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Universal Medium

Nainan K. Varghese*

Independent Researcher, India

***Corresponding Author:**

Nainan K. Varghese, Independent Researcher, India.

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Abstract

Action at a distance through empty space' is an illogical assumption. An all-encompassing medium is essential to facilitate physical (apparent) actions between two real entities. The use of aether in aether theories lacks clarity and fails to logically describe many physical actions involving 3D material bodies. An alternative concept, presented in the book 'MATTER (Re-examined)' envisages an all-encompassing medium that is structured by real matter particles and has definite properties and mechanisms of action. For details, kindly refer to the book [1].

Keywords: Aether, Universal Medium, Quantum of Matter, 2D Energy-Field, Matter-Field, Distortion-Field, Disturbance

Introduction

'Action at a distance through empty space' is the worst assumption in physics. Rationality suggests an essential all-encompassing medium that fills the entire space outside the most basic 3D matter particles. Past proposals suggested in various aether theories assumed a medium of aether that immersed all 3D material bodies in it. All actions were attributed directly to the 3D material bodies, which would affect others through the medium. These assumptions required that the medium should have particular properties, which, when taken together, often contradicted themselves. Although the efforts could be transmitted through the medium, 3D material bodies were assumed to move in relation to the medium. Relative motion (between the medium and 3D material bodies) raised the question of friction between them and culminated in an assumption that a moving 3D material body experiences certain friction (or drag) from the medium. Many attempts to determine such a drag failed to show any results. Failure to determine aether-drag temporarily put an end to further search for the all-encompassing medium, and we have returned to the illogical assumption of 'action at a distance through empty space'.

However, in many of the current theories, vague forms of a medium, such as various types of fields, imaginary constructs, mysterious particles, etc., are currently used. They have no particular structure or properties. Each type of assumption is associated with a particular phenomenon. They are mainly used in analytical explanations to indicate the region of influence of a phenomenon in space. Regardless of lack of logical basis, their parameters facilitate better analytical understanding of a phenomenon.

This article summarises an alternative concept about a real universal medium that has definite constituents, structure, and properties. It is made of matter and fills the entire space outside the most basic 3D matter particles. It has the same matter density as a basic 3D matter particle, yet it behaves like a perfect fluid for the relative motions of 3D material bodies. It acts as an all-encompassing medium for all apparent interactions between them. Above all, it creates and sustains basic 3D matter particles out of structural disturbances in it. All actions are caused and executed by the universal medium itself rather than by the 3D material bodies. The universal medium inherently seeks permanency and serenity in nature. All statements made in this article are logically explained in the book. For details, kindly refer to [1].

Space

Perception is a process by which the living organisms become aware of their relative positions and objects around them (and of their own bodies). For perception, living organisms use data received by their senses to conjure their own versions of their surroundings. This helps their orientation and activities with respect to the surroundings. It aids the

individuals to understand their location in relation to any other objects with respect to depth, distance, etc., which are important for accounting for their safety and various movements. In order to be perceived, an object has to be real, i.e., it should have objective reality and positive existence in space. With respect to 3D rational beings, only the 3D material bodies have these qualities.

Since space has no material existence, it is a functional entity that is envisaged by rational beings whenever they think of material objects. Logically, space is understood as the boundless three-dimensional extent of the universe, where all material objects exist and in which events occur. All material objects have their relative positions and displacements in space. The extent outside the 3D material bodies becomes the space. Space has no real form or structure. An entity that has no form or structure cannot deform. Curvature, expansion or contraction of space, etc., used in some physical theories, are pure imagination, which may aid mathematical exercises to prove illogical and mysterious laws.

All spatial concepts are related to contact experiences of 3D material bodies. This has made it necessary to envisage an entity independent of 3D material bodies and yet embodying their locations. This entity is outside the 3D material bodies, yet enclosing them in close contact is understood as space. When the rational mind envisages a real object, it logically presupposes a place for its existence, and it is understood not by sensing such a place but by the necessity of a place for a real entity's existence. This does not happen in the case of functional entities, like emotions or qualities. In this sense, space appears to have a physical reality, which solely depends on the existence of (real) material objects in it. As a result, the notion of space is somewhat incoherent because it professes to be a container that is logically prior to its contents. Space turns out, in practice, to be merely an indefinitely extensible collection of its contents—the 3D material bodies. Everything that occupies space falls within this wider spatial context. Space denotes a property by virtue of which different real entities occupy different positions in the universe. The possibility of arranging an unlimited number of 3D material bodies next to one another denotes that the space is infinite in its extent.

It was believed that an entity named Aether filled the entire space. Therefore, all properties assigned to space could be the properties of aether. Aether had an ambiguous form, but it was regarded as a real entity. Since aether was real, it could deform, move, or otherwise interact with other 3D material objects. Unfortunately, no one could describe a satisfactory structure, constituents, or properties for the aether. It was assumed to be weightless, transparent, frictionless, undetectable chemically or physically, and literally permeating all matter and space. Aether theory was seriously weakened (1881) by the Michelson-Morley experiment, which was designed specifically to detect resistance to the motion of Earth through aether. Experiments showed no such tangible effect. Finally, when aether's existence could not be proved experimentally, the majority of scientists abandoned the concept of aether. They returned to more mysterious concepts of space and action at a distance through empty space.

Everyday experience of natural phenomena shows that mechanical things are moved by contact between a force-applying body and the force-receiving body. Thus, we came to conclude that for any action to take place between two 3D material bodies, there must be a contact between them. The nature of this contact is expressed as an action of effort between them. Cause and effect, without a discernible contact between participating 3D material bodies ('action at a distance through empty space'), contradicts common sense and has been an unacceptable notion. Whenever the nature of transmission of actions and effects over a distance was not understood, even today, aether (in the forms of various fields) is resorted to as a conceptual solution of a transmitting medium. However, descriptions of its functions remain vague, but its existence in the forms of various fields was required by common sense and thus not questioned. This is because an all-encompassing medium is essential to destroy the myth of 'action at a distance', which is the worst (illogical) assumption of modern science. There are many forms of fields used in various theories, each one proposing different types of fields with vague properties of aether.

Quantum of Matter

In our materialistic world, the existence of matter is closest to absolute truth. Hence, this concept regards the existence of matter as the single assumption required for its development. Matter provides substance (stuff) to all real entities in the universe. Substance is essential for an entity's objective reality and positive existence in space. Therefore, all real entities are made of matter, and anything not made of matter is functional. Functional entities are invented to fulfil functions assigned to them by rational beings. They have neither substance nor real existence in space. They exist in the minds of rational beings and in mathematical descriptions. Being non-material entities, they can neither act on nor be acted upon by other real entities. However, they are essential for our everyday dealings.

As the space is considered three-dimensional, a real body occupies a volumetric space, however small its measurement in any dimensional space may be. It may be tangible or not in any number of spatial dimensions. A 3D entity is tangible in all three spatial dimensions. A 2D entity has tangible measurement only in two spatial dimensions. A 1D entity is tangible only in one spatial dimension. We are 3D beings. All of our senses and instruments are devised to sense only 3D objects. Real entities that have intangible measurements in one or two spatial dimensions cannot be sensed by us or by our instruments. This does not make them unreal or functional.

'Quantum of matter' is derived (postulated) from the single assumption of the existence of matter. No other imaginary particles or assumed properties are envisaged. A quantum of matter is a bit of unstructured matter that has positive

existence in space. It has its existence in all spatial dimensions, however small such measurements may be. Each quantum of matter is an independent unstructured matter particle, and it keeps its individuality under all conditions. Quantum of matter cannot be divided, destroyed, or created. Different quanta of matter may contain different quantities of matter. The majority of quanta of matter in nature have (somewhat) equal matter-contents. The entire space is filled with quanta of matter in definite structural formations.

Nearest points within the matter-content of a quantum of matter or between quanta of matter in direct contact, in the same spatial dimension, have adhesive property (tendency to merge) so that the matter-content of a quantum of matter maintains its integrity under all conditions. Due to the adhesive property of its matter-content, a free quantum of matter tends to grow in one spatial dimension while reducing its measurements in other spatial dimensions. Even though the measurements of a quantum of matter in spatial dimensions other than its single spatial dimension are negligibly small, it has positive existence in all three spatial dimensions. A quantum of matter has a natural tendency to grow in its own single spatial dimension. Reducing the length of a free quantum of matter by external means compels it to grow into its second spatial dimension. Similarly, reducing the area of a 2D quantum of matter in its spatial plane compels it to grow into its third spatial dimension. If left free in free space, a quantum of matter (theoretically) grows in length indefinitely. Quanta of matter in different spatial dimensions but passing through the same point in space coexist at the point. Quanta of matter can express their individuality only in the spatial dimension(s) of their existence.

During the lengthening process of a quantum of matter, its ends may come in contact with others, which happen to be in its spatial dimension. Under such conditions, its lengthening process is restricted. Matter-contents of quanta of matter, in contact in the same spatial dimension, interact to move both of them towards each other's ends to form a junction point and turn so that both of them (their 1D bodies) align in a straight line. In this manner, free quanta of matter in space tend to form 1D quanta-chains. Due to frequent breakdowns of quanta-chains and the availability of free quanta of matter to migrate into them, there are far too many quanta of matter in any quanta-chain. Due to the excess number of quanta of matter forming a quanta-chain, they are held at reduced lengths in their 1D status. The tendency of quanta of matter in quanta-chains to grow in length keeps them under compression from their ends.

Universal Medium

A junction point may be formed by any number of quanta of matter in the same plane. Quanta of matter forming a junction point settle (radially) around the junction point in the same plane, with equal angular differences between neighbouring quanta of matter. However, junction points with four quanta of matter (neighbouring quanta of matter perpendicular to each other) provide the most stable configuration. For this, the quanta-chains settle perpendicular to each other and cross at junction points to form separate latticework structures in each plane. Each quantum of matter occupies one side of a latticework square formed by four quanta of matter. Only quanta of matter of (somewhat) equal matter-contents make a stable latticework structure that may be called a 2D energy-field. A 2D energy-field extends infinitely in its plane, in all directions.

Although a 2D energy-field is made of inflexible quanta of matter, the latticework structure formed by them is very flexible in its plane. Structural distortions of limited magnitude are tolerated within the latticework structure of a 2D energy-field. During such deformations: (1). Quanta of matter at the junction points are angularly deflected from their stable alignment with respect to each other and/or (2). Quanta of matter in the quanta chains vary their length, depending on variation of compression from their ends.

Angular displacements of quanta of matter at a junction point invoke reactions on them to return to their stable positions. Similarly, changes in the lengths of quanta of matter invoke reactions in the 2D energy-field to restore its stable configuration. Structural distortions in a 2D energy-field are opposed by the reaction that tends to restore stability and serenity of the 2D energy-field. Thus, it becomes an inherent property of the 2D energy-field to strive towards its stable state. In its stable state, a 2D energy-field is isotropic, homogeneous, and serene. Every plane in space contains a 2D energy-field. 2D energy-fields in different planes, passing through a point, coexist at that point. 2D energy-fields in all possible planes in space, together, form a universal medium. The universal medium, as a whole, is steady in space. Small local distortions in a 2D energy-field may be transferred within its plane. The universal medium can provide an absolute reference in space.

The universal medium replaces the 'functional entity of space' with a real entity. Due to the filling of volumetric spaces by the universal medium, the entire volume of space is occupied by quanta of matter. Total matter-content, within this volume of space is comparable with a 3D matter particle occupying the same volume of space. Since the constituent 2D energy-fields of the universal medium cannot act between themselves, matter-content enclosed within a volume of space (in the form of latticework structures) cannot express themselves to the 3D beings. However, when a 3D matter particle of the same volume is acted upon by the 2D energy-fields, the universal medium is able to express itself to the observer. We recognise 3D material bodies by their expression to an observer. Therefore, even though matter-content of a volumetric space in the universal medium remains hidden from the observers, a 3D matter particle of the same volume in the universal medium is observable. This is why 3D matter is considered real matter, and 2D and 1D matter may be considered functional matter. This hidden part of matter in the universe could be the proposed 'dark matter'.

Due to the latticework structures of the universal medium and its inherent property of stabilisation, distortions in its structure cannot be contained in a locality. Any structural distortion is bound to spread out in the latticework structures. If there is an external cause, these structural distortions tend to be transferred in the direction of the cause. Sequential spread of structural distortion from one latticework square to the next introduces delay in their development and transfer. As soon as the cause is removed, the latticework structure tends to regain its stability. However, distortions contained in the latticework structure continue to spread in its original direction unless they are removed by an external agency (by introducing structural distortions of equal magnitude but in the opposite direction) in the latticework structure. This property of delay during the development and transfer of structural distortions and the constant speed of their transfer through the universal medium gives rise to the property of inertia, which is presently (and wrongly) attributed to the 3D material bodies.

Displacements of quanta of matter (including changes in their lengths) are positive changes in 2D spatial system. They constitute 'work'. Stress, produced in latticework structures by the structural distortions, is the 'energy', associated with the work. Rates of structural distortions (work), being introduced into the latticework structures of the universal medium, are 'force or power'. Ultimately, the displacements of 3D material bodies in the universal medium are produced by the transfer of structural distortions from the higher distortion-density region to the lower distortion-density region. This is the action of an effort. Whichever is the manifestation of effort ('natural forces', like gravitational, electromagnetic, nuclear, inertial, etc.), they all act in a similar manner. Thus, fundamentally, there is only one type of effort ('natural force') in nature. Force is generally associated with displacement of a 3D material body, and it simply means the rate of work, irrespective of the nature of work or its source.

Constituent quanta of matter in the universal medium are held under compression from both their ends. This keeps the whole of the universal medium under compression. This compression, experienced by any disturbance (or 3D objects) in the universal medium, is the gravitation. 'Natural forces' are different manifestations of gravitation. If there are more than one disturbance (or 3D material body) in the universal medium, the extents of latticework structure on their outer sides are greater than the extent of latticework structure between them. The magnitude of gravitational effort is proportional to the extent of the 2D energy-field that is applying the effort. Hence, greater gravitational efforts experienced by these disturbances on their outer sides, compared to the gravitational efforts on their inner sides, produce the resultant efforts that tend to move them towards each other. This phenomenon is the attraction due to gravity. Universal medium acts on the 3D matter-content of each disturbance separately. Simultaneous actions on two or more disturbances (in 3D material bodies), considered together, appear as an attractive interaction between them.

The distortion-field of a 3D matter particle or a material object is a local region in the universal medium outside its border. It does not require discontinuity in the universal medium. Due to the latticework structure of the 2D energy-field, distortions in it have to form a closed loop. If the structural distortions start at a point, they have to spread through the 2D energy-field and return to the starting point so that there is no discontinuity in the latticework structure. The development of a distortion-field is an inertial action. Unlike structural distortions that act on the disturbances due to gravitation, distortions in the distortion-fields cannot act on 3D material bodies because certain actions of the same 3D material bodies are the cause of the distortions. A distortion-field has no ends at the borders of 3D material bodies.

Two overlapping distortion-fields change the distortion-densities on either side of a 3D material body. The tendency of the universal medium, to achieve homogeneity, tends to transfer the distortions from the region of higher distortion-density to the region of lower distortion-density. Transfer of structural distortions in the universal medium carries 3D matter particles, which are producing the overlapping distortion-fields, to move them in space (which appears as attraction or repulsion between them). Displacement of 3D material bodies is an inertial action. During this motion, additional structural distortions are created within its matter-field to change its state (of motion).

A deformed region of universal medium is a distortion-field. Due to the latticework structures of universal medium, structural distortions in it can exist only in arrangements of closed loops. A region in the universal medium in and about a 3D material object that contains all structural distortions associated with it may be generally called its matter-field. All distortion fields in and about a 3D material body that sustains the integrity and state of its motion, together, is its matter-field. Intrinsic structural distortions in the matter-field determine the integrity and stable existence of the 3D material body. Structural distortions that determine the state of the 3D material body's state of motion are its inertial field. Structural distortions that appear in the matter-field due to the presence of another 3D material body in the neighbourhood is the gravitational field.

A distortion-field in each plane may be classified by the nature of its structural distortions that are indicated by the imaginary lines of force with arrows. Linear lines of force indicate a magnetic field. The commencing end of the lines of force is the north magnetic pole, and the terminating end is the south magnetic pole. Circular or curved lines of force indicate an electric field. With respect to an observer, clockwise lines of force indicate positive electric charge, and anti-clockwise lines of force indicate negative electric charge. Each electric field has both positive and negative electric charges. Radial lines of force indicate a nuclear field. Inward lines of force indicate attractive, and outward lines of force indicate repulsive nuclear fields.

Properties of Universal Medium

A 2D energy-field is a two-dimensional entity. It has only length and breadth as its fundamental spatial dimensions. However small the dimensional measurement may be, 2D energy-field has its existence in the third spatial dimension also. A volumetric space is made of many parallel planes in contact. If the thickness of a plane is considered as nil or zero, any number of parallel planes cannot constitute a volumetric space. Therefore, parameters of a 2D energy field or other 2D disturbances can be accurately determined only after evolving a mathematical system that can measure the thickness of a plane or breadth and thickness of a straight line. 2D energy-fields in all possible planes, together, forms the universal medium.

2D Energy-Fields in the Universal Medium have the Following Inherent Properties:

- Inherent properties of universal medium are derived from the inherent nature of its constituent quanta of matter and the mechanical structure of their latticework formations.
- 2D energy-fields are two-dimensional material entities made of single-dimensional quanta of matter. Each 2D energy-field exists and acts in its own plane. Only one 2D energy-field exists in any one plane, and all planes in all directions in 3D space contain one 2D energy-field each.
- 2D energy-fields in different planes, passing through the same point in space, coexist at the point of their intersection.
- Quanta of matter in 2D energy-fields (in perpendicular quanta-chains, crossing at junction points) are held under compression from their ends.
- In the stable state of a 2D energy-field, constituent quanta of matter form sides of perfect squares in its latticework structure. Instability or deformation produces a restoring reaction in the latticework structure.
- 2D energy-fields (and hence the universal medium) are self-sustaining entities. They strive to sustain their integrity, stability, homogeneity, isotropy, and serenity.
- The tendency of the universal medium to close in any gap in the latticework structure of the 2D energy-field produces the phenomenon of gravitation.
- Universal medium fills entire space outside basic 3D matter particles. Each 2D energy field extends indefinitely in all directions in its plane. No 3D matter particles exist outside the universal medium.
- All higher-dimensional matter particles are disturbances with respect to the universal medium.
- The universal medium tends to reduce disturbances in it to a minimum either by reducing their sizes by shaping them circular (spherical) and compressing to a smaller size or by ejecting it out of its present location.
- All 3D matter particles and macrobodies are created by the universal medium from itself. The universal medium stabilises, sustains, and reverts them back into itself.
- The universal medium provides an all-encompassing medium for all apparent interactions between 3D material bodies.
- On the whole, the universal medium is perpetual and steady in space. No new 2D energy-field is ever produced. The universal medium provides an absolute reference.
- The region of universal medium, in and about a 3D material body, stores work in the form of structural distortions (energy in the form of stress due to structural distortions) to sustain its integrity, stability, and state (of motion).
- Structural distortions in two 2D energy-fields cannot interact with each other. The transfer of structural distortions or interactions between distortion-fields is limited to the plane of each 2D energy field. Simultaneous actions in many planes together appear as an action in 3D space.
- 3D matter particles are displaced in space by the transfer of surrounding structural distortions in steady universal medium. Absolute motions of 3D material bodies are with respect to a steady universal medium.
- 3D material bodies are moved by the universal medium rather than they move through the universal medium.
- Latticework structures of 2D energy-fields cause sequential development of structural distortions in the neighbouring latticework squares. Structural distortions, once developed, remain permanently within a 2D energy-field, unless removed by an external action. This gives rise to the property of inertia.

Conclusion

2D energy-fields, formed by quanta of matter in all possible planes, extending infinitely and filling entire space outside the most basic 3D matter particles, provide an all-encompassing universal medium for the creation, sustenance, and apparent interactions of 3D material bodies. This avoids the assumption of 'action at a distance through empty space'. Actions by the universal medium are the result of mechanical movements of its constituent quanta of matter within their latticework structures. Since the structural distortions in the universal medium are the cause of all actions, fundamentally, there is only one type of 'natural force' in nature that manifests in seemingly different forms. The natures of structural distortions in the matter fields determine the type of apparent interactions and field-efforts manifested during their overlapping. Inertia is a property of the universal medium. Perpetuity of universal medium bestows the universe with its steady state of existence.

Reference

1. Nainan K. Varghese.