

BROWNIAN MOVEMENTS

(According to “Hypothesis on MATTER”)

Author: Nainan K. Varghese, matterdoc@gmail.com

Abstract: In free space, least dense particles in a fluid body settle at the centre and the body itself becomes spherical in shape. External pressure on a body reduces its size to increase its matter density and internal pressure. Internal pressure within a body acts as external pressure on its constituent primary particles. Enhancement of external pressure on primary particles increases their size and reduces their matter (and energy) content level to lower their matter density. In a fluid body, situated near a massive body, reduction of matter density of its constituent particles, corresponding to their location, produces a convection motion that causes “Brownian movement” of suspended particles in it. If no massive body is near the fluid body, Brownian movements in the fluid body do not take place.

Keywords: Brownian motion, Gravitational pressure, Kinetic theory of gas, Primary particles, Biton, Hypothesis on MATTER.

Introduction:

“Hypothesis on MATTER” describes an alternative concept. It advocates a radically different dynamics. In it: the matter content of a body and the energy about a body are distinctly separate. Matter content is the total sum of three-dimensional matter in a body. Energy is the strain developed due to ‘distortions’ in the natural arrangements of 1D ‘quanta of matter’ in and about a body. Matter content and energy content of a body cause and support each other for their existence and stability. They are not convertible into each other. Entire space is filled with ‘2D energy fields’, two-dimensional latticework formations by quanta of matter. 2D energy fields, in various directions and planes, passing through a point, co-exist. Although, 2D energy fields are made of (apparently) solid matter particles, due to their lattice-structures, they have all properties of an ideal liquid. 2D energy fields, with definite structure and properties, substitute for the imaginary aether. Parts of 2D energy fields within the body-dimensions contain sufficient distortions to sustain integrity and stability of a body in its current state. This part of 2D energy fields is the ‘matter field’ of the body. Distortions in the matter field are the ‘work’ existing in the body and it determines the state of the body. Force is the rate of work (distortions) being stored in the matter field of a body with respect to the displacement of a body. Energy is the stress due to distortions in the matter field. Action of a force is simple structural reshaping of the matter field and the resulting motion of any matter particles present in the region. State of a body depends on the work (energy stored) in the

matter field rather than on the force applied. 3D matter is inert. All apparent interactions between matter bodies take place through the medium of 2D energy fields. This avoids the assumption of ‘actions at a distance’. There are no ‘pull forces’ or ‘rigid bodies’ in this concept. All forces, classified into various types, are different manifestations of ‘only one type of force’ and it is of ‘push nature’.

Quanta of matter, dislodged from the 2D energy fields, during a local breakdown of the lattice structure, are gathered and compressed by gravitational actions to form 3D matter disturbance. Tendency of a 2D energy field to attain serene state ejects any 3D disturbance out of it at the highest possible speed. A 3D disturbance moving at critical constant linear speed and spinning at an angular speed proportional to its matter content is a ‘photon’ (corpuscle of light). Photons are spinning (about one of the diameter), disc shaped 3D matter bodies accompanied by corresponding distortions (similar to electromagnetic wave) in the 2D energy fields. Photons are the basic 3D matter particles. They are of uniform radial size and they, in various combinations, constitute all other superior 3D matter particles/bodies.

Presence of 3D matter particles in a 2D energy field breaks its continuity. Discontinuity causes imbalance in the 2D energy field. Pressures applied by the 2D energy field latticework from the sides, compress a matter particle. If the extents of 2D energy field on opposite sides of a matter particle are unequal, it experiences a resultant motion, which tends to move the particle towards the side of lower pressure. Extent of 2D energy fields between two 3D matter particles, in free space, is less than the extent of 2D energy fields on their outer sides. As a result, matter particles are apparently pushed towards each other. This action gives rise to the apparent gravitational attraction. Apparent gravitational attraction between two bodies is, relatively, a minor by-product of gravitational actions. It takes place between spinning and disc-shaped photons (which are in the same plane at the given instant) of both the bodies. Apparent gravitational attraction is produced between extremely small numbers of photons in two macro bodies. An average apparent gravitational attraction is derived from sporadic actions between various photons in two macro bodies, which happen to be in the same plane. Contrary to present belief, the gravitational force is enormously stronger compared to other manifestations of force.

Photons, corpuscles of light, are the smallest 3D matter particles in nature. All other bodies are made up of photons in various self-sustaining combinations. If two (high matter and energy content) photons moving in opposite directions approach near enough and are in phase (when nearest), they form a binary system under gravitational actions. Each of the photons orbits about the other in circular paths. This union of two photons is a primary particle – biton. Photons in a biton spin in synchronism, once during every rotation about each other. Mean size of a biton (circular path of the constituent photons) is equal to one wave length of the (corresponding) photon. Bitons in various self-sustaining combinations form fundamental particles, atoms, etc.

Changes in the external pressure on a biton tend to move its constituent photons towards or away from each other. As the photons are pushed nearer, apparent attraction due to gravity between them increases. Parts of this gravitational attraction act in opposite direction to photons’ linear motion in an attempt to slow them. Any attempt to lower the linear speed of a photon reduces its matter and energy contents [2]. Loss of matter and energy contents reduces photon’s spin motion, which in turn lowers its frequency and increase the length of its circular path. Enlargement of photons’ circular path increases the size of the biton, with corresponding reduction in its matter density. Similarly, reduction in the external pressure about a biton forces its photons to increase their matter content and reduce biton’s size with corresponding increase in its matter density. This phenomenon leads to the expansion of a body during compression (or heating) and its contraction during decompression (or cooling). Expansion during compression is usually overcome by reduction in the size of the body by pushing the matter particles towards the centre of the body. Contraction during decompression is usually overcome by displacement of body particles outwards from the centre of the body. Contrary to present theories, a matter body gains matter and energy contents during cooling or decompression and it loses matter and energy contents during heating or compression. A matter body is at its highest matter and energy content levels when it is coolest and in free space. A matter particle is at its lowest matter and energy content levels in its hottest state and in the centre of a body.

All conclusions expressed above are taken from the “*Hypothesis on MATTER*” [1]. For details, kindly refer to the same.

Compression of a body:

External pressure acting on a body compresses it. Compression is nothing but inward forces acting at body's surface towards a common centre. Force is the rate of work introduced into the body. Work, in and about a body, is the distortions in its matter field. Distortions in the matter field of a body determine body's current state. External force on a body acts against the reactive forces at the 2D energy field junctions in the matter field of the body.

Constituent particles of a body are held together by compression of the body by the apparent attraction due to gravity and attractive field forces between the body-particles. Gravitational forces on the particles tend to move them towards each other. Particles are prevented from colliding into each other by the repulsive field forces about them. During compression, body particles are moved towards the common centre and nearer to each other. In most cases, this can be seen by a reduction in the size of the body. Reduction in the distances between body particles increases the repulsion due to field forces between them. Changes in the field forces are due to changes in the matter field density in the area. Reactive component of this repulsive force provides external compressive pressure on the primary particles - constituent bitons in the fundamental particles of the body. Work done, due to compression of body, is stored in the form of additional distortions in the matter field. Increased matter field density provides compression of bitons in the body. As the bitons are compressed, they expand in size and lower their matter and energy contents. Matter content lost from the bitons, if in sufficient quantity, form photons to be radiated away in the form of heat or light. This phenomenon produces radiations from massive bodies. If in insufficient quantity, matter content lost from the bitons remain as 2D disturbances or the liberated quanta of matter are absorbed back into the 2D energy fields.

Actions on a body, during compression and heating are similar. Reduction in the matter content of bitons under compression lowers the mass of corresponding atoms/molecules of the body. At the same time, bitons increase in size, leading to expansion of atoms/molecules. These actions, together, reduce the matter density of the atoms and the body. Expansion of the body may be compensated, up to an extent, by decrease in body's volume due to external compressive pressure, moving the atoms towards each other. Application of external pressure on the body reduces body's volume by forcing constituent atoms/molecules of the body nearer, against the field forces keeping them away from each other. This may affect the change in the matter density of the body as a whole but leaves the matter density of constituent atoms/molecules, unaffected. Variations in the matter density of bitons are produced by changes in their matter content. Expansion of bitons in the body increases the size of a heated body, which is under no compressive force. Applying external pressure on a body makes the body lose its matter and energy contents.

Constituent particles (atoms / molecules) of a body are held together by the apparent mutual attraction due to gravity and other field forces. In any body, the inner most atom/molecule is under highest pressure due to gravity. Higher external pressure on this atom/molecule reduces its matter density by a larger magnitude compared to atoms at other locations within the body. If the body is in free space, where there is no other external force/pressure on the body, atom at the body's centre has least matter density. Matter density of atoms of the body gradually increases towards the surface of the body. In very large bodies, this difference in matter density (produced by high internal pressure of the body) may correspond to different physical states of matter. Thus a large body in free space may have its outer body in solid state while its interior is in liquid state. Very large bodies may have a solid exterior with matter in liquid states below it and matter in gaseous state at its centre. If such a body has very large and very dense atmosphere, weight of atmosphere may exert enough pressure on the matter particles in the main body to convert them to gaseous state. Atmosphere of a body consists of low-density matter particles trapped on its surface during body's formation. Gaseous part of a body at its centre is formed after certain amount of gravitational collapse. Bodies with very heavy atmosphere cannot have solid or liquid matter in its body. They will be gaseous throughout. Physical states of various parts of a very large body are directly related to bodies' total matter content. A body of matter content equal to our earth will reach a stable state with solid exterior and a hot liquid interior, as is believed today, whatever its initial condition may have been. Effects due to proximity to sun and its radiations are temporary and hence they do not affect earth's stable state. It is not right to consider that the earth or any other planetary bodies have their origin from a very hot body and they are, at present in their cooling-down stages. Stable state on earth's surface, corresponding to earth's

matter content, is the state of its surface where every day effects of sun's heat radiation are not felt, like; below the surface near earth's polar regions. Physical state of any body in free space solely depends on its total matter content (mass).

Brownian motion:

Constituent atoms/molecules of a fluid body are not held rigidly. Depending on the viscosity of the fluid, they have certain degree of freedom to move about each other, within the limitations imposed by their molecular formations. If a fluid body is situated on the surface of a large body, each atom of the fluid is apparently attracted towards the large body due to gravity. Denser atoms of the fluid tend to move towards the large body, under greater apparent gravitational attraction. Disregarding the actions of external pressure on primary particles, the fluid body achieves a stable state with denser atoms at the bottom (towards the large body) and lighter atoms at the top.

Within the fluid body, its atoms are also apparently attracted towards each other due to gravity. Inter-atomic attraction, in association with apparent attraction due to gravity towards the large body, applies higher external pressure on the atom which is at the bottom-centre of the fluid body. This atom will have least matter density compared to all other atoms in the fluid body. Due to its lowest matter density, apparent attraction due to gravity towards the large body becomes least on this atom. Other atoms, on which the apparent attraction due to gravity towards the large body are higher (due to higher matter density), tend to move towards the large body – that is, to the bottom of the fluid body. Atom, which is at the bottom-centre and least dense will be replaced by another atom which is denser. Displaced atom will slowly move towards the top of the fluid. As the denser atom reaches bottom-center position in the fluid, due to higher external pressure on it, it will discard its matter content corresponding to external pressure on it and thereby lower its matter density. Now this atom becomes the least dense atom in the fluid body, to be replaced another denser atom. In the mean time, atoms rising to the top are relieved of excess external pressure. They will absorb matter content from the surrounding 2D energy fields to compensate for the loss suffered. Depending on the rate of absorption of matter content by these atoms, their motions towards the surface are restricted by the viscosity of the fluid. Actions of gravitational forces on the atoms, external pressure applied on them and the rate of absorption of matter content by their bitons produce certain randomness in the activity. In this way a continuous convection is initiated within the fluid body near another large body. This convectational motion, within the fluid body, affects very small solid particles suspended in it. Convectational motions of a molecule located at the bottom-centre of the fluid body, near a larger macro body, are described above. Molecules in other locations, throughout the fluid body, depending on their relative matter density and attractive force due to gravity towards the large body, also undergo similar convectational motions.

In any body, constituent molecules are arranged in definite pattern, determined by the distribution of their resultant distortion fields. A molecule or atom, moving from its current location in a macro body, can settle only in a different location that has similar distribution of distortion field, as at the location of its present existence. Field forces, holding a molecule or atom in its current location will resist external forces that are trying to dislodge it from the place of its existence. As and when the external forces overcome the retaining field forces, the molecule or atom will be dislodged from its present location, but it can be accommodated only in another location with similar distortion field configuration. If there are suitable locations nearby, the molecule will immediately occupy one of them. If suitable locations are not available, the molecule will slip back into its original location. However, the relocation of the molecule takes place very fast. Speed of relocating molecules is determined by molecular field forces rather than the speed of convection in the fluid. Hence, a molecule or atom, dislodged from its present location is catapulted to its new location in the fluid body.

A molecule moving under this effect moves with small but quick jerky motions. Although these movements are initiated by variations in the matter density of the molecules, movements of molecules are governed by their distortion field distribution. A molecule, ejected from its location finds another location with identical distortion field distribution. During its stabilisation, the molecule may twist or turn to conform to the local distribution of distortion fields. Departure of the molecule from one place and its arrival at another location produce movements of all molecules around it. Force exerted by high-speed movements of these molecules may be transferred to any (sufficiently small) suspended solid particles in

the fluid as small kicks. Hence, motion of these suspended particles is not smooth, but appears to be at random or erratic and jerky in fashion. This phenomenon produces the “**Brownian motion**”. Average motions of suspended particles are calculated by using probability principles.

All matter bodies have apparent attraction between their constituent atoms. This provides the body with its viscosity. In solid macro bodies, the viscosity is very high and its constituent atoms cannot have relative motion. In fluid macro bodies, its viscosity is low enough that its constituent atoms/molecules can be moved relative to each other by external force. As temperature of a fluid macro body is raised, its viscosity comes down and the external force required to move its molecules relative to each other decreases. If the temperature of a fluid body is raised, without creating convectional currents of its own, Brownian motion in it will increase. Molecules/atoms move more freely.

Brownian motion of a suspended particle in the fluid macro body will continue as long as the fluid macro body is within the gravitational (attractive) sphere of a larger macro body. In the absence of a larger macro body in the vicinity (in free space) of the fluid macro body, Brownian movements cannot take place in it. Least dense atom will come to settle at the centre and the fluid macro body will attain a stable spherical shape. In this state all atoms of the liquid body are held at their relative positions within the body by the field forces. Irrespective of their energy states, they can have no relative motion without the help of external forces.

Conclusion:

In any material, whichever physical state it may be, there is a definite pattern of arrangement for its constituent atoms/molecules. Unless affected by external forces, they cannot have relative motion between them. Bond between atoms/molecules may be very strong as in solids or weak as in fluids. But it will not permit relative motion between constituent atoms/molecules of a body, unless affected by external forces. Hence, ‘kinetic theory of gas’, which presumes relative motion of gaseous (or liquid) macro body’s constituent atoms/molecules in proportion to their energy level, without appropriate external forces, is illogical. The phenomenon of Brownian motion should not be attributed to such illogical theory. Brownian movements in fluid bodies can take place only within the gravitational sphere (immediate neighbourhood) of another (large) macro body. Higher the apparent attraction due to gravity, more energetic the Brownian movements will be.

References:

- [1] Nainan. K. Varghese, *Hypothesis on MATTER* (second edition), (2008).
<http://www.geocities.com/matterdoc/index.html>
- [2] Nainan. K. Varghese, *Speed of Light*,
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