

Concept of MATTER

According to 'MATTER (Re-examined)'
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Abstract: Attempts to define 'matter' were unsuccessful throughout development of natural philosophy. As advancement in physics called for speedier pace, one attribute of matter – the mass – was accepted as a substitute. Mass of a body (an assumed relation that exists in mathematical analyses and in the minds of analyzers) is considered as an equivalent that can represent body's 3D matter-content. Mass has successfully usurped rightful place of 3D matter in all contemporary theories to increase their complexity and confusion. In material world, existence of matter is nearest to absolute truth. Defining matter on this basis can provide logical foundations to physical theories.

Key words: Matter, mass, spatial existence, quantum of matter, universal medium.

Introduction:

Physical world is made of real entities. Imaginary expanse, containing real entities is known as space. Space is an invented and limitless container, envisaged by rational beings, whenever they think of existence of real entities. Real entities have objective reality and positive existence in space. In order to have these attributes, all real entities are formed by substance (stuff). It is the substance that provides a real entity with its objective reality and positive existence in space. In material world, existence of matter is nearest to absolute truth. Therefore, it is prudent to consider existence of matter as the sole assumption, to base all other scientific principles on. In this sense, matter is the sole entity that provides substance to all real entities in universe.

The concept of mass is fundamental in contemporary physics. Mass is essentially defined as that property of a body, which governs its acceleration when acted on by an external force. Magnitude of mass of a body becomes irrational, when the body is unable to accelerate or when the external force cannot act on the body. This is often countered by illogical assumptions. As both, acceleration and force are vector quantities; their relationship (mass) also has to be directional. However, mass is often treated as a scalar quantity that represents a property of an object. Mass is a functional (imaginary) entity that exists in the minds of scientists and in mathematical analyses. There is nothing real about mass. Mass neither has objective reality nor positive existence in space. In order to satisfy certain axioms, in many modern theories, mass is co-related with energy (another imaginary entity) and linear speed of light. As physics has progressed, concept of mass has become more complex and often baffling. This confusing state can be clarified only by precise definition of matter and re-instating matter in its rightful place.

All conclusions, expressed in this article, are from the book 'MATTER (Re-examined)' [1]. For details, kindly refer to the same.

Matter

Space is imagined as a limitless container that provides place of existence for all real entities in universe. It is the region presupposed by rational beings, whenever they envisage real entities and their existence. As a functional entity, space fulfils all functions assigned to it by rational beings. Being an imaginary entity, space has neither physical form nor structure. As it is not a real entity, it can neither act nor be acted upon, nor deform, nor expand, nor contract, nor bend, nor curve, etc. Space extends to infinity means that real entities can be found however far one goes and beyond. Spatial dimensions are envisaged to indicate relative locations of real entities in space. Most convenient and widely used system is 'three-

dimensional spatial system'. In this, space is divided by three mutually perpendicular imaginary planes into three-dimensional (3D) spatial system with its origin at the intersection of the planes. Dimensions are represented by length, breadth and height (thickness).

Substance of an entity makes it real. Attributes of a real entity are due to substance (stuff) it contains. Objective reality and positive existence of real entities make them sensible by rational beings and tangible by physical instruments. However, it is not right to consider only those that can be sensed by rational beings or tangible by physical instruments are real. There are real entities which are beyond capabilities of rational beings and their instruments to sense.

We are three-dimensional rational beings (3D objects). All our senses are evolved to sense and our instruments are designed measure distances in three-dimensional (3D) spatial system. Therefore, it is physically impossible for us to comprehend matter that exists in two-dimensional (2D) or single-dimensional (1D) spatial systems. Matter (and entities structured by matter), in spatial dimensions lower than three-dimensional, will forever remain insensible to and intangible by rational beings like us. This is the major drawback in realizing existence of matter as the basis of all other physical phenomena.

Matter exists simultaneously in tangible and intangible states in this universe. Matter is the only entity that exists and it structures every thing else, including a medium that fills entire space without voids. Matter is the concrete form of substance, existence of which reflects in itself as absolute essence of a real entity. Existence of matter, as substance of all real entities, is a physical fact rather than a metaphysical assumption.

In 3D spatial system, existence of a real entity indicates its volumetric presence in all three spatial dimensions, however small its measurements in each spatial dimension may be. Real entities exist in 3D spatial system. Nevertheless, if magnitude of an object's measurement in any spatial-dimension is so small that it is intangible by our scales, that object may be considered not to exist in that particular spatial-dimension. Objects that are intangible in all three spatial dimensions may be considered not to exist. Objects that are intangible in two spatial-dimensions may be considered as 1D objects. A single-dimensional object has its tangible existence only in one spatial dimension. Its measurements in other two spatial dimensions are too small to be tangible by our standards. Objects that are intangible in any one spatial dimension are considered as 2D objects. A 2D object has its tangible existence only in two spatial dimensions. Its measurement in third spatial dimension is too small to be tangible by our standards. Objects that are tangible in all spatial dimensions are considered as 3D objects. A 3D object has its tangible existence in all three spatial dimensions. Therefore, irrespective of the fact that measurements of certain real objects in single-spatial dimension or two-spatial dimensions are too small to be tangible by our standards, all real objects (including 1D and 2D objects) have volumetric presence in space.

Having considered 'existence of matter' as the absolute truth, we may proceed to analyze its inherent properties. Matter provides substance to all real entities. Substance bestows them with objective reality and positive existence in space. Matter is real, absolute, most elementary, particulate and omnipresent. It constitutes diverse objects in universe, which depending on their structures exhibit different unique (often contrary) properties. As substance of all real entities is matter, diverse characteristic properties exhibited by them can only be due to differences in their structures rather than different properties of matter. Therefore, matter cannot be the basis for their different properties and it has to be deduced that matter has no properties at all, except its ability to exist in space. Lack of any particular property enables matter to subscribe to differing properties of objects according to their structures.

To exist in any size, nearest points within a block of structure-less matter have to have some sort of affinity (like attraction, cohesion or adhesion) between them. Due to lack of any other property, this affinity of matter, alone, forms the basis of all creations and physical actions. Such affinity is only between nearest points in direct contact and does not extend beyond this limit. Magnitudes of affinities on a point within a lump of unstructured matter, in all directions, are identical. However, magnitude of affinity on a point on the periphery of lump of unstructured matter is only inward and hence not identical in all directions. Imbalance in magnitudes of affinity acts as an inward moving element on that point of unstructured matter. Similar

acts, all around the lump of unstructured matter, squeeze it and form an outer layer that prevents disbursement of unstructured matter within.

Balance between peripheral affinities in various directions (in any plane) depends on the shape of lump of unstructured matter. If the lump is a perfect sphere, magnitudes of inward affinities (in any plane) from its periphery are identical in all directions and the sphere of unstructured matter would maintain its shape and size indefinitely. This is an ideal and most improbable condition. Magnitudes of peripheral inward affinity in a lump of unstructured matter in any other shape would not be in balance. They will have a resultant action to squeeze the lump (in any plane) of unstructured matter and reduce its size in resultant direction [3].

Consider action in one plane in a lump of unstructured matter, which is not perfectly circular in that plane. Resultant of affinities from its peripheral region squeezes the lump gradually and at accelerating pace towards its major axis and reduces its size along minor axis to make its shape elliptical. Magnitude of resultant affinity along minor axis in the elliptical section is highest, which tends to bring points in the lump of unstructured matter across its minor axis nearer. Gradually, elliptical section will divide itself, by bringing these points nearer, into two elliptical daughter-sections. Similar actions will take place in every plane, passing through the lump of unstructured matter. As parts of lump of unstructured matter become smaller, similar processes will continue to act on all fragments to splinter them into smaller and smaller pieces of unstructured matter.

As fragmentation continues, pieces of unstructured matter would reduce to intangible measurements in spatial-dimensions. If left free, a piece of unstructured matter will first become intangible in one spatial-dimension and make it a 2D object. Further actions will reduce its measurements in second spatial-dimension intangible and convert it into a 1D object. Due to geometrical shape of 1D object no further actions can reduce its existence intangible in all spatial-dimensions and form a matter-fragment without existence, in our scale. Lengthening process during conversion from 2D object to 1D object involves much greater movements, which initiate structural formations by neighboring pieces. These smallest parts of unstructured matter, which exists in single spatial-dimension, may be called 'quanta of matter'.

Fragmentation of pure matter into lower spatial-dimensions is a natural process. However, this process can be reversed by external efforts on quanta of matter. If an external inward effort acts on ends of a 1D quantum of matter, its length can be reduced by increasing its breadth to make it a 2D quantum of matter. If identical efforts can be applied all around a 2D quantum of matter, its thickness can be increased to make it a 3D quantum of matter. As there are minute gaps between matter-contents of two adjacent quanta of matter in contact, they maintain their individuality under all conditions. Spatial dimensional state of a quantum of matter depends on external efforts on its periphery.

A quantum of matter is the smallest fragment of unstructured matter. It contains pure matter in its single spatial-dimensional state, whose measurements in two other spatial-dimensions are equal to thickness of a plane. As, there is no definite mechanism to regulate quantity of matter in a quantum of matter, matter-contents of various quanta of matter may differ. This is an essential requirement for development of further structures by matter. Ability of quanta of matter to exist in 1D and 2D spatial dimensions makes them capable to co-exist at points of their intersections [1]. This is another essential requirement for matter to fill entire space without voids. Quanta of matter, in their 3D status, constitute all 3D matter-particles and macro bodies.

A macro body is structured by numerous 3D matter-particles. 3D matter-particles in a macro body apparently interact to maintain macro body's state and integrity. Apparent interactive efforts between 3D matter-particles are additive in any direction. Because of this nature of apparent interactive efforts, any macro body tends to achieve most perfect volumetric shape. If its constituent 3D matter-particles are free to have relative motion, a macro body would eventually become spherical. This is a natural process that compels structured 3D matter-bodies to fully occupy (as far as possible) all three spatial dimensions.

Contrary to tendency of structured 3D matter-bodies to maximize their existence into all available spatial dimensions, unstructured (pure) matter has a tendency to reduce its existence to minimum spatial

dimensions. This difference, in behavior of structured matter and unstructured matter, is the basis of all physical phenomena, including creation, sustenance, destruction, actions and interactions of all real entities in universe.

Understanding matter in its various spatial dimensional states could remove all confusions prevailing in contemporary physics. 3D matter-content of a 'reference 3D matter-particle' under standard conditions can be considered for a reference scale to measure 3D matter-contents of all objects. 3D matter-content of an object remains constant unless 3D matter is added to it or removed from it. Unlike 'mass', '3D matter-content' of an object is not affected by external actions on it or its motion.

Universal medium

Space can become a real entity, only when it is filled entirely without voids by real entities. These entities, being real, have to be structured by matter and have to be in direct or indirect contact with all tangible objects and fill tangible space between them. Having a real entity between every tangible object and in contact with them can do away with the illogical assumption of 'action at a distance through empty space'. Entity that fills entire space, outside most basic tangible objects, acts as a universal medium of interactions between them. In fact, simultaneous actions by universal medium on two 3D matter-bodies appear as interactions between the 3D matter-bodies. Universal medium is a particulate and continuous materialistic medium that pervades whole of space, outside basic 3D matter-particles. Physical structure of universal medium (space) endows it with abilities to act, be acted upon, deform, expand, contract, bend, curve, etc. In this case, the space and the universal medium become synonymous. Imaginary space becomes a real physical structure. A universal medium, that is more or less stable and steady in space, can provide an absolute reference to all physical actions.

Substances of both, the universal medium and 3D matter-particles are matter. They are real entities with objective reality and positive existence in space. As universal medium (structured by lower spatial dimensional matter) and 3D matter-bodies occupy space entirely without voids, matter-density of universal medium and 3D matter in universe is identical. Entire space has same matter-density. Yet, structure of universal medium makes it quite different from 3D matter-bodies. While 3D matter is tangible and sensible by rational beings, universal medium is neither tangible nor sensible by them. While universal medium can deform on its own, shapes and movements of 3D matter-particles are determined by actions of universal medium on them. While universal medium can act and can be acted upon, 3D matter is inert (it can only be acted upon). While universal medium is more or less steady in space; to be stable, basic 3D matter-particles have to be under constant motion at the highest possible linear speed (speed of light) through space (universal medium). Etc. [1]

Conclusion

Matter is the sole entity that provides substance to all real entities. It can exist in tangible (3D matter-particles) as well as intangible (1D or 2D quanta of matter) states. Part of matter that is intangible is forever unobservable by rational beings. Understanding behaviour of matter in its various spatial dimensional states can overcome necessity to use 'mass' as its mathematical equivalent. Re-instating matter to its rightful place can remove all illogical assumptions in modern physics and enhance our understanding of nature. Simple mechanical interactions between quanta of matter (forming the universal medium) cause all physical phenomena in our universe.

Reference

References are self-published by the author. They are neither reviewed nor edited.

[1] Nainan K. Varghese: MATTER (Re-examined), CreateSpace (On-demand publishing Company), Scotts Valley, CA. (2013).

Vol I - <https://www.createspace.com/4415292> ,

Vol II - <https://www.createspace.com/4415297>

[2] Nainan K. Varghese: Universal medium, <http://vixra.org/abs/1007.0042>

[3] Nainan K. Varghese: ARTICLES, <http://www.matterdoc.info>