Concept of MATTER

According to 'MATTER (Re-examined)'

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Abstract: Attempts to define 'matter' were unsuccessful throughout the development of natural philosophy. As advancements in physics called for a speedier pace, one attribute of matter – 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 the body's 3D matter-content. Mass has successfully usurped the rightful place of 3D matter in all contemporary theories, thereby increasing their complexity and confusion. In the material world, the existence of matter is nearest to absolute truth. Defining matter on this basis can provide logical foundations for physical theories.

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

Introduction:

The physical world is made of real entities. An imaginary expanse, containing real entities, is known as space. Space is an invented and limitless container, envisaged by rational beings whenever they consider the 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 the material world, the existence of matter is nearest to absolute truth. Therefore, it is prudent to consider the 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 the universe.

The concept of mass is fundamental in contemporary physics. Mass is essentially defined as a property of a body that governs its acceleration when acted on by an external force. The magnitude of the 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. To satisfy certain axioms, in many modern theories, mass is correlated with energy (another imaginary entity) and the linear speed of light. As physics has progressed, the concept of mass has become more complex and often baffling. This confusing state can be clarified only by a precise definition of matter and reinstating 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 a place of existence for all real entities in the 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 the relative locations of real entities in space. The most convenient and widely used system is the 'three-dimensional spatial system'. In this, the space is divided by three mutually perpendicular imaginary planes into a three-dimensional (3D) spatial system with its origin at the intersection of the planes. Dimensions are represented by length, breadth, and height (thickness).

The substance of an entity makes it real. Attributes of a real entity are due to the substance (stuff) it contains. Objective reality and positive existence of real entities make them sensible to 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 as real. There are real entities that are beyond the 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 to measure distances in a three-dimensional (3D) spatial system. Therefore, it is physically impossible for us to comprehend real entities that exist 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 the 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 everything else, including a medium that fills the entire space without voids. Matter is the concrete form of substance, the existence of which reflects in itself as the absolute essence of a real entity. Existence of matter, as the substance of all real entities, is a physical fact rather than a metaphysical assumption.

In the 3D spatial system, the existence of a real entity indicates its volumetric presence in all three spatial dimensions, regardless of the degree or extent its measurements may be small in each spatial dimension. For us, the real entities exist in the 3D spatial system. Nevertheless, if the magnitude of an object's measurement in any spatial dimension is so small that it is intangible by our scales, that object is considered not to exist in that particular spatial dimension. Objects that are intangible in all three spatial dimensions are considered not to exist at all. Objects that are intangible in two spatial dimensions are considered to be 1D objects. A single-dimensional object has its tangible existence only in one spatial dimension. Its measurements in the other two spatial dimensions are too small to be tangible by our standards. Objects that are intangible in any one spatial dimension are considered 2D objects. A 2D object has its tangible existence only in two spatial dimensions. Its measurement in the third spatial dimension is too small to be tangible by our standards. Objects that are tangible in all spatial dimensions are considered 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. Matter constitutes diverse objects in the universe, which, depending on their structures, exhibit different, unique (often contrary) properties. As the 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 the lack of any other property, this affinity of matter, alone, forms the basis of all creations and physical actions. Such affinity is only between the 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, the magnitude of affinity on a point on the periphery of a lump of unstructured matter is only inward and hence not identical in all directions. Imbalance in the 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 the dispersal of unstructured matter within.

The balance between peripheral affinities in various directions (in any plane) depends on the shape of the lump of unstructured matter. If the lump is a perfect sphere, the 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 the resultant direction.

Consider an 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 of the plane squeezes the lump gradually and at an accelerating pace towards its major axis and reduces its size along the minor axis to make its shape elliptical. The magnitude of resultant affinity along the 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, the elliptical section will divide itself by bringing these points in contact, such as to form two elliptical daughter-sections. Similar actions will take place in every plane, passing through the lump of unstructured matter. As parts of the 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 the 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 form a 2D object. Further actions will reduce its measurements intangible in the second spatial dimension, to convert the fragment into a 1D object. Due to the geometrical shape of a 1D object, no further actions can reduce its existence in spatial dimensions and form a matter-fragment without existence, on our scale. The prolongation process during conversion from a 2D object to a 1D object involves much greater movements, which initiate structural formations by neighboring pieces. These smallest parts of unstructured matter, which exist in a 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 the 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 the periphery of a 2D quantum of matter, its thickness can be increased to make it a 3D quantum of matter. As there are minute gaps between the matter contents of two adjacent quanta of matter in contact, they maintain their individuality under all conditions. The spatial dimensional state of a quantum of matter depends on the 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 the thickness of a plane. As there is no definite mechanism to regulate the quantity of matter in a quantum of matter, the matter contents of various quanta of matter may differ. This is an essential requirement for the development of further structures by matter. The ability of quanta of matter to exist in 1D and 2D spatial dimensions makes them capable of co-existing at points of their intersections. This is another essential requirement for the matter to fill the entire space without voids. Quanta of matter, in their 3D status, constitute all 3D matter-particles and macrobodies.

A macrobody is structured by numerous 3D matter-particles. 3D matter-particles in a macro body apparently interact to maintain the macrobody’s state and integrity. Apparent interactive efforts between 3D matter-particles are additive in any direction. Due to this nature of apparent interactive efforts, any macro body tends to achieve the 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 material bodies to fully occupy (as far as possible) all three spatial dimensions.

Contrary to the tendency of structured 3D material bodies to maximize their existence in all available spatial dimensions, unstructured (pure) matter has a tendency to reduce its existence to the 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 the universe.

Understanding matter in its various spatial dimensional states could remove all confusion 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', the '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 in direct or indirect contact with all other tangible objects, and fill the entire 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'. An entity that fills the entire space, outside most basic tangible objects, acts as a universal medium of interactions between them. In fact, simultaneous actions by an invisible universal medium on two 3D material bodies appear as interactions (directly) between the 3D material bodies. Universal medium is a particulate and continuous materialistic medium that pervades the whole of space, outside basic 3D matter-particles. Physical structure of the universal medium (space) endows it with the ability 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 can provide an absolute reference to all physical actions.

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

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 the behaviour of matter in its various spatial dimensional states can overcome the necessity to use 'mass' as its mathematical equivalent. Reinstating 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)*,
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