

IDEAL UNIVERSAL MEDIUM

According to 'MATTER (Re-examined)'

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Abstract: No actions can be performed at a distance through empty space. An all-encompassing medium is essential to facilitate (apparent) physical actions between material bodies at a distance. Aether, used in aether-theories and other imaginary entities currently used to explain various physical phenomena, is too vague and fails to describe many physical actions of material bodies logically. By realising an entity that fills the entire space as an all-encompassing universal medium, the formless space can be replaced with a structured real entity. An ideal universal medium is a real entity with positive existence in space that has all properties currently assigned to space and other imaginary entities, like different types of aether, imaginary particles, various types of fields, etc.

Keywords: Space, aether, fields, ether, universal medium.

'Action at a distance through empty space' is the worst assumption in physics. Almost everyone accepts it as an illogical concept. Various types of 'aethers', used in the past to overcome this defect, were not very successful in providing logical media, for many reasons. Different types of aethers or other types of media (proposed in similar theories) had no uniform constituents, structure, or properties. Although the concept of aether is now discarded by most physicists, we currently consider many similar undefined concepts in conjunction with various phenomena to bring certain conceptual logic to their actions. A search for a logical concept to explain direct actions started very early in history and continues to date without much success.

Even when we advocate non-existence of a medium of actions, we use and believe in many types of media of actions, like imaginary particles with mysterious properties, different types of undefined fields, structure-less space with physical properties, mathematical constructs like space-time continuum, etc. These fields or entities have no particular structure or properties. Each type of field or entity is associated with a particular phenomenon. They are mainly used in analytical explanations to indicate the region of influence of a phenomenon in space. Lines of force in these fields facilitate a better analytical understanding of a phenomenon. Use of these concepts with widely varying and indefinable properties indicates a dire necessity for a universal medium, without which the concepts of physical phenomena cannot be logically understood. Hence, the quest for a concept towards a unified theory should start with a formulation for the logical development of an all-encompassing universal medium.

Rational thought suggests the existence of an all-encompassing medium that fills the entire space, including interparticle spaces within macrobodies. So far, all proposals suggesting such a medium have failed to stand scrutiny. Past proposals, suggested in various theories, assumed that the medium fills the entire space and all material bodies are immersed in it. All actions were attributed to material bodies, whose actions would affect other material bodies through the medium. Similar assumptions are used with respect to many different types of substitutes (used even today) to explain various physical phenomena. These assumptions required that the medium have certain properties. Proposed properties of different types of media, when taken together, often contradict each other.

A 'universal medium' that has all desirable properties of aether and other media but has no disadvantages of the same may be proposed to replace the (imaginary) functional entities like space, fields, force-carrying particles, concentrated forms of energy, imaginary entities with negative existence, vibrating strings, etc., currently used to facilitate conceptual explanations on various physical phenomena. Then the terms 'universal medium' and 'space' can be used synonymously. The term 'space' (and other functional entities used in place of space) will then mean the 'universal medium' and vice versa. No assumed particles, imaginary properties, or mysterious interactions should be necessary to understand any physical phenomenon.

Desirable qualities:

A useful medium should be universal in its character. It should extend infinitely in all directions. It should be reasonably isotropic, homogeneous, self-sustaining, stable, and static under all conditions and throughout its

whole extent. Since two material bodies cannot occupy the same space simultaneously, the universal medium should fill the entire space outside the smallest basic 3D matter-particles, without scope for empty regions. In this way, the universal medium will be in direct contact with every basic 3D matter-particle in the universe. All actions will occur directly between basic 3D matter particles and the universal medium. Simultaneous actions between the universal medium and many 3D matter-particles can be understood as (apparent) interactions between basic 3D matter-particles. Due to its (practically) static nature, the universal medium can provide an absolute reference for all actions and (apparent) interactions in nature.

A logical universal medium should be a real entity that exists in space. It should have objective reality. Only matter can provide substance, required for objective reality and positive existence in space. Therefore, it is imperative that an ideal universal medium should be made of matter, the same substance out of which all basic 3D matter-particles and macrobodies are made. However, we (the rational beings) consider only 3D matter as real. Hence, irrespective of the fact that only the 3D matter-particles are considered real, matter should be able to structure the universal medium also. To fulfil this requirement, it should be possible for the matter to exist in different forms other than in a 3D spatial status, without losing its identity as matter and its objective reality.

Real matter-particles should structure the universal medium under a definite mechanism of formation. A universal medium should have definite constituents, structure, and properties. The mechanism of formation and reformation, and the structure of the universal medium, should be identical throughout the universe. All actions, interactions, and properties of the universal medium should be derived from the properties of constituent matter-particles. Actions of basic matter-particles, forming the universal medium, should be able to account for all physical phenomena in nature; from creation and sustenance of the universal medium to interactions between 3D objects; from creation and sustenance of fundamental particles to cosmological events; from gravity to nuclear interactions, etc.

Basic 3D matter-particles contain matter without voids in them. The whole space, occupied by a basic 3D matter-particle, is occupied by matter. The universal medium fills the entire space outside 3D matter-particles. There are no voids in it, either. Hence, the entire space outside basic 3D matter-particles is also filled with matter. In order to satisfy this requirement, the matter density of a basic 3D matter-particle and the matter density of the universal medium outside the basic 3D matter-particle, should be identical. Yet, while the basic 3D matter-particles and macrobodies formed by them are tangible and can be sensed, the universal medium and its components should remain intangible and hidden from 3D rational beings. The entire universal medium, along with basic 3D matter-particles in it, should form a single block of matter of uniform matter-density and of infinite extent and volume. Matter cannot be compressed beyond the matter-density of a basic 3D matter-particle or that of the universal medium. A material body of zero volume and infinite mass (singularity) is impossible to achieve.

In order to avoid the problems related to impacts between imaginary particles and material bodies as envisaged in some earlier theories, the universal medium should be in direct and continuous contact with all basic 3D matter-particles in nature. All basic 3D matter-particles (and superior material bodies made of basic 3D matter-particles) should exist within the universal medium. The universal medium should serve as an interlink between every basic 3D matter-particle in the universe. Since there are no direct contacts between material bodies and all material bodies are in contact with the universal medium, the universal medium should serve as an intermediary for all apparent interactions between material bodies.

Universal medium should be a self-sustaining material body. By its inherent properties, the universal medium should strive towards homogeneity, isotropy, and serenity; all by itself. All 'natural forces', apparent interactions between material bodies, and diverse properties of material bodies in various forms and states should be the extensions of inherent properties of the universal medium. These properties should be derived from the properties of the universal medium's constituent foundational matter-particles.

Matter is inert. It cannot cause its own changes or displacements. All actions on material bodies or those actions which appear as actions by the material bodies, in nature, should be performed by the universal medium outside basic 3D matter-particles. Universal medium should contain all material bodies and hence form a common link between them. Each material body should be acted upon by the universal medium separately. Simultaneous actions by the universal medium on different material bodies appear as an interaction between material bodies. Having a universal medium that is in contact with every basic 3D matter-particle in the universe does away with the illogical assumption of 'actions at a distance through empty space'.

Since the universal medium pre-exists all material bodies and no material body exists outside the universal medium, it will fulfill the role of a container that is logically prior to its contents. Since material bodies do not exist outside the universal medium, the universal medium has to create basic 3D matter-particles out of itself, sustain them in their free states or in various combinations in the form of self-sustaining superior 3D matter-particles and macrobodies.

To maintain its own stability, it will be necessary for the universal medium to create and destroy material bodies cyclically and in different localities in the universe. This should be done by gradually destroying the macrobodies in certain regions to revert their matter-contents back into the universal medium, while creating new macrobodies using the matter-contents from the universal medium in other regions. This will not only maintain the integrity and stability of the universal medium, but it will also regulate the entropy of the universe within limits. A stable universal medium should be able to sustain a steady state of the universe, perpetually.

Rational beings are material bodies that can sense only 3D objects. Since universal medium or its components remain intangible and hidden to 3D rational beings, they should have their status in 1D or 2D spatial systems. 3D rational beings will be unable to sense them directly. Although foundational matter-particles have real existence in space, the magnitudes of their spatial dimensions will be too small to be tangible or sensed by using 3D spatial standards. Thus, the universal medium or its constituents in 1D or 2D states will remain hidden for all practical purposes. However, it could manifest its presence by tangible actions on material bodies.

All actions require impetus. Impetus is the drive or 'ability to do work' that is currently called 'energy'. A material body contains nothing but matter, which is incapable of doing work. Hence, the 'ability to do work' should be stored outside the matter-contents of material-bodies but in association with them. Universal medium, surrounding the basic 3D matter-particles or in and about a macrobody, is an ideal place to store the 'ability to do work' and 'work' itself. Transfer of work (in part or full) associated with one macro body to another macrobody may be understood as doing work by the first macrobody on the second macro body. In this process, the first macro body utilizes its 'ability to do work' (energy) to accomplish the work of the second macro body. In order to act on material bodies, the universal medium should have 'ability to act' (energy), stored in association with every 'force-applying' macrobody, which may be transferred during an action. That is, a universal medium should be able to transfer work from one region to another.

Actions are recognized by the motion (displacement) of material bodies. Macrobodies move by sequential displacements of their basic 3D matter-particles, starting from the point of application of an external effort. Basic 3D matter-particles, nearest to the 'force-applying mechanism', move first. This, in turn, compresses the universal medium between the displaced basic 3D matter-particle and the basic 3D matter-particle in front. The inherent property of stability causes the compressed part of the universal medium to return to its original form by expanding. Expansion can be achieved only by pushing basic 3D matter-particles, on either side of the compressed region, away from each other. Since basic 3D matter-particles at the point of application of external effort are displaced forward and held in place, basic 3D matter-particles in front have no options but to move forward. Similar repetitive actions, between basic 3D matter-particles of a macrobody, cause its displacement in space, during action by an external effort.'

'Energy-transfer' in or by macrobodies, essentially requires a universal medium between their constituent basic 3D matter-particles. Functional entity of 'energy' can also be transferred through the universal medium in the form of invisible disturbances, like: 'electromagnetic waves', 'field-disturbances', etc. Since no displacements of basic 3D matter-particles are involved in this process, the universal medium itself has to act as an agent of 'energy-transfer' by its own compression and expansion.

The universal medium should be a stable but deformable real entity. Deformations are displacements and hence tangible. Displacements, caused by deformations, in the universal medium are 'work' and are tangible. A tangible entity is real. Hence, work is a real entity. 'Ability to do work' could be the stress produced in the universal medium due to a strain or structural distortions in it. The ability to act or to do work is called 'energy'. Hence, the universal medium should act as a storage space for the 'energy'. Unlike stress, the strain or displacement in the universal medium is tangible and hence real. Stress accompanies strain in a stable system. Hence, strain in the universal medium about a material body is 'work,' and the associated stress is the associated 'energy'. Energy has no independent existence, and it is a functional entity. It appears as a shadow of work.

Efforts (forces) can be transmitted through the universal medium, and material bodies move in relation to the medium. Relative motion (between the medium and the material bodies) raises the question of friction between the universal medium and material bodies moving in it. This culminates in the assumption that a

material body, moving in the universal medium, should experience certain friction (or drag) to its motion, resulting in changes in the material body's temperature. In order to overcome this assumption, the universal medium should have a mechanism to move the material bodies through it without relative motion between them. Thus, the universal medium should not cause resistance (drag) to the motion of material bodies through it.

Universal medium, being the agency of actions, its constituent matter-particles should be able to have relative movements within its structural formation, so that such movements can move the material body through the universal medium. If the speed of movements by the constituent matter-particles is equal to the speed of the material body, there will be no relative motion between the universal medium and the material body, while having relative speed between them.

Due to the structural formation of the universal medium, relative movements of its constituent matter-particles should have an upper limit. Therefore, the universal medium would not be able to move material bodies at speeds greater than the speed corresponding to the upper limit of relative movements of its constituent matter-particles.

Although the universal medium has an identical matter-density as that of a basic 3D matter particle, it should be able to behave like a perfect liquid to the relative motions of material bodies. The structural formation of the universal medium should endow it with properties of both solid and fluid, simultaneously.

The universal medium should not interfere with apparent actions on or by the material bodies, because it is the universal medium itself that produces all such actions rather than material bodies.

A universal medium should be a self-sustaining material body. By its inherent properties, the universal medium should strive towards homogeneity, isotropy, and serenity; all by itself. All 'natural forces', apparent interactions between 3D material bodies, and diverse properties of 3D material bodies in various forms should be extensions of these inherent properties. These properties should be derived from the properties of the universal medium's constituent matter particles. The universal medium should inherently seek serenity in nature.

Advantages:

Having a structured universal medium that substitutes for a formless and imaginary space has many advantages. An all-encompassing universal medium ensures direct contact between every 3D matter-particle in the universe. This avoids the assumption of 'action at a distance through empty space'. 2D energy fields in all possible planes, extending infinitely in all directions and filling the entire space, provide an all-encompassing and real universal medium. A steady universal medium provides an absolute reference for all actions and locations of bodies in space. Since the universal medium has a structure, it can deform, contract, or expand. It acts as the originator of all actions on 3D matter bodies and apparent interactions between them. Matter is inert; it has no ability to act or move on its own. A universal medium, structured with real matter-particles, can logically explain all actions and characteristic properties of diverse material bodies in nature.

Universal medium accounts for the creation, sustenance, and apparent interactions of three-dimensional material bodies. Actions by the universal medium are the result of mechanical movements of its constituent quanta of matter, within their latticework structure. Since the structural distortions in the universal medium are the cause of all actions, fundamentally, there is only one type of effort in nature, which is currently bifurcated into many types of 'natural forces'. The manner of structural distortions in the universal medium determines the type of 'natural force' manifested during an interaction. Gravitation and inertia are properties of the universal medium. Perpetuity of the universal medium bestows the universe with its 'steady state' of perpetual existence.

We are 3D beings. All our actions and observations are limited to 3D material bodies. Hence, it is impossible for us to observe or act on the universal medium directly. This does not preclude the existence of a universal medium or its actions on 3D material bodies. If all physical phenomena related to matter can be logically explained by this concept of universal medium, it can be recognised as a real entity.

Reference:

Reference is self-published by the author. It is neither reviewed nor edited.

[1] <https://www.matterdoc.in/>

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