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Matter and Form of Micro-structure, *Vargana,* in Jainism

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ABSTRACT

. *Pudgalastikaya,* or *pudgala,* is one of the six constituent substances, *dravyas*, of *loka* and is the only substance that is sense perceptible. The smallest constituent of *pudgala* is *paramanu*, the other forms are its combinations. The combination of *parmanus* forms various states of the matter. In modern terminology a *paramanu* is a charge, vibrating and moving, that is bosonic in character. *Varganas* are aggregates of *paramanus*. Some *varganas* associate with the soul and form various types of bodies of organisms and others exist as forms of matter in *loka* (universe). All matter (visible or invisible) is made up of Gross Matter *Vargana*. The *paramanu* defines the smallest units of energy, space, time and sense quality of *pudgala*.

Annie Besant and C.W. Leadbeater observed matter at micro level clairvoyantly and described its nature. Their observations were published in the book Occult Chemistry. They found that the smallest constituent of an atom called Anu exists as vortex having spiral arrangement of flow of force. Stephen Philips examined their observations in scientific perspective and found that most of the observations are of high scientific significance. Neppe and Close in their TDVP model of reality also regard the physical reality at all levels to consist of vortices.

This paper interprets the results of these investigators in the context of Jainism and shows that their findings largely agree with Jain views that *varganas* exist as vortices. Jainism also describes matter at subtle level that is not investigated by these researchers.

"Matter" in Jainism:

According to Jain metaphysics one form of *Ajivadravya* (Non-living substance) is *pudgalastikaya* (matter substance) which exists in the Universe in various forms. *Pudgala* is tangible reality within the sensuous and super sensuous experiences in perceptible and imperceptible conditions. *Pudgala* is permanent, non-living, non-conscious, extensive, physical, corporeal and concrete, active, disintegrating and integrating, and changeable substance [1]. It is characterized by origination, decay and permanence without giving up its essential nature of existence.

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Pudgala is the only substance which is *murta* (corporeal) and perceivable. *Rupatva* (form) */murtatva* (corporeality) or sensory perceptibility is the sum total of the four sensuous qualities as follows [2].

- Colour-five types of primary colour : Black, blue, red, yellow, white
- Taste- five types of taste: Sweet, bitter, pungent, sour & astringent
- Smell- two types of odour: Good smell and bad smell.
- Touch- eight types of touch: Cold, hot, smooth (positive charge), rough (negative charge), light, heavy, soft and hard.

All colours, tastes and smells can vary in magnitude and range.

Based on the above qualities the matter substance in nature is broadly of three types [3]:

(i) Matter substance having one colour, one smell, one taste and two touches.
(ii) Matter substance having five colours, two smells, five tastes and four touches.
(iii) Matter substance having five colours, two smells, five tastes and eight touches.

Paramanu is the two-touch matter substance (*pudgala*); it has only one colour, one smell and one taste [4]. The four-touch *pudgala* comprise the subtle (*suksama*) class of matter substance, as aggregates (*skandha*), which has significant energy. This matter has five colours, two smells and five tastes. On the other hand the eight-touch matter constitutes the gross (*badar*) class of aggregates comprising of energy and matter we are commonly familiar with. These aggregates have the five colours, two smells and five tastes.

Cold, hot, smooth and rough are primary touch qualities of *pudgala*. The smooth touch is also regarded as positive charge and the rough touch is regarded as negative charge. The other four touch qualities viz. light, heavy, soft and hard are secondary touch qualities. These touch qualities are supposed to develop when bonding between infinite *paramanus* produces a gross aggregate. The weight (or mass?) of the aggregate is said to relate to the light and heavy touch qualities. The four touch aggregates and *paramanu* are weight less. The weight is a property of gross aggregates having eight- touch [5]. This aspect is further discussed below.

In the true sense the *paramanus* and their aggregates as a class have no origination; they have always been in existence. But a particular aggregate or *paramanu* has a beginning and a life time. The minimum life time of a *paramanu* as free *paramanu* and that of an aggregate can be one '*samaya*'[2] and maximum life duration can be innumerable '*samayas*' [6]. Thereafter they undergo change. The *pudgala* are of two types, subtle and gross, as mentioned earlier. The subtle does not remain subtle and gross does not remain gross for all time. After innumerable '*samaya*' the subtle changes to gross and gross splits into subtle form.

[2] *Samaya* is the smallest unit of time and is equal to time taken by a *paramanu* moving at slowest speed to travel a distance of one *predesa*. One *pradesa* is the space occupied by one *paramanu*.

Jain philosophy provides rules for bonding among *paranamus* and their aggregates. The bonding takes place due to positive and negative charge of *paramanus*. Bonding takes place between dissimilar charge *paramanus* as well as between similar charge *paramanus*.

Paramanu

Paramanu is defined in canonical literature in general and in the Bhagvati Sutra in particular in various ways from different perspectives. It is the basis (ultimate constituent) of the physical universe. It is indivisible, indestructible, impenetrable, incombustible and imperceptible to sense organs [7]. It cannot be split or destroyed by any means whatsoever. It has no half-portion, no middle portion and no *pradesa*. It has no length, no breadth and no depth. It is truly infinitesimal.

A *paramanu* has one of the five primary colours, one of the two smells, one of the five tastes, two of the four primary touches i.e. either hot or cold and either smooth (positive charge) or rough (negative charge) [8]. Although the four qualities are permanently possessed by a *paramanu*, the intensity of the qualities does not remain constant. A *paramanu* possessing one unit of blackness at any moment may sometimes later possess two, three or many units of *blackness* and so on.

A single free *paramanu* is invisible not only to the naked eyes but also to other physical instruments. Its existence is to be inferred by the collective action and reaction of aggregates of infinite *paramanus*. Only the omniscient (*kevalajnan*i) and those possessing superlative visual intuition (*paramavadhi jnani*) can perceive and cognize the nature of a free *paramanu*.

The *paramanu* is the direct unit of physical substance (*pudgala*) and also the indirect unit of space, time and magnitude of quality of attributes The *paramanus* have the innate capacity of uniting with one another to form composite bodies. The composite bodies are liable to the process of disintegration and the united *paramanus* may become free *paramanus* and thus the process of association and dissociation goes on continuously. *Paramanu* is capable of being dynamically active (*kriyavan*). When dynamic, it may have spin, vibratory, rotary and migratory motions [9]. The activity of a *paramanu* is not continuous, rather it is in quanta. The dynamics of *paramanu* in some respect follow certain rules but it also follows some rules of uncertainty. *Paramanu* generally cannot be stopped or hindered by any object (*apratighati*) and at the same time it does not cause hindrance to others.

A ***paramanu is a vibrating and moving charge.*** It has also been said that infinite number of *paramanus* can occupy one space point [10]. This means that *paramanu* is bosonic in character. As the *paramanu* is indivisible, the energy of a *paramanu* is the smallest amount of energy that can exist in Free State and therefore it can be regarded as a quantum of energy.

It should be mentioned that the atom described by modern science is not the same as *paramanu*. The *paramanu* is weightless (it has infinitesimal energy) and has one colour, one taste, one smell and two touches whereas an atom has mass and belongs to the class three matter; it has

five colours, five tastes, two smells and eight-touches. According to Jainism an atom, rather each of its elementary particles, contains infinite number of *paramanus* as described below.

Vargana (Energy Fields)

Vargana is an important concept to understand nature particularly at subtle level. *Vargana* has been defined as *pudgala* aggregate made up of similar *paramanus* or as a cluster of *paramanus*. There are infinite numbers and types of *varganas* according to Bhagvati Sutra but eight types are important from the point of view of their association with the soul [11]. Gommatsara Jivakanda provides another type of classification of *varganas* on the basis of number of *paramanus* present in the cluster [12]. According to this, there are 23 types of main *varganas* found all over *loka*. The *varganas* fall into two broad categories, one has four- touch and the other has eight-touch. The 2nd to 14th order *varganas* are four-touch type and weight less. The 16th to 23rd order *varganas* are eight-touch type and have weight. The 15^{th} order *vargana* falls in between the two categories and its nature is uncertain [13].

The lower order weightless *varganas* can be divided in two groups.

1. Associable *varganas* – *varganas* that associate with the soul and form various kinds of subtle bodies and other structures that assist the soul in its worldly functioning.
2. Non associable *varganas* – *varganas* that do not associate with the soul.
3.

The higher order *varganas* can be divided in three groups.

1) *Varganas* that is helpful in formation of gross bodies of plants and small microorganisms (*nigodas*), belonging to category of non-mobile beings (*Sthavara jivas*). These *varganas* assist in formation of plant bodies and bodies of small microorganisms. The *vargana* that assists in formation of plant body compares with sun light (photons).
2) Permanent Nil (*Sunya*) *Varganas*. Detailed information about these *varganas* is not available in scriptures.
3) Gross Matter (*Maha skandha*) *Vargana* (GMV). This *vargana* is supposed to constitute all ordinary matter, visible and invisible, in the universe including bodies of mobile beings.

The charge in *vargana* produces an electric field. A moving electric charge in *vargana* also produces a magnetic field. In view of modern science, a field is nothing but a charge in the space-time continuum. All fields, magnetic, electrical and gravitational, are physical realities. A *vargana* contains a bundle or packet of energy. The energy density or energy intensity increases with the order of *vargana*. As mentioned above *varganas* of 15th and higher order are supposed to have eight- touch i.e. in addition to four basic touches, namely cold, hot, positive and negative charge, other four secondary touches - light, heavy, soft and hard are also present. These additional touch properties are supposed to come in existence due to bonding between *paramanus*. The light and heavy touches are supposed to produce the property of weight. In the lower order *varganas* of four touch types the *paramanus* cluster but do not bond.

Gross Matter *Vargana* (GMV) and Matter

All ordinary matter (visible or invisible) is made up of GMV according to Jain view as mentioned above. We examine now how the sub atomic particles may be produced from GMV [14]. Consider the case of leptons first. The neutrino is the smallest lepton having negligible mass and no charge. If neutrino is made of GMV then it must be a combination of at least two GMV, one having positive charge and the other a negative charge. This will be the case when the two GMV have equal and opposite charge. As *varganas* exist with differing charges it is very likely that more than two GMV combine to produce a neutral charge in neutrino. So a neutrino of negligible mass should be made up of many GMV. There are three types of neutrinos. The mass of all three types is negligible but still there is a minor difference between them. Such minor variation in mass is obtained by variation in number of GMV in the three types of neutrinos. It may be noted that when the mass of a neutrino is considered to be negligible, the mass of GMV is still much less.

Now consider another lepton, the electron. The mass of electron is 0.511 MeV, which is millions of times greater than the mass of a neutrino. This means that an electron is made of millions of GMV. In an electron the number of negative charge GMV exceeds the positive charge GMVs giving a net negative charge of -1.6022×10^{-9} coulomb. This also shows that the charge of one GMV is millions of times smaller the charge of an electron. And since a GMV contains infinite *paramanus*, the quantum charge of a *paramanu* is really unimaginably small.

Next consider the stable baryon particles proton and neutron. These particles are supposed to be made up of quarks. The mass of a proton is 1836.12 times greater than that of the electron and neutron is very slightly heavier than proton. The mass of a quark is uncertain but it is many times more than that of the electron. So a quark is made of that many times more GMV than an electron. There are six types of quarks having fractional charges, both positive and negative, and masses ranging from 2 MeV to 18000 MeV. According to Jain view the fractional charges of quarks are possible by appropriate combination of positive and negative GMV. Another thing we observe is that the charges of up quark, charm quark and top quark are the same but their masses vary considerably. Similar is the case with down quark, strange quark and bottom quark. Formation of these quarks is clearly possible with suitable combination of GMV. So, in Jain view quarks and leptons are composite particles and subject to gravitational force.

Mass of matter is nothing but transformation of energy, that is, both matter and energy are but two modifications of a single principle, as has been only recently realized in science. Jain physics has identified all forms of matter and energy as modification of the same substance *pudgala*. Intra-convertibility of various forms of energy - mechanical into electrical, electrical into heat, light, sound etc., - which is the basis of modern technology - has been recognized by Jain philosophers as the basic attributes of *pudgala*, since all forms of energy are fundamentally the modification of the same substance, *paramanu pudgala*.

Clairvoyant Observation of Matter

Omniscient is not present now but the observations of clairvoyant can provide valuable information about reality. Annie Besant and C.W. Leadbeater clairvoyantly examined the chemical elements Hydrogen, Oxygen, Nitrogen, etc. [15]. The drawings of the elements were made by two artists on the basis of observations made by them. The observers said that the elements could be raised to etheric conditions by will power. They found that the gaseous state is succeeded by the etheric state, as the solid is succeeded by the liquid. The etheric state is found to cover four sub states distinct from each other. Thus the matter in the physical world has seven sub states, including the three of solid, liquid and gaseous.

They first examined the chemical element of hydrogen which appeared to have six bodies contained in an egg-like form as shown in fig 1. It rotated with great speed on its own, vibrating at the same time, the internal bodies performing similar gyrations. The whole atom spins and quivers and has to be steadied before exact observation is possible. The six little bodies are arranged in two sets of three forming two triangles that are not interchangeable. The six bodies are not all alike; they each contain three smaller bodies which were called as Anu or Ultimate Physical Atom (UPA). In two of them the three Anu are arranged in a line, while in the remaining four they are arranged in triangle. It is, of course, impossible to convey in words the clear conceptions that are gained by direct vision of the objects of study.

Two types of Anu were observed by them as shown in fig 2. In one case force pours in from the "outside" and passing through the Anu pours out into the physical world. In the second case, it pours in from the physical world and out through the Anu into the "outside" again i.e. vanishes from the physical world. The former is like a source and the second is like a sink. They called source Anu positive or male and the sink Anu negative or female. All Anu observed by them were one or other of these two forms.

It was seen that the Anu is a sphere slightly flattened having a depression at the point where the force flows in, and there is a little apex at the diametrical opposite location. Each Anu is surrounded by a field.

According to Besant and Leadbeater the Anu can scarcely be said to be a "thing", though it is the material out of which all things physical are composed of. It is formed by the flow of life force and vanishes in its absence. If the flow were checked for an instant, the whole physical world would vanish as a cloud melts away in empyrean. It is only the persistence of that flow which maintains the physical basis of the universe.

Describing the construction of the Anu the authors said that the surrounding force flows in, and three whorls appear with their triple spiral of two and half coils, and returning to their origin by a spiral within the Anu, see fig 2; these are at once followed by seven finer whorls, which, following the spiral of the first three on the outer surface, and returning to their origin by a spiral

within that, flowing in the opposite direction form a caduceus with the first three. Each of the finer whorls is formed of seven yet fine ones, set successfully at right angles to each other, each

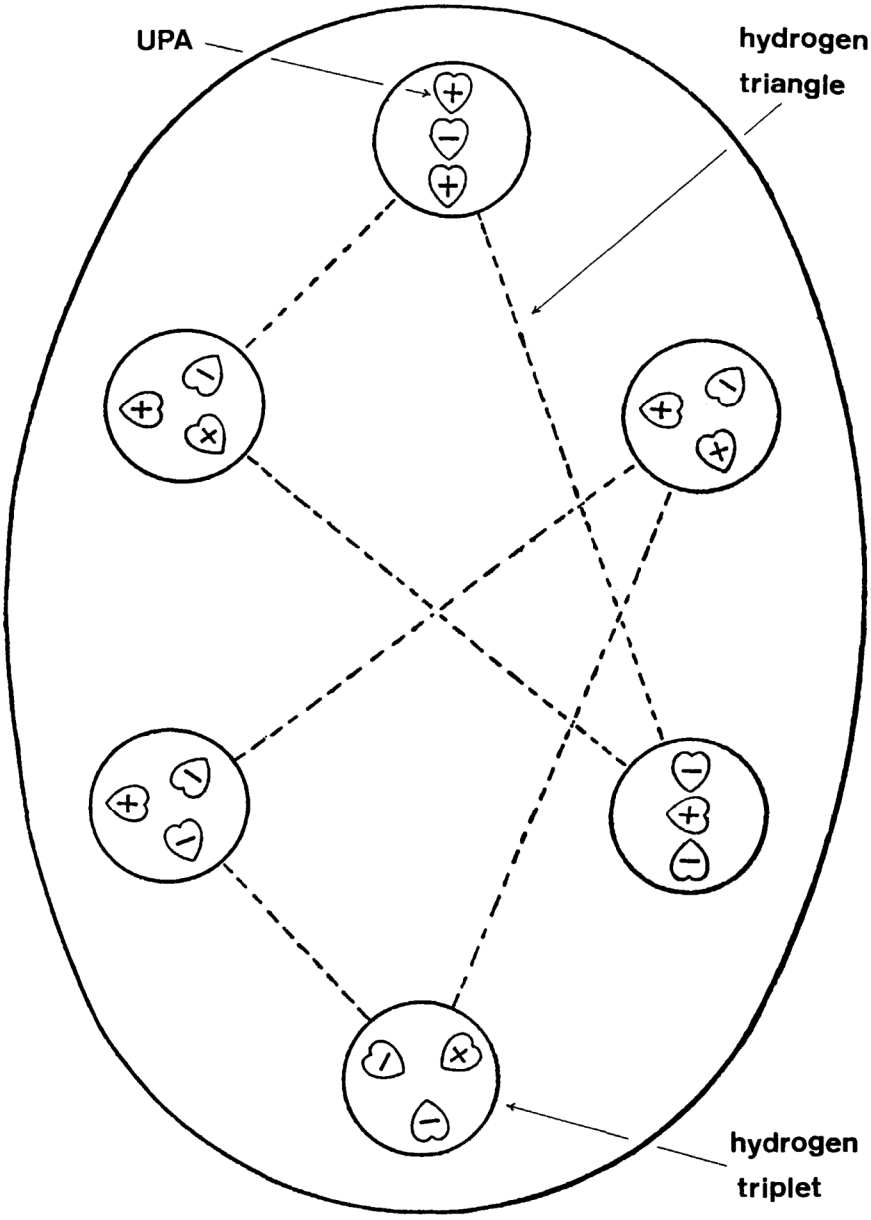
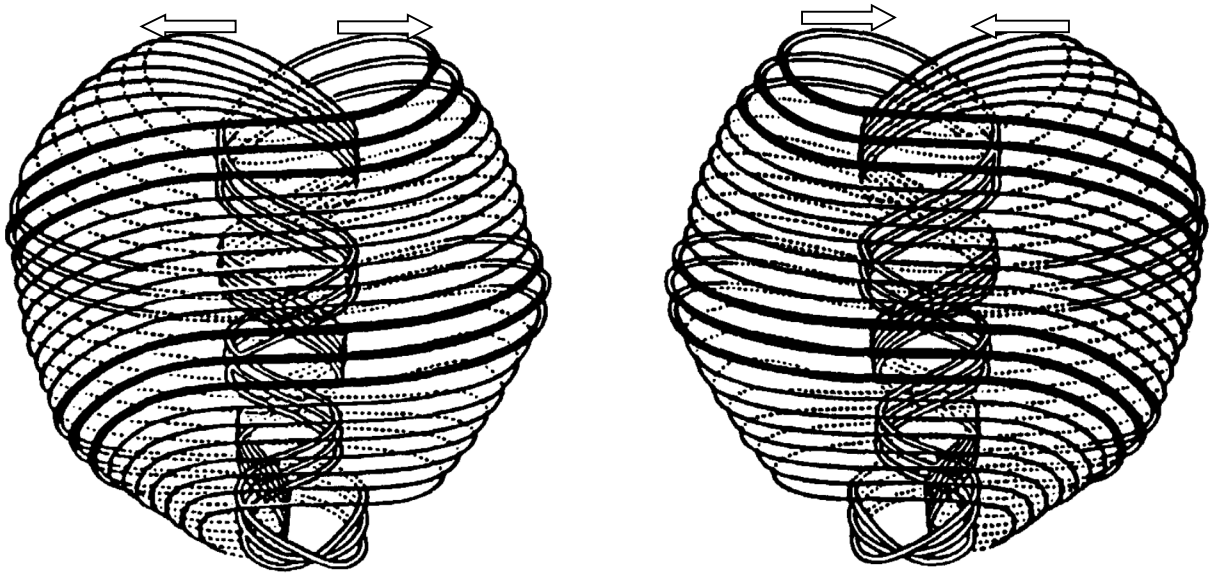


Figure 1. The hydrogen



Positive Negative

Figure 2. The Anu

finer than its predecessor, called spirillae. In the three whorls flow currents of different electricity; the seven whorls vibrate in response to etheric waves of all kinds- the sound, light, heat, etc.; they show the seven clours of the spectrum; give out the seven sounds of the natural scale; respond in a variety of ways to physical vibrations- flashing, singing, pulsing bodies, they move incessantly, inconceivably beautiful and brilliant.

Force pours into the heart shaped depression at the top of the Anu, and issues from the point, and is changed in character by its passage. The force rushes through every spiral and every spirilla, and the changing shades of colour that flash out from the rapidly revolving and vibrating Anu depend on the several activities of the spirals, and with the change of activity from one spiral to another the colour changes.

The Anu has three proper motions independent of any imposed upon it from outside. It turns incessantly upon its own axis spinning like a top; it describes a small circle with its axis, as though the axis of the spinning top moved in a small circle; it has a regular pulsation, a contraction and expansion, like the pulsation of the heart. When a force is brought to bear upon

it, it dances up and down, flings itself wildly from side to side, performs the most astonishing and rapid gyrations, but the three fundamental motions incessantly persist.

An electric current brought to bear upon the Anu checks their proper motions i.e. renders them slower; the Anu exposed to it arrange themselves in parallel lines, and in each line the heart shaped depression receives the flow, which passes out through the apex into the depression of the next and so on as shown in fig 3.

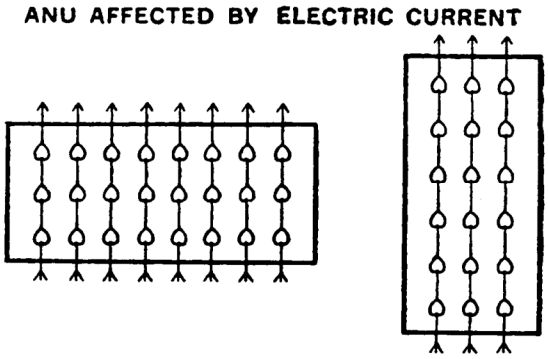


Figure 3.

Two Anu positive and negative brought near to each other, attract each other, and then commence to revolve round each other, forming a relatively stable duality; such a molecule is neutral.

Besant and Leadbeater observed atoms of many chemical elements of the Periodic Table and studied their structures. These structures fell into seven natural classes with a few exceptions. The reader may refer to the book Occult Chemistry for details.

Scientific Perspectives of Clairvoyant Observations

Stephen Philips studied the work of Besant and Leadbeater in scientific perspective [16]. In the paper published in 1995 he reports how facts of nuclear and particle physics are consistent with purported psychic descriptions of subatomic particles by Besant and Leadbeater made nearly 100 years ago. He says that most of their descriptions of atoms were published several years before physicists even suspected that atoms had nuclei and therefore their observations must not be rejected as fraudulent.

He interpreted the observations in the context of current scientific knowledge of the atom. In the Standard Model of particle physics the subatomic particles are composed of fundamental spin - 1/2 particles called “quarks”. This model requires six varieties of quarks to exist; the up (u), down (d), charm ©, strange (s), top (t), and bottom (b) quarks. The up quark with its partner the down quark makes up the protons and neutrons inside atomic nuclei. A proton consists of two positively charged up quarks and a negatively charged down quark and a neutron consists of one

up quark and two down quarks. Philips and some other physicists have proposed that quarks are not fundamental but are composed of still smaller, indivisible particles. They may be called subquarks. If quark consists of three subquarks, protons and neutrons would each consist of nine subquarks bound together as three groups of three subquarks. This view compares with the observations made by Besant and Leadbeater as shown in fig 1 in which each triangular array has three bodies each enclosing a group of three Anu. Then each body compares to a quark, the Anu to a subquark and the upper triangle structure compares with a proton or neutron. The two triangle form observed by Besant and Leadbeater could be deuteron or arrangement of two similar nuclei of hydrogen according to Philips.

On detailed study Philips reached at the conclusion that Besant and Leadbeater accurately describe by ESP quasi-nuclear, bound systems of subatomic particles created from pairs of atomic nuclei of the element under observation.

One of the questions in science is to answer how the quarks are bound together in proton and neutron. The currently accepted theory assumes a strong force between quarks. Each quark exists in three quantum states called “colour”; red, blue and green. Each colour state is characterized by its “colour charge”, which is the source of the strong force binding quarks together. This “colour force” is transmitted by eight spin-1 particles called gluons. In the Besant model Anu is supposed to have magnetic charge, albeit of a kind similar to that known to be associated with the colour force rather than with ordinary magnetism. Indeed, the positive and negative types of Anu have opposite magnetic polarity. According to Besant and Leadbeater in the former, source, “force comes out” and in the latter, sink, it disappears.

It may be mentioned that despite his attempts, Leadbeater did not succeed in examining an electron with his micro-psi powers.

Recently Neppe and Close have proposed a Theory of Everything known as TDVP (Triadic Dimensional-Distinction Vortical Paradigm) model as a comprehensive attempt to develop a unified model to reconcile physics, biology, psychology, parapsychology, philosophy, consciousness researches and mathematics [17]. A concept of vortices has been introduced in this model. Such vortical motions are assumed to exist at all levels starting from the subatomic and up to larger ones like movement of large masses. Authors argue that the mathematics currently being used in mainstream physics is inadequate, and sometimes inappropriate for application to quantum phenomena. The authors devised new calculus called the Calculus of Dimensional Distinction (CoDD) in which the mass/energy content and space-time volume of elementary particles are multiples of the unitary quantum equivalence units of the smallest finite distinctions possible in quantized reality. This new calculus allows a clearer understanding of electrons and quarks and subatomic, atomic and molecular structures of reality.

The authors also proposed (and proved) the hypothesis that mass is nothing more and nothing less than combined resistance to acceleration due to the angular momentum related moments of

inertia of the rapidly spinning elementary particles that, in combination, make up an object. They proposed that quarks are rapidly spinning energy vortices and protons are spinning vortex created by the combination of three elementary vortices of quarks. To do such calculations the authors used the mathematics of integrals, the Diophantine equations to the integral powers of 3. In this process they found that additional quantum equivalence units were necessary to form a stable proton. So the quarks were provided with additional units to produce an axially rotating symmetric vortex and therefore stable proton. These additional units, they called gimmel, occupy space-time but not register as mass or energy. Proceeding on these lines they accurately predicted the mass of proton. So the hypothesis that quantum particles like quarks and their combinations may be treated as energy vortices was validated. The authors also correctly predicted the mass of neutron. All these calculations were carried out taking electron as quantum unit.

The authors emphasized that the elementary and compound particles cannot be point particles (mathematical singularities), or even classical solid spinning particles forming the basis of an atomic description in a quantized model. They also showed that conservation of mass, energy and gimmel in a dynamic system ensures that the moment of inertia of a spinning vortex that merges with another spinning vortex, and becomes part of a compound vortex is conserved in the total angular momentum of the larger vortex.

Jainism Interpretation of Clairvoyant Observations

According to Jainism clairvoyance occurs in a range from low to high. In the highest case the *param avadhijnani* is able to see objects as minute as a *paramanu*. The smallest part both Besant and Leadbeater could see was the Anu, much bigger than the electron, indicates that their clairvoyance was much lower than the highest kind. The observations of such clairvoyant persons may not be hundred percent correct and may require examination before its validity is accepted.

It was mentioned above that an electron should be made up of millions of GMV shows that the Anu observed by Besant and Leadbeater must contain billions of GMV. The Anu was seen to be a kind of spiral or vortical structure in spherical form in which a force pours in from cosmos, moves in a web of spiral path and goes out at the opposite location on the sphere. What is this force? The force must comprise of a stream of GMV entering the sphere. Billions of GMV are packed inside the spherical space in a spiral arrangement and a continuous flow of GMV is maintained in the spirals. The flow takes place in thousands of spirals before finally exiting the spherical space. The GMVs have vibration, rotational and linear movements in the Anu. This Anu is not a “thing” as rightly said by the authors but it is conglomeration of billions of GMVs which themselves are aggregation of infinite number of *paramanus*. It is the electrical force between the GMVs that keep them bound in a spherical space. It may be noted that a sphere has minimum surface area for a given volume and thus has minimum energy loss for a given content of energy and is the preferred shape to be formed in nature. The depression on the sphere where

the force pours in is due to inflow of energy of GMV. If this flow were checked the Anu would not form a stable structure of quark as explained below.

The flow of charge in a spiral or helical path produces a magnetic field. The GMV has positive or negative charge. As the Anu consists of thousands of spirals a strong magnetic field is produced which exerts a magnetic force on another Anu in close vicinity. This magnetic force binds the three Anu together. If the GMVs were not flowing the quark structure would not exist. Similar magnetic force exists between the quarks in a proton. This magnetic force has been called strong force in science?

Besant and Leadbeater observed three types of motions in Anu spin, rotation and pulsation. We know that there is no stationary object in the universe, every object is moving for stability. Spin and rotation are natural tendencies for stable structures in nature. Pulsation requires further explanation. The GMVs in cosmos are supposed to exist with differing charges and so the flow of GMV entering the Anu does not have uniform charge. The variation in charge of GMV would change the size of the sphere which appears as pulsation motion of Anu.

Besant and Leadbeater identified two types of Anu positive and negative, the former having source like flow and the later sink lie flow in the spherical unit. We know that direction of electric flow in the spiral decides the direction of magnetic field produced. Therefore the source and sink types of flow would produce Anu with opposing magnetic forces that would keep the Anu bound together in a quark. The Anu are also seen to arrange themselves in triangular and linear fashion. In the former case the Anu forces are at 120 degree to each other and in the later case the forces lie on the same axis. Both of these arrangements would produce magnetically stable structures. Conversely, we can say that the Anu arrange themselves in a way so as to produce a stable structure.

Neppe and Close considered quarks as rapidly spinning energy vortices and protons as spiral vortex created by combination of three elementary vortices of quark. In the Besant and Leadbeater observations even the quarks are combination of three vortices of Anu. Nevertheless, the Neppe and Close theory that physical reality exists in vortical form is supported.

Science considers only energy and mass as the fundamental properties of matter. Presence of electrically charged GMVs in subatomic particles is a new aspect of matter introduced by Jain philosophy. Jain philosophy says that charge (*paramanu*) is the fundamental constituent of matter and this causes bonding between *paramanus* and its clusters, *vargana*, and gives rise to magnetic forces at subatomic level for producing stable structures.

Besant and Leadbeater also observed colours in Anu. Jain philosophy says that GMV is eight-touch matter and has all the five colours. These colours manifest in appropriate conditions and are seen in the Anu. The authors also observed that Anu arrange themselves in parallel lines by electric current. This further validates the electric, and magnetic, nature of Anu.

The Form of *Vargana*

We have seen that the Anu is a spherical unit having spiral arrangement of flowing GMV. What is the form of GMV? Extending the inquiry, what is the form of any *vargana*? Neppe and Close have shown that the physical reality exists as energy vortices. In Jainism *varganas* are groups of *paramanus* and a *paramanu* is a quantum of energy. The *vargana* is therefore a three dimensional structure in space. In order that such a structure is stable the *paramanus* must be moving in some pattern. Intrinsically, a *paramanu* is dynamic; it has vibration, rotational and linear kinds of motions. So, in all possibility the *vargana* must exist as vortex in which the *paramanus* are vibrating, rotating and moving to give an extension to *vargana*.

As mentioned before there are two classes of *varganas* four-touch type and eight-touch type, the former are weightless (massless) and the later have mass. It is also mentioned that as the number of *paramanus* increase the *vargana* occupies less space that is the *paramanus* are packed densely in higher *varganas*. The *paramanu*, and therefore energy, density is highest in GMV, which extends relatively a tiny space. From this consideration the massless *varganas* may exist as some kind of elongated vortices and a GMV as a spherical vortex of micro size. Figure 4 shows artist's conception of the two kinds of *varganas*. Figure 4a shows that in a four touch type massless *vargana* the *paramanus*, or groups of *parmanus*, are whirling around and the *vargana* extends a certain space. In a GMV, fig 4b, the *paramanus* are packed in a spherical space and inside this space the *paramanus* are dynamic having all kinds of motion. The GMV is thus not a particle but a dense structure of closely packed dynamic *paramanus*. In both kinds of *varganas* continuous flow of *paramanus* in and out maintain a dynamic balance. So what is flowing in and out of spherical Anu is also tiny spherical *vargana* packed with energy.

4a 4b

Figure 4. 4a presents artist's concept of four-touch mass less *vargana* and 4b that of eight-touch GMV in which the *paramanus* are in bound state.

Conclusion

Matter in Jain philosophy is one of the non-living substances. *Paramanu* is the smallest indivisible constituent of matter and is the quantum of energy. It exists as charge. All other forms of matter are combinations of *paramanus*. At subtle and micro

level matter exists as *vargana*. The largest vargana GMV has the highest energy density among the *varganas*.

The clairvoyant observations of atom by Annie Besant and C.W. Leadbeater reveal the details of subatomic parts of chemical elements and shows that the smallest part Anu is a vortex structure having continuous flow, in and out, of some kind of force. They said that the Anu can be positively or negatively charged depending on the direction of flow of the force in the spherical space of vortex. Stephen Philips regards the observations of Besant and Leadbeater of great scientific significance and compares the Anu to subquark. Neppe and Close in their TDVP model also consider the physical reality at all levels to exist as vortices. They developed mathematics for combining vortices of quarks in formation of protons and neutrons.

Jain philosophy proposes that the force flowing in Anu observed by Besant and Leadbeater must be GMV and that GMV acts as brick from which all gross matter starting from quark is formed. It is further proposed that all kinds of *varganas* are some kind of vortices. Jain philosophy shows that matter at subtle level exists as energy and the high energy density GMV is the source of formation of all kinds of gross matter in the universe.

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