicals and radiations (leshyas) generated in the body.
3. These molecules and compounds can be shed by the soul; therefore it has a particular repulsive force, not yet discovered by science. This force of repulsion depends on enjoyment and suffering by the body and hence on happy chemicals/radiations and unhappy chemicals/ radiations produced in the body.

**Characteristics of Karmanus**

1. They are chatursparshiya i.e. have colour (1/5), smell(1/2), taste (1/5) and touch (4/8) mentioned above. What are these 4 touch properties/

Of the 8 touch types: cold, hot, smooth (+), rough (-), , soft and hard and light, heavy, since it is mass less, Karmanus have light touch properties, and not heavy type. So following types of Karmanus exist

1.Hot,+,light,

2. Cold,+,light

3.Hot,-,light

4.Cold,-,light

**The soul Karma** body interaction is called adhyavasay or interaction resulting in exchange of information.

 The karma particles which are chatursparshiya will not be affected by the four forces which affect the ashtasparshiya ordinary matter, e.g. strong nuclear, weak nuclear, electromagnetic and gravitation. Some new forces will be required for their aggregation and disaggregation. The forces for the karma or chatursparshiya particles.

**Rules of combination of Paramanus**

Many scriptures e.g. Tattvartha, Bhagvati, Prajnapana , Uttaradhyayan , sarvarth siddhi and Satkhandagama etc. describe the rules of combination of paramanus and types of bonds between them (Chaitanya Prajna, 2017). There is some critical differences between them. For example, we can not understand the rules mentioned in Tattvartha sutra logically and formulate them mathematically, as shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| Degree of two paramanus | Same charge  |  | Opposite charge |
| 1+1 (p+ , p+); (p- , p-); | Not allowed  | (p+ , p-) | Not allowed  |
| 1+2 (p+ , 2p+); (p- , 2p-); | Not allowed | (p+ , 2p+); (p- , 2p-); | Not allowed |
| 2+2 (2p+ , 2p+); (2p- , 2p-); | Not allowed | (2p+ , 2p-);  | Not allowed |
| 2p++3p+ | Not allowed |  | Not allowed |
| 2p+4p | ALLOWED |  | ALLOWED |
| 2+n, n=5 to infinity | Not allowed |  | Not allowed |

Only two groups of 2 and 4 Paramanaus , all having positive or negative charges or 2 paramanus having positive (or negative) and 4 having negative (or positive) charges can combine. The other combinations are prohibited. These rules may imply:

1. Two paramanus, whether having similar charges or opposite charges, do not interact to form an aggregate. This implies a repulsive force between them.
2. The how does an aggregate of two paramanus form? This must be by the process of disaggregation (fission) of larger aggregates, and must be a transient state, which quickly combine with an aggregate of 4 paramanus, having similar charge or opposite charge, and form an aggregate of six paramanus.
3. Even with a large aggregate of infinite paramanus (>5) , an aggregate with additional 2 paramanus (with whatever charge + or -) can not be formed.
4. The above three rules should give us some clues to the forces and bonds existing between paramanus.

We therefore consider the Bhagavati sutra (or Prajnapana and Satkhandagama) here, which appears rational and logical.

According to Bhagavati,

(i) 1P can not combine with another P or another aggregate of 2P, whether having similar ( either + or -) or opposite (+ and -) charges.

 (ii) Here 1P can combine with aggregates of 3 or more paramanus, having similar or opposite charges.

The very fact that 1P can not combine with 1P or 2P, whatever the charge be implies the existence of a repelling force, which has magnitude more than the electrical attractive force, which is overcome when the number of paramanus in an aggregate (#P=3 )or more.

Thus a repulsive force at the paramanu level, irrespective of its charge is predicted by these rules. The attractive forces , which may include electrical (between oppositely charged paramanus) and gravitational forces (between similarly charged paramanus can be imagined since we are familiar with chemical (electrovalent, covalent etc.) bonding and gravitational aggregation in currently used physics/chemistry language.

The scriptures mention several types of bonds between paramanus and their aggregates.

1. Bonds by confinement
2. Bonds caused by Transformation
3. Forced bonding

Apart from bonding between paramanus (Pudgal), the Scriptures mention several types of bonds between soul and karmanus:

1. Alapana Bond
2. Alinkarana bond
3. Sarira Bandha
4. Sarira prayoga bandh

Such bonding require an attractive force between soul and karmanus and shedding of karmas imply a repulsive force between them. Here emotions and thoughts provide the force carriers.

Clearly such forces have not been envisaged in modern science because the existence of soul has not yet been universally accepted.