

# 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 are too vague and fails to describe many physical actions of matter bodies, logically. By realising a real 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 should be a real entity with positive existence and with all properties currently assigned to space or to other imaginary entities like; different types of aether, imaginary particles or various types of fields.

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

'Action at a distance through empty space' is the worst assumption in physics. Almost every one accepts it is an illogical concept. Various types of 'aethers', used in past to overcome this defect, were not very successful to provide 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, concept of aether is now discarded by most physicists, currently, we use many similar undefined concepts in conjunction with various phenomena, to bring certain conceptual logic to their actions. Search for a logical concept to explain direct actions started very early in the history and continues to date without much success.

Even when we advocate non-existence of media 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 forces in these fields facilitate better analytical understanding of a phenomenon. Use of these concepts with widely varying and indefinable properties indicates dire necessity for a universal medium, without which concepts of physical phenomena cannot be logically understood. Hence, quest for a concept towards unified theory should start with a formulation for logical development of an all-encompassing universal medium.

Rational thoughts suggest existence of an all-encompassing medium, which fills the entire space, including inter-particle spaces within macro bodies. So far, all proposals suggesting such a medium 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. Somewhat 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 should have certain properties. Properties of different types of media, when taken together often contradicted themselves.

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 (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 same space simultaneously, universal medium should fill entire space outside smallest basic 3D matter-particles, without scope for empty regions. In this way, universal medium will be in direct contact with every basic 3D matter-particle in universe. All actions will be directly between basic 3D matter-particles and universal medium. Simultaneous actions between universal medium and many 3D matter-particles can be understood as (apparent) interactions between basic 3D matter-particles. Due to its (practically) static nature, 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 macro bodies are made of. However, we (the rational beings) consider only 3D matter as real. Hence, irrespective of the fact that only 3D matter-particles are considered real, matter should be able to structure universal medium also. Because of this requirement, it should be possible for matter to exist in different forms other than 3D status, without losing its identity as matter and its objective reality.

Real matter-particles should structure universal medium under a definite mechanism of formation. Universal medium should have definite constituents, structure and properties. Mechanism of formation and re-formation and structure of universal medium should be identical throughout universe. All actions, interactions and properties of 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 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 it. Whole space, occupied by a basic 3D matter-particle, is occupied by matter. Universal medium fills the entire space outside 3D matter-particles. There are no voids in it, either. Hence, entire space outside basic 3D matter-particles is also filled with matter. In order to satisfy this requirement, matter-density of a basic 3D matter-particle and matter-density of universal medium, outside basic 3D matter-particle, should be identical. Yet, while basic 3D matter-particles and macro bodies formed by them are tangible and can be sensed, universal medium and its components should remain intangible and hidden from 3D rational beings. Entire universal medium, along with basic 3D matter-particles in it, together 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 universal medium. A matter-body of zero volume and infinite mass (singularity) is impossible to achieve.

In order to avoid problems related to impacts between imaginary particles and material bodies as envisaged in some earlier theories, universal medium should 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 universal medium. Universal medium should serve as interlink between every basic 3D matter-particle in universe. Since there are no direct contacts between material-bodies and all material-bodies are in contact with 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, 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 extensions of inherent properties of universal medium. These properties should be derived from properties of 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 material-bodies, in nature, should be performed by 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 universal medium separately. Simultaneous actions by universal medium on different material-bodies will appear as an interaction between material-bodies. Having a universal medium that is in contact with every basic 3D matter-particle in universe does away with illogical assumption of 'actions at a distance through empty space'.

Since universal medium pre-exists all material-bodies and no material-body exists outside universal medium, it will fulfill the role of a container that is logically prior to its contents. Since material-bodies do not exist outside universal medium, 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 macro bodies.

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

Rational beings are material-bodies, who are able to 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, magnitudes of their spatial dimensions will be too small to be tangible or sensed by using 3D spatial standards. Thus, 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 drive or 'ability to do work' that is currently called 'energy'. A material-body contains nothing but matter, which is incapable to do work. Hence, 'ability to do work' should be stored outside matter-contents of material-bodies but in association with them. Universal medium, surrounding basic 3D matter-particles or in and about a macro body is an ideal place to store 'ability to do work' and 'work' itself. Transfer of work (in part or full), associated with one macro body, to another macro body may be understood as doing work by first macro body on second macro body. In this process, first macro body utilizes its 'ability to do work' (energy) to accomplish work of second macro body. In order to act on material-bodies, universal medium should have 'ability to act' (energy), stored in association with every 'force-applying' macro body, which may be transferred during an action. That is, universal medium should be able to transfer work from one region in it to another.

Actions are recognized by motion (displacement) of material-bodies. Macro bodies move by sequential displacements of their basic 3D matter-particles, starting from the point of application of external effort. Basic 3D matter-particles, nearest to 'force-applying mechanism', move first. This, in turn, compresses universal medium between displaced basic 3D matter-particle and basic 3D matter-particle in front. Inherent property of stability causes compressed part of 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 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 macro body, cause its displacement in space, during action by external effort.

'Energy-transfer' in or by macro bodies, essentially requires a universal medium between their constituent basic 3D matter-particles. Functional entity of 'energy' can also be transferred through 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, universal medium, itself, has to act as an agent of 'energy-transfer' by its own compression and expansion.

Universal medium should be stable but deformable real entity. Deformations are displacements and hence tangible. Displacements, caused by deformations, in universal medium are 'work' and it is tangible. A tangible entity is real. Hence, work is a real entity. 'Ability to do work' could be stress produced in universal medium due a strain or distortion in it. Ability to act or to do work is called 'energy'. Hence, universal medium should act as storage space for 'energy'. Unlike stress, strain or displacement in universal medium is tangible and hence real. Stress accompanies strain in a stable system. Hence, strain in universal medium about a matter-body is 'work' and associated stress is its '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 universal medium and material-bodies move in relation to the medium. Relative motion (between the medium and material-bodies) raises the question of friction between universal medium and material-bodies, moving in it. This culminates in the assumption that a material-body, moving in universal medium should experience certain friction (or drag) to its motion, with resulting changes in material-body's temperature. In order to overcome this assumption, universal medium should have a mechanism to move material-bodies through it without relative motion between them. Thus, universal medium should not cause resistance (drag) to 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 material-body through universal medium. If the speed of movements by constituent matter-particles is equal to speed of material-body, there will be no relative motion between universal medium and material-body, while having relative speed between them.

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

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

Universal medium should not interfere with apparent actions on or by 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 matter bodies and diverse properties of 3D matter bodies in various forms should be extensions of these inherent properties. These properties should be derived from the properties of universal medium's constituent matter particles. This universal medium inherently seeks serenity in nature.

### **Advantages:**

Having a structured universal medium, in place of form-less 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 creation, sustenance and apparent interactions of three-dimensional material bodies. Actions by universal medium are the result of mechanical movements of its constituent quanta of matter, within their latticework-structure. Since distortions in 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'. Manner of distortions in universal medium determine the type of 'natural force' manifested during an interaction. Gravitation and inertia are properties of universal medium. Perpetuity of 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 matter bodies. Hence it is impossible for us to observe or act on universal medium, directly. This does not preclude the existence of universal medium or their actions on 3D matter-bodies. If all physical phenomena, related to matter, can be logically explained by this concept of universal medium, it should be recognised as true.

### Reference:

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

[1] <http://www.matterdoc.info>

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