

UNIVERSAL MEDIUM

According to 'MATTER (Re-examined)'

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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 actions. Aether, used in aether-theories is too vague and it fails to describe many physical actions about 3D matter-bodies, logically. Alternative concept, presented in the book, 'MATTER (Re-examined)' envisages an all-encompassing medium, which has real constituent matter-particles, structure, properties and actions. For details, kindly refer to same [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. Rational thoughts suggest an all-encompassing medium, which fills entire space, including inter-particle spaces within macro bodies. Past proposals, suggested in various aether theories, assumed that the medium fills entire space and all matter-bodies are immersed in it. All actions were attributed to matter-bodies, whose actions would affect other matter-bodies through the medium. These assumptions required that medium should have certain properties, which, when taken together often contradicted themselves. Although, efforts could be transmitted through medium, matter-bodies were assumed to move in relation to medium. Relative motion (between medium and matter-bodies) raised the question of friction between them and culminated in an assumption that moving matter-body experiences certain friction (or drag) to its motion in medium. Many scientists attempted to determine such drag, until experiment to determine aether-drag on earth's motion in space 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 illogical assumption of 'action at a distance'.

However, in many of current theories, vague forms of universal medium are used – various types of fields, etc. They have no particular structure or properties. Each type of field 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.

This article summarises an alternative concept about universal medium that has definite constituents, structure and properties. It is made of matter and fills entire space outside 3D matter particles. It has same matter-density as matter density of basic 3D matter-particle, yet it behaves like a perfect liquid to relative motions of 3D matter-bodies. It causes no friction to moving 3D matter-bodies but acts as an all-encompassing medium for all apparent interactions between them. Above all, it is universal medium that creates and sustains basic 3D matter-particles out of disturbances in it. It cannot interfere with any apparent actions of 3D matter-bodies, because universal medium itself produces all such actions rather than 3D matter-bodies. Universal medium inherently seeks serenity in nature. All statements, made in this article, are logically explained in the book. For details, kindly refer [1].

Space:

Space is treated differently in different aspects. In physics; space is understood as boundless three-dimensional extent of universe, where all material objects including organisms (including rational beings like ourselves) exist and in which objects and events occur. All material objects have their relative positions and displacements in space. Space, itself, has no material existence. It is a functional entity that serves the purpose of locating various material bodies in it and where rational beings relate them with each other. The extent, outside material bodies, becomes the space.

Perception is a process by which living organisms become aware of relative positions of objects around them (and of their own bodies). For perception, living organisms use data received by their senses to conjure their own version of surroundings. This helps their orientation and activities with respect to surroundings. It aids individuals to understand their location in relation to any other objects with respect to depth, distance, etc., which are important for accounting for their various movements. In order to be perceived, an object has to real, i.e. it should have positive (real) existence. With respect to rational beings, only 3D matter-bodies can have positive existence. Since space has no material existence, it is a functional entity that is visualized by the rational beings for purposes, assigned to it. Space has no real form or structure. An entity that has no form or structure cannot deform or distort. Curvature, expansion or contraction of (structure-less) 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 matter-bodies (information gained by rational beings). This has made it necessary to envisage an entity independent of matter-bodies and yet embodying their locations. This entity is outside material bodies, yet enclosing them, is understood as space. When rational mind envisages a real object, it logically pre-supposes a place for its existence. This is understood not by sensing such a place but by the necessity of a place for real entity's existence. This does not happen in case of functional entities, like, emotions. In this sense, space appears to have a physical reality, which solely depends on existence of (real) material objects in it. As a result, 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 – 3D matter-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 universe. Possibility of arranging an unlimited number of material bodies next to one another denotes that space is infinite in its extent.

There is no logical argument for theories, based on these types of concepts. That is why it was believed that an entity, named aether, filled the entire space. In these theories, aether replaced space by filling it entirely. Therefore, all properties assigned to space could be 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 material objects. Unfortunately, no one could describe a satisfactory structure, constituents or properties for aether. It was assumed to be weightless, transparent,

frictionless, undetectable chemically or physically and literally permeating all matter and space.

Aether theories met with increasing difficulties as nature of light and structure of material objects became better defined, even if it was on imaginary basis. Since there is no accepted definition of aether, scientists concentrated their effort to find effects aether may make on other macro bodies. For this they assumed; when a large macro body moves through aether, it should essentially experience drag due to friction between the two. Aether theory was seriously weakened (1881) by Michelson-Morley experiment, which was designed specifically to detect resistance to motion of Earth through ether. Experiments showed no such tangible effect. Finally, when aether's existence could not be proved experimentally, by experiments based on illogical theories, majority of scientists abandoned the concept of aether. They returned to more mysterious concepts of space.

Everyday experience of natural phenomena shows mechanical things are moved by contact between force-applying body and force-receiving body. Thus, we came to conclude that for any action to take place, between two material bodies, there must be a contact between them. Nature of this contact is expressed as action of effort between them. Cause and effect, without a discernable contact between participating material bodies ('action at a distance through empty space') contradicts common sense and has been an unacceptable notion since earliest of time. Whenever 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 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.

Aether, expressed as various types of fields were discovered during the heyday of aether-theories, according to which whole space is permeated by a medium capable of transmitting actions between material bodies. Electric and magnetic fields were interpreted as descriptions of state of strain of aether, so that location of stored energy in space was like as it would be in a compressed spring. With abandonment of aether-theories, following rise of relativity theory, this imaginary model ceased to have validity. However, original aether is preserved by us in the form of various fields in our theories. This is because, an all-encompassing universal 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.

Space is also viewed only as a conception. Since space provides an extent for real or 3D material bodies to exist, concept of '3D material object' is necessary to define space. Concept of '3D material object' is linked to our sense-experiences, which continue through certain time. Existence of real objects is thus of a conceptual nature, linked to our sense-experiences. Existence or reality of material bodies are defined simply as concepts of our mind, which depends wholly on their being connected with our sense-experiences. Argument, supporting these types of theories, is that a rational being's thoughts and concepts are created by experiences of his senses with 3D material objects. They are meaningful only with reference to his senses. His thoughts are products of his mind's activity. As long as the mind can act in certain way, existence or reality of objects is immaterial to understand his surroundings. Therefore, no wise logical consequences of sense-experiences are required to understand universe or actions in it. Although this argument overlooks that presence of real objects is necessary to produce sense-experiences, without which mind's activity cannot take place, it is very useful to produce exotic and mysterious physical theories. In these theories, space is often linked with another functional entity, 'time', to form another functional entity called 'space-time continuum'.

Quantum of matter:

'Quantum of matter' is derived (postulated) from the single assumption used in this concept ('Substance is fundamental and matter alone provides substance to all real entities'). 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. Majority of quanta of matter in

nature have (somewhat) equal matter-contents. Entire space is filled with quanta of matter in definite structural formations.

Nearest points within matter-content of a quantum of matter or between quanta of matter in direct contact, in same spatial dimension, has adhesive property (tendency to merge) so that matter-content of a quantum of matter maintains its integrity under all conditions. Due to 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, 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. Thus, a free quantum of matter is a 1D matter-body with positive existence in all spatial dimensions. A quantum of matter has a natural tendency to grow in its own single spatial dimension. Reducing length of a free quantum of matter, by external means, compels it to grow into second spatial dimension. Similarly, reducing area of a 2D quantum of matter, in its spatial plane, compels it to grow into third spatial dimension. If left free, in free space, a quantum of matter (theoretically) grows in length, indefinitely.

During 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 condition, lengthening process of the quantum of matter is restricted. Matter-contents of quanta of matter, in contact in same spatial dimension, interact to move both of them towards each other's ends to form 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 break-downs of quanta-chains and availability of free quanta of matter to migrate into them, there are far too many quanta of matter in any quanta-chain. Due to excess number of quanta of matter, forming a quanta-chain, they are held at reduced lengths in their 1D status. Tendency of quanta of matter in quanta-chains, to grow in length, keeps all quanta of matter in it under compression from their ends. Normally, quanta of matter in a quanta-chain are maintained at the brink of their growth into second spatial dimension. If a quantum of matter encounters quanta of matter in other spatial dimensions during its lengthening process, it is not restricted in its growth. Quanta of matter in different spatial dimensions but passing through same point, in space, coexist at the point. Quanta of matter can express individuality only in the spatial dimension(s) of its existence.

Although quanta of matter in their 1D status are real matter-bodies, as 3D beings, we are unable to appreciate their real existence in our 3D spatial system. Because of this difficulty, we may consider quanta of matter in their 1D and 2D states as functional entities.

Universal medium:

A junction-point may be formed by any number of quanta of matter (whose second spatial dimension is) in same plane. Quanta of matter, forming a junction-point settle (radially) around the junction-point, in 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 most stable configuration. For this, quanta-chains settle perpendicular to each other and crossing 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 stable latticework-structure. Latticework-structure, formed by quanta of matter, is 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, latticework-structure formed by them is very flexible in its plane. Distortions of limited magnitude are tolerated within latticework-structure of a 2D energy-field. During distortions: (1). Quanta of matter at junction points are angularly deflected from their stable alignment with respect to each other and/or (2). Quanta of matter in quanta-chains vary their length, depending on variation of compression from their ends.

Angular displacements of quanta of matter at a junction-point invoke reaction on them to return to their stable positions. Similarly, changes in lengths of quanta of matter invoke reaction in 2D energy-field to restore its stable configuration. Distortions in 2D energy-field are opposed by reaction. Reaction tends

to restore stability and serenity of 2D energy-field. Thus, it becomes an inherent property of 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, co-exist. 2D energy-fields in all possible planes in space, together, form universal medium. Universal medium, as a whole, is steady in space. Small local distortions in a 2D energy-field may be transferred within its plane. Universal medium can provide an absolute reference in space.

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

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

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

3D matter:

Constituent quanta of matter in universal medium are held under compression from (both) their ends. Should there be a local break-down in latticework-structures; a gap is created in universal medium. Quanta of matter in each plane, which occupied the region of gap as part of latticework-structure, are released to freely float within the gap. As soon as quanta of matter become free, they start to grow in their single spatial dimension and increase their lengths, while attempting to regain positions in latticework-structures. In the mean time, due to compression in quanta-chains, they grow into and reduce area of gap. As a result, many of free quanta of matter in gap are not able to migrate back into latticework-structure in corresponding planes.

Encroaching quanta-chains gather quanta of matter in the gap, which are unable to gain positions in latticework-structures. Universal medium compresses gathered free quanta of matter, in each plane, until combined entity of free quanta of matter become a circular 2D disturbance within 2D energy-field.

This gives rise to property of 2D energy-fields to reduce any disturbance in them to minimum magnitude. Magnitude of a disturbance is length of its perimeter in contact with latticework-structure of 2D energy-field. Tendency of 2D energy-field, to grow into a gap in it, is gravitation. Gravitational pressure (effort) is enormously strong, that it can compress 1D quanta of matter into higher spatial dimensions.

If matter-content of 2D disturbance is more than certain limit, compression on disturbance, by gravitation, compel constituent quanta of matter in disturbance to grow into their third spatial dimension. A disturbance, growing into third spatial dimension, creates 3D matter. In our sense, this is creation of real matter from postulated 1D matter-particles (functional entities with respect to 3D beings). Reverse process is reversion of real matter into its functional state.

Gravitational effort is by latticework-structure of a 2D energy-field in the direction away from quanta-chains, which are exerting the effort. It is of push nature. Gravitational effort can act only on curved perimeter (surface) of a disturbance. All 3D matter-particles are disturbances with respect to universal medium. If distortion-densities on opposite sides of a 3D matter-particle are different, distortions tend to redistribute by transferring towards region of lower distortion-density. While doing so, they carry the 3D matter-particle, along with them. This displaces 3D matter-particle in space.

If there are more than one disturbance in a 2D energy-field, extent of latticework-structure on their outer sides are greater than the extent of latticework-structure between them. Magnitude of gravitational effort is proportional to the extent of 2D energy-field that is applying the effort. Hence, these disturbances experience greater gravitational efforts on their outer sides, compared to gravitational efforts on their inner sides. Relative differences between gravitational efforts, on either side of disturbances, produce resultant efforts that tend to move them towards each other. This phenomenon is attraction due to gravity. Moving two disturbances, by attraction due to gravity, to combine with each other and form a larger disturbance is another manifestation of 2D energy-field's property to reduce disturbances in it to minimum. All higher dimensional matter-bodies are disturbances with respect to 2D energy fields (universal medium).

Universal medium acts on each disturbance separately. Simultaneous actions on two or more disturbances (3D matter-bodies), considered together, appear as interaction between them. Since apparent attraction between two disturbances is the resultant of differences in gravitational actions on them, it appears very feeble compared to other forms of 'natural forces'.

Action of gravitational effort on each 3D matter-body is independent of all other 3D matter-bodies. Development of distortions in universal medium, about a 3D matter-body, which produce gravitational actions on it, is an inertial action (action that produces the property of inertia). This takes place during development of basic 3D matter-particle. Thereafter, apparent interactions between 3D matter-bodies, due to gravity, are instantaneous. Hence, changes in magnitude and action of attraction due to gravity takes place instantaneously on change of parameters or constitution of 3D matter-bodies. Changes in parameters or constitution of a 3D matter-body are carried out by developing appropriate distortions in universal medium about it. Gravitational efforts on it changes simultaneously during this development. This causes instantaneous changes in gravitational attraction between two 3D matter-bodies, on changes of their parameters. No transfer of imaginary particles/energy from one 3D matter-body to another is required to produce changes in attraction due to gravity between two 3D matter-bodies. However, their inertial motions, under attraction due to gravity, are again subject to inertial delay.

Photon:

Larger 2D disturbances are further compressed, into 3D states, by universal medium to form 3D disturbances, which later become matter-cores of basic 3D matter-particles. During creation of a 3D disturbance, unevenness of gravitational action on its surface ejects it (in full or in part) from 2D energy-fields, where it was originally located. 2D energy-fields are everywhere in space. Ejected 3D disturbance can never escape from being in 2D energy-fields. Therefore, ejection of 3D disturbance from 2D energy-fields of its existence is a continuous process. Hence, matter-core of basic 3D matter-particle has inherent property of linear motion in universal medium. It is shaped as disc and its radial size is maintained at critical value, which is common to matter-cores of all basic 3D matter-particles.

Asymmetry of ejection on 3D disturbance initiates spin motion of its matter-core about one of its diameter. Eventually, gravitational actions on 3D disturbance move it at constant (highest possible) linear speed and spin it at angular speed proportional to its matter-content.

Universal medium exerts gravitational effort by creating distortions in the region surrounding 3D disturbance. All work (energy) required for its creation and motion is stored in associated distortions in universal medium. As distortions are transferred through universal medium at highest possible linear speed, 3D disturbance is also carried with them at the same linear speed. This 3D disturbance (disc-shaped matter-core, moving at a constant linear speed and spinning at angular speed proportional to its matter-content) and associated distortions in universal medium, together form a 'photon'.

A photon is a corpuscle of radiation (infra red, light, x-rays, etc.). It has a matter-core and surrounding distortions (inertial-pocket) in universal medium. Inertial-pocket, about a photon's matter-core in any plane, has many similarities with electromagnetic waves. Matter-core and surrounding inertial-pocket give a photon, its dual nature. Matter-core provides corpuscular nature and inertial-pocket provides electromagnetic nature.

Photon moves through universal medium. Moving distortions in universal medium (inertial-pocket) carry matter-core of photon. Motion of photon relative to universal medium produces resistance to its motion. However, at any instant, sufficient ejection-effort is produced by inertial-pocket to overcome this resistance. Since, both, resistance and ejection-effort are produced by universal medium; drag on photon is effectively reduced to nil value. It becomes inherent property of universal medium to move all photons (even in the form of superior 3D matter-particles) at the highest possible linear speed. Ability of ejection-effort to overcome resistance determines the highest possible linear speed, which we observe as critical constant linear speed of light. Highest possible linear speed that can be provided by any region of universal medium (space) is constant.

Linear and angular speeds of photon are with respect to universal medium. Its linear speed is critical constant; because that is the highest possible linear speed at which it can be moved by transfer of distortions in universal medium, without causing break down of its own latticework-structures. A photon traverses same number of latticework-squares in universal medium in the same interval of time. (Note that scale of time and distance are defined in terms of observed linear speed of light). Spin speed or frequency of photon is proportional to its matter-content.

Attempt to increase photon's linear speed tends to increase its matter-content (by assimilating quanta of matter from surrounding universal medium) with corresponding increase in its frequency rather than increasing its linear speed. Similarly, attempt to reduce photon's linear speed tends to decrease its matter-content (by discarding quanta of matter into surrounding universal medium) with corresponding reduction in its frequency rather than reducing its linear speed. Hence, linear speed of light in any region space, in any direction is a critical constant.

Usually, observer is also located in the region of universal medium, where linear speed of light is considered. Under such conditions linear speed of light with respect to observer is identical in all direction, irrespective of motions of observer. This is because linear speed of observer with respect to surrounding universal medium is negligible, when compared to linear speed of light with respect to surrounding universal medium. If observer is small enough to move with considerable linear speed with respect to the surrounding universal medium, linear speed of light in the region obeys all physical rules of relative motion, as motion of any other macro body. Discrepancies appear only when linear speeds of light in different regions of space (with different distortion-status in universal medium) are compared. This is how we came to regard linear speed of light as variable, when it is inside a medium within the region of observer and time as variable, when it is outside the region of observer.

Shape of matter-core of a stable photon is segmented spherical with convex curvature at rear of each segment. Curvatures on surface of photon's matter-core vary continuously to provide required ejection and spinning efforts. Photon is the basic 3D matter-particle and there are no other types of basic 3D matter-particles. All superior 3D matter-bodies are made of photons, in various combinations.

Macro bodies:

Two (complimentary) photons of high matter-content, under suitable conditions, combine like a binary unit of spinning 3D matter-particles (spinning about a common axis) moving in a circular path about common centre. This unit is a primary matter-particle called biton. Bitons, in turn, combine to form fundamental particles, atoms, molecules, etc., to form macro bodies. Each 3D matter-particle of a macro body has its constituent photons and associated inertial-pockets. Due to curved paths of photons in bitons, their inertial-pockets are permanently unstable. Distortions in universal medium from unstable inertial-pockets of constituent photons form distortion-field of biton. Distortion-fields of all 3D matter-particles in a macro body, together, form macro body's matter-field.

Matter-field of a macro body contains enough distortions in it, to sustain stability and integrity of its 3D matter-particles and combined macro body in its current state. Due to latticework-structures of universal medium, matter-field of a macro body extends outside its periphery. Magnitude of extension depends on size of macro body and distortion-density of its matter-field. Distortion-density, in matter-field, gradually reduces from macro body's perimeter until all distortions are lost and latticework-squares in universal medium become undistorted.

Additional distortions, introduced into macro body's matter-field, from external source, induce macro body's whole-body motion. 3D matter-particles of macro body move with respect to universal medium. Although universal medium is steady in space, it is the moving distortions in them, which are moving 3D matter-particles of macro body. Because of this arrangement, even though 3D matter-particles are moving with respect to static universal medium, no resistance is offered to motion of 3D matter-particles. A macro body, moving through universal medium, does not suffer drag from the medium.

Additional distortions in universal medium move in straight lines, separately in each plane. Rotary motion of a macro body is produced by linear motions of its 3D matter-particles in different directions at different linear speeds. If constituent 3D matter-particles of a macro body are moved away (by another effort) from linearly moving distortions in matter-field of a macro body, part of original linearly moving distortions are lost into space and macro body stops responding to lost distortions. State (of motion) of macro body depends on distortion-density of additional distortions (other than distortions required to sustain integrity and stability of macro body and its constituent 3D matter-particles) and distribution of additional distortions in its matter-field.

Introduction of distortions from external source and their stabilizations within macro body's matter-field, takes time. This delay gives rise to inertia, which is presently attributed to 'body-mass'. Inertia is a property of associated matter-field (universal medium) of macro body. Matter-content of macro body is inert. It is the associated universal medium that produces all apparent actions/interactions, presently attributed directly to matter-bodies. Once, certain magnitude of additional distortions are introduced into matter-field of a macro body, it remains permanently within it and continues to keep macro body indefinitely in its current state, until additional distortions are added, lost or removed (neutralized by distortions in opposite direction) by an external effort.

Since additional distortions (introduced by external source and moving 3D matter-particles) in matter-field are associated with 3D matter particles of macro body, speed of their transfer is limited by magnitude of distortions. Hence, a macro body may move at any speed, lower than highest permitted speed by universal medium (less than linear speed of light). As linear speed of macro body approaches linear speed of light, its constituent 3D matter-particles break down to inferior 3D matter-particles until its linear speed reaches linear speed of light. At linear speed of light, only photons from macro body survive. Beyond this linear speed no 3D matter-particle can move. This limits linear speed of macro bodies in space to less than linear speed of light. Gradually, even matter-contents of photons revert back to quanta of matter in universal medium. Continuous recycling of matter, between macro bodies (where entropy increases) and universal medium (where high order is maintained), keeps entropy of universe within limits. Total magnitude of matter, in the form of macro bodies in universe, varies cyclically.

Inertia is a property of universal medium, produced by its latticework-structures. Attraction due to

gravity is the product of difference in extent of universal medium on opposite sides of basic 3D matter-particles of a macro body. Both these phenomena have nothing to do with mass of a macro body, which is mathematical relation between force due to external effort on a macro body and its acceleration. Hence, differentiation into gravitational mass and inertial mass is arbitrary.

Distortion-fields:

Application of gravitation, essentially, requires gaps in universal medium, which are filled with 3D matter. Universal medium applies gravitation on disturbance (even if it is in the form of 3D matter-particle) within gaps in it. Gravitation is applied on disturbance as long as it is in existence in universal medium. Due to continuous application of gravitation, latticework-squares of surrounding 2D energy-fields remain distorted as long as disturbance is in existence. Directions of distortions are inward from (curved) perimeter of disturbance, towards centre of curvature (of its perimeter). This part of distortion-field may be called gravitational-field.

A matter-body is moved by transfer of distortions in universal medium. Conversely, movement of a 3D matter-particle through a 2D energy-field can be considered to produce distortions in universal medium. Two sets of distortions, transferred in different directions tend to move a 3D matter-particle in resultant direction. Displacement of 3D matter-particle in resultant direction produces distortions in 2D energy-fields in its direction of motion, while original distortions, which caused its resultant motion, are lost to the 3D matter-particle due to its displacement from direction of transfer of the distortions. State of its motion in new direction is maintained by distortions caused by its displacement in resultant direction. 3D matter-particle, moving under more than one set of distortions, produces independent set of distortions in surrounding universal medium, corresponding to its current direction of motion.

Constituent (two) photons of bitons move in circular path. They are under constant action by distortions causing their linear and spin speeds at critical values and distortions produced due to attraction due to gravity between them. Motions of these photons in resultant circular path create new sets of distortions in universal medium. They constitute distortion-field of biton, which is angular in nature, around biton. Number of bitons combines to form superior 3D matter-particles. Distortion-field of a superior 3D matter-particle is resultant of distortion-fields of all its constituent bitons.

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

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

In order to simplify explanations, complicated nature of distortions in a distortion-field (in a plane), we may resolve nature of distortions in latticework-structure of a 2D energy field into various components. There are three possible varieties of distortions – linear, angular and radial. Direction of component of distortion-field is indicated by imaginary lines of forces. If (linear) directions of two interacting components of distortion-fields are in opposite directions, they tend to inactivate each other. If (linear) directions of two interacting components of distortion-fields are in same direction, they tend to enhance each other.

Linear distortions:

For linear distortion, latticework-squares of a 2D energy-field are compressed or expanded in same linear direction. This gives rise to magnetic nature of distortion-field. Since there are no 3D matter-bodies, which produce linear distortion-fields, magnetic nature of distortion-field can be produced only by arranging number of bitons, which have angular distortion-fields, in suitable array. End of linear distortion-field, from where lines of forces appear to come out (of 3D matter-body, producing the distortion-field), is North pole and the end of distortion-field, to which lines of forces appear to enter is South pole. A small part of a curved line of force acts as a linear line of force. Hence, an angular distortion-field, where lines of forces have less than certain magnitude curvature, acts as linear distortion-field (magnetic field).

Angular distortions:

For angular distortions, latticework-squares of a 2D energy-field are deformed in angular direction. Lines of forces are curved lines with arrows in clockwise or anti-clockwise direction. This gives rise to electric nature of distortion-field. Photons in bitons move in circular paths. Hence, all bitons and superior 3D matter-particles (they are unions of bitons) have electric fields. Due to angular nature of electric field its lines of force are circular lines in (resultant) direction of motion of photons in bitons. Looking from one side, lines of force appear clockwise. This side of electric field is positive electric charge. Looking from opposite side, lines of force appear anti-clockwise. This side of electric field is negative electric charge. Electric charges are relative directions of electric field. Since they are relative directions, electric charge of an electric field depends on reference used. Electric charges have no independent existence as is believed today. Every electric field has both positive and negative electric charges. Both electrons and positrons have similar electric fields and electric charges.

Field-efforts or inertial action on corresponding 3D matter-bodies, produced by interaction between electric fields, not only depend on type of electric charges but also on distance between them. At certain distance (zilch-effort distance) between two electric fields, interaction between them produces no field-efforts or inertial motions of corresponding 3D matter-bodies. Beyond zilch-effort distance, due to lower curvature of lines of force, magnetic nature of distortion-fields dominates and electric fields behave like magnetic fields. Electric nature of distortion-fields (during interaction between two angular distortion-fields) is exhibited only when distance between them is less than zilch-effort distance, where lines of force have greater curvatures.

Radial distortion:

For radial distortion, latticework-squares of 2D energy-field are deformed in linear directions, radially towards or away from a central point. This type of distortions gives rise to nuclear field. If distortions are directed outwards from a central point, they produce repulsive nuclear field. Fundamental particles, associated with repulsive nuclear field (electrons), apparently repel all other primary and fundamental particles. If distortions are directed inward towards a central point, they produce attractive nuclear field. Fundamental particles, associated with attractive nuclear fields (positrons), apparently attract all other primary and fundamental particles.

Properties of universal medium:

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

2D energy-fields in universal medium have the following inherent properties:

1. Inherent properties of universal medium are derived from inherent properties of its constituent

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- quanta of matter and mechanical structure of latticework formations.
2. 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.
 3. 2D energy-fields in different planes, passing through same point in space, co-exist at the point.
 4. Quanta of matter in 2D energy-field (in perpendicular quanta-chains, crossing at junction points) are held under compression from their ends.
 5. In stable state of a 2D energy-field, constituent quanta of matter form sides of perfect squares in latticework-structure. Instability produces restoring reaction in the latticework-structure.
 6. 2D energy-fields (and hence universal medium) are self-sustaining entities. They strive to sustain their integrity, stability, homogeneity, isotropy and serenity.
 7. Tendency of universal medium to close-in any gap in latticework-structure produces gravitation.
 8. 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 can exist outside universal medium.
 9. All higher-dimensional matter-particles are disturbances with respect to universal medium.
 10. Universal medium tends to reduce disturbances in it to minimum either by reducing their sizes by shaping them circular (spherical) and compressing to smaller size or by ejecting out of itself.
 11. All 3D matter-particles are created from, sustained by and reverted back into universal medium.
 12. Universal medium provides an all encompassing medium for all apparent interactions between 3D matter-bodies.
 13. On the whole, universal medium is perpetual and steady in space. No new 2D energy field is ever produced. Universal medium provides an absolute reference.
 14. Region of universal medium, about a 3D matter-body, stores work in the form of distortions (energy in the form of stress due to distortions) to sustain its integrity and stability and state (of motion).
 15. Distortions in two 2D energy-fields cannot interact. Transfer of distortions or interactions between distortion-fields are limited to plane of each 2D energy field. Simultaneous actions in many planes appear as action in 3D space.
 16. 3D matter-particles are displaced in space by transfer of distortions in steady universal medium. Absolute motions of 3D matter-bodies are with respect to steady universal medium.
 17. 3D matter-bodies are moved by universal medium rather than they move through universal medium.
 18. Latticework-structures of 2D energy-fields cause sequential development of distortions in neighbouring latticework-squares. Distortions, once developed, remain permanently within 2D energy-field, unless removed by external action. This gives rise to property of inertia.

Aether drag:

It was the absence of assumed aether drag on earth's motion through space that ended progress in search for an all-encompassing universal medium. This was unnecessary because assumption of 'aether drag' itself is unwarranted. In above explanations, it is shown that every photon is moved by universal medium at highest possible linear speed. Photons, constituting primary particles, fundamental particles and superior 3D matter-bodies, have curved paths limited within bitons. A macro body consists of millions of photons, moving in circular paths, in it. Simple displacements/deflections of circular paths of constituent photons displace a macro body. It is the universal medium that is affecting such motion. Matter has no ability to move on its own. Since universal medium is the entity, which displaces a macro body, there is no relative motion or friction between them. Action is limited to universal medium within and in immediate neighbourhood of macro body.

Motion of a macro body, through universal medium, is like motion of a floating body in a narrow ocean current. Ocean current carries the floating body along with it and there is no relative motion between floating body and surrounding water. However, floating body has a clear relative motion with respect to vast ocean. Similarly it is the moving distortions in universal medium, which is moving a macro body. This part of universal medium is a local region in and about macro body. Distortions carry macro body along with them and there is no relative motion or friction between them. However, with respect to vast universal medium, macro body has relative displacement.

Photons, during their motion through universal medium, experience resistance. Photon's ejection (moving) effort is also caused by universal medium. Linear speed of photon is determined by resultant of these efforts. This linear speed is the highest possible linear speed through universal medium that can be sustained without breakdown. Since resistance from universal medium is already accounted for in the motion of photons, resistance is not carried further into motion of macro bodies. Therefore, macro bodies do not experience drag to their motion through universal medium (space).

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 existence of universal medium or its actions on 3D matter-bodies.

Conclusion:

2D energy-fields in all possible directions, extending infinitely and filling entire space provides an all-encompassing universal medium for creation, sustenance and apparent interactions of 3D matter-bodies. This avoids the assumption of 'action at a distance through empty space'. Actions by universal medium are the result of mechanical movements of its constituent quanta of matter, within latticework-structures. Since distortions in universal medium are the cause of all actions, fundamentally, there is only one type of 'natural force' in nature. Natures of distortions in universal medium determine type of interactions and field-efforts, manifested. Inertia is a property of universal medium. Perpetuity of universal medium bestows universe with its steady state of existence.

Reference:

- [1] Nainan K. Varghese, *MATTER (Re-examined)*, <http://www.matterdoc.info>

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