

# COPLANAR FORCES

(According to “Hypothesis on MATTER”)

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*Abstract:* Mechanism of direct interaction between two coplanar forces is described. Work-done is the additional distortions developed in the two-dimensional entities of 2D energy fields about a body and the force is the rate of their development. Work-done, in each plane, can interact (directly) only with other works-done in the same plane. Hence, forces interact separately in each plane in the 3D space system.

*Keywords:* Force, Work, Energy, Quantum of matter, 2D energy field, Inertia, Hypothesis on MATTER.

## Introduction:

“Hypothesis on MATTER” describes an alternative concept. In it: the matter content of a body and the energy about the body are distinctly separate. Matter content of a macro body is the total sum of three-dimensional matter in a body. Energy is the strain developed due to ‘distortions’ in the natural arrangements of basic ‘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 structures by 1D quanta of matter, in all possible directions. Parts of 2D energy fields within the body-dimensions contain sufficient distortions to sustain integrity and stability of a macro body in its current state. This part of 2D energy fields is the ‘matter field’ of the macro body. Additional distortions in the matter field (over and above those required to maintain the integrity of the macro body) are the ‘work’ existing in the body and it determines the state of (motion of) the macro body. All apparent interactions, between matter particles, take place through the medium of 2D energy fields. This avoids the illogical assumption of ‘actions at a distance’. 2D energy fields fill the entire space. It is aether-like entity, but with definite structure and properties. Matter is incapable of any actions or movements on its own. It is the inertial actions of the 2D energy fields about a matter body, which move it.

Displacements of quanta of matter (including the changes in their lengths) are tangible in 2D space system. They constitute ‘work-done’. Strain, produced in the latticework-structure, by the distortions is the ‘energy’ associated with the work-done. Energy as such has no independent existence in any form. Rates of distortions (work) being introduced into a 2D energy field latticework is the ‘force or power’ [3]. Ultimately, displacements of matter bodies, in space (2D energy fields), are produced by transfer of latticework distortions from higher distortion-density region to lower distortion-density region in the 2D

energy fields. Mechanical re-arrangement of quanta of matter in the 2D energy fields is the action of a force. Whichever is the manifestation of force (gravitational, electromagnetic, nuclear, inertial, etc.), they all have only one type of mechanism and act in similar manner. Thus, fundamentally, there is only one type of force in nature. Force, acting on a body, is the rate of mechanical rearrangement of quanta of matter in the 2D energy fields in and about the body.

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

### **Mechanism of inertial force:**

In 3D space system, a force is recognized only by its inertial action. Inertial action is an action that produces the phenomenon of inertia. Displacements of matter particles in space are necessary to create inertial actions. Inertial forces are applied from outside a body. Inertial force is a force that invokes the property of inertia about a matter body. 2D energy field-distortions, produced by inertial forces in a body, are invested from external sources, either by field forces, by gravitational forces or by the motion of external bodies towards it. We shall consider the action of an inertial force on a force-receiving body by a force-applying body. As the force-applying body approaches the force-receiving body, distortion fields about the nearest matter particles in both bodies come within their interacting distance. Matter particles of the bodies tend to keep their relative distance between them. In the process, matter particles of the force-receiving body are pushed away from the approaching force-applying body. Movements of the matter particles in the force-receiving body create distortions in the matter field of the force-receiving body. These additional distortions, received into the matter field of the force-receiving body are transferred in the direction of application of the force.

Speed of transmission (within a macro body) of the additional distortions depends on the magnitude of distortions invested into the matter field. In 3D space system, only the inertial nature of forces can transfer tangible work from one body to another. Inertial forces may be transmitted at any speed but at lesser than the speed of light. Highest speed possible, is limited by the ability of body particles to maintain their integrity by avoiding local breakdown of 2D energy field latticework structure. Action of an inertial force transfers additional distortions from the force-applying body to the force-receiving body. As there can never be a point-direct force (because matter field of any body is extremely large compared to a latticework square of a 2D energy field), explanation in the following section is only a hypothetical case where a point force is considered to bear upon one or few of the latticework squares of a matter field.

Matter fields of two macro bodies are differentiated by their individual 2D energy field-distortions, within their body dimensions. Taking a plane, passing through both the bodies, it is the same 2D energy field passing through both the bodies, in this plane. Nevertheless, parts of this 2D energy field within the confines of border of each body are distorted appropriately for each of the bodies and are part of their matter fields. Therefore, when it is said that a body is under the action of a force by another body, it means that the distortions in the matter field of a body is brought to bear up on the distortions of matter field of another body. Matter particles of the bodies do not touch each other. In the process, both the matter fields try (they being part of the same latticework structure in a plane, tend to share the total distortions by influencing each other) to modify each other. When a body is said to meet or collide with another body, it is their matter fields, which meet or collide. Matter field represents the distortions in the 2D energy fields within the body. Collision between the matter fields, depending on the strength of collision between the bodies, transfer part of the distortions in their matter fields to each other. Since no transfer of matter takes place, bodies’ matter contents are not affected.

Matter field of a macro body contain all the 2D energy field distortions, required to sustain the integrity and stability of its matter particles and the macro body as a whole in its current state of motion. Macro body’s state (of motion) may be changed by introducing additional distortions into its matter field from external source. In this article, we shall ignore all the 2D energy field distortions required to maintain the integrity, stability and current state of motion of the macro body. We shall consider only those additional 2D energy field distortions, introduced by external sources to cause changes in the state (of motion) of the macro body.

A matter field latticework square is deformed to the extent that is required for the stable existence of the macro body. Introduction of additional distortions from external sources vary the distortions, already

existing in the matter field, correspondingly. Strain, developed in the arms of the 2D energy field latticework squares, transfer part of the deformation to the next square in front of it, in the direction of the force. Similar actions are repeated forward, in sequence. Because of the latticework structure of the matter field, no single latticework square can be deformed or strained in isolation. Due to the inter-linking of the squares in the latticework, strain in a latticework square is automatically transferred and shared by the neighboring latticework squares in the same plane. Additional distortions, introduced by a force, acting on any part of the 2D energy field, are progressively absorbed by the latticework squares of the matter field, allowing them to be strained and distorted. Latticework square, nearest to the point of application of the force is distorted by highest magnitude, the latticework next in front, is distorted to a lesser degree, latticework square next in front, is distorted to still lesser degree and so on. This is how a distortion field, created by a force (applied to a part of the 2D energy field), is transmitted through it. In fact, it is the distortions in the 2D energy field, containing the work, which are transmitted. A latticework square move only so much as required to store the work of its share. Rest of the work is transferred to the next latticework square and so on. During transmission of a distortion field, each square of the 2D energy field latticework absorbs part of the work-done by remaining in distorted condition to certain degree and passes on the rest of distortion to the subsequent squares. They become free to return to their stable condition only on removal of the force-applying mechanism. As the additional distortions, received by the matter field, progress in the direction of force, 2D energy field latticework squares remain in place in space. In this article, wherever transmission of force is mentioned, it is to be understood in these terms.

Since the 2D energy field extends only in one plane, no distortion field can be transmitted directly into the third dimension of the 3D space system. Transmission of a distortion field is restricted to the plane of the corresponding 2D energy field. A 3D matter particle simultaneously occupies gaps in many 2D energy fields (3D space) in the same location. A distortion field, acting on a 3D macro body in a plane, moves it. The body being three-dimensional, during its motion, it produces distortions in all the 2D energy fields occupied by it. In this way, a distortion field in one 2D energy field may be transferred or transmitted to other 2D energy fields, indirectly. A force, (presumably) acting, through the medium of 2D energy fields, on a 3D matter particle has its components in one or more of the 2D energy fields in the planes occupied by the particle. Each 2D energy field transmits distortion field only in its plane. Such actions by various 2D energy fields occupied by the 3D particle, together, produce a straight-line transmission of distortion fields (associated with 3D matter bodies) in the 3D space system.

Consider an example of a moving body 'A' coming in contact with a static body 'B'. Matter field of a macro body has enough and the required additional distortions in it, to maintain the state of rest or motion of the body, in addition to the distortion fields required to maintain the stability and integrity of its matter particles and the body as a whole. Motion of the body 'A', as a whole, is produced by additional distortions in its matter field, introduced by an external force. Additional distortions, which produce body's motion, are over and above the natural distortion fields, existing in the matter field of the body. These additional distortions are transferred at a constant speed through the matter field of the body, and thereby, transfers the matter field itself in the 2D energy fields in space. As these distortions are transferred through the space, the body bearing them achieves translational motion in the same direction. As soon as the moving body 'A' encounters the static body 'B', there is a restriction for the forward motion of the matter particles of body 'A'. Distortions, in the 2D energy fields, tend to move at the constant speed of the body. Parts of distortions, in line with the matter particles are prevented from moving at the original speed by the necessity to carry the matter particles with them. Due to the latticework structure of the 2D energy fields, distortions, which are in line with the inter-particles space, are also held back by the distortions, which carry the matter particles. There is no restriction for the motion of the distortions in the 2D energy fields in body 'A' to move into the body 'B'. Thus, depending on various other factors, whole or part of the additional distortions in the matter field of body 'A' are transferred into the matter field of body 'B'. If whole of the additional distortions in the matter field of body 'A' are transferred into the matter field of body 'B', body 'A' will come to a halt and body 'B' will start to move, carrying the additional distortions with it. Whole of the energy (strain), due to the distortions producing the motion of body 'A' is now transferred to the matter field of body 'B'. For partial transfer of the additional distortions, both the bodies will behave correspondingly. Here, body 'A' is the 'force-applying body' and body 'B' is the 'force-receiving body'.

If the effort from the ‘force-applying body’ is able to act on the ‘force-receiving body’, both their matter fields are modified. Normally we take only the modifications done on the matter field of the ‘force-receiving body’, unless we are taking the reaction also into consideration. In case, the body ‘B’ produces certain changes in the distortions in the matter field of body ‘A’ due to their relative speed, body ‘A’ will start to move in the opposite direction. Such motion is considered as due to the reaction to the original force. The force, corresponding to the action of the effort and responsible for this motion, is called a reactive force.

Additional distortions, produced in the matter field of the ‘force-receiving body’, are the work-done and the strain developed due to them is the energy received. Reduction in the distortions in the matter field of the ‘force-applying body’ is the work-undone and the strain reduced in its matter field is the energy given away. In a case, where the action of one body changes the state (of motion) of another body, the additional distortions in the matter field of the ‘force-applying body’ are reduced and additional distortions in the matter field of the ‘force-receiving body’ are increased. That is to say, that the work is undone in the ‘force-applying body’ and work is done on the ‘force-receiving body’. Work-done and work-undone are equal in magnitude. Energy lost by the ‘force-applying body’ is equal to the energy gained by the ‘force receiving body’. Work-done in the matter field of the ‘force-receiving body’ is due to a direct force and alteration to the matter field of the ‘force-applying body’ is due to the reactive force. Magnitude of additional distortions received by the ‘force-receiving body’ is the same as the magnitude of distortions lost by the ‘force-applying body’. Hence, numerically the action is equal to the reaction. Direction of resultant distortions in the matter field of the force-receiving body and its inertial displacement is along the direction of the original force. Direction of resultant distortions in the matter field of the force-applying body is opposite to the direction of the original force.

Distortions in the 2D energy fields move in straight lines, separately in each of the planes. Rotary motion of a macro body is produced by linear motions of body-parts in different directions at different linear speeds. If the constituent matter particles of a macro body are moved away (by another force) from the linearly moving matter field distortions of a linearly moving macro body, linearly moving distortions will be lost from macro body’s matter field into space and the macro body will stop responding to the lost distortions. State (of motion) of a macro body depends on the distortion-density of additional distortions (other than the distortions required to sustain the integrity and stability of the macro body and its constituent particles) and the distribution of the additional distortions in its matter field.

Introduction of distortions from external source into the matter field and their stabilizations within the matter field of the macro body, takes time. This time delay gives rise to the inertia, which is presently attributed to the body’s mass. Inertia is a property of associated matter field of a macro body (2D energy fields). Matter content of a body is inert. It is the associated 2D energy fields that produce all apparent actions/interactions, presently attributed to the matter bodies. Once, certain magnitude of additional distortions are introduced into a matter field of a macro body, it remains permanently within the matter field and continues keep the macro body in its current state (of motion) indefinitely, until the distortions are lost or removed (neutralized by distortions in opposite direction) by an external force. Since the additional distortions (introduced by external source and moving the matter particles) in a matter field are associated with the matter particles, speed of their transfer is limited by the magnitude of distortions. Hence, a macro body may move at any speed, lower than the maximum permitted speed by the 2D energy field (less than the speed of light). As the speed of a macro body approaches the speed of light, constituent particles of the body break down to inferior particles until its speed reaches the speed of light. At the speed of light, only photons from the macro body can survive. Beyond this speed no matter particle can move. This limits the speed of 3D matter bodies in space to less than the speed of light. Gradually, even the photons revert back to quanta of matter in the 2D energy fields. Continuous recycling of matter between 3D macro bodies (where the entropy increases) and 2D energy fields (where high order is maintained) keeps the entropy of universe within limits. Total magnitude of matter, in the form of 3D macro bodies in the universe, vary cyclically.

Inertia is a property of 2D energy fields, produced by their latticework structure. Apparent attraction due to gravitation is the product of difference in the extent of 2D energy fields on opposite sides of a matter body. Both these phenomena have nothing to do with mass of a body, which is the mathematical relation between an external force on a macro body and its acceleration. Hence, differentiation into gravitational mass and inertial mass is arbitrary.

Forces are mathematical relations between work, introduced into a macro body, and the body's linear acceleration in space. They, being functional entities, cannot interact. Interaction between two forces means the superimposition the work, introduced by one force in a macro body on the work, introduced by another force or the work, already existing in association with the macro body. Work-done is nothing but additional distortions introduced into the matter field of the macro body. Hence, the interaction between two forces indicates the modifications to the additional distortions in a macro body and the changes in their inertial properties, both, in magnitude and direction. Since a 2D energy field is confined to its plane, action of each force is confined to the plane of the 2D energy field. Distortions (work) introduced by two or more forces in the same plane may produce a resultant. A macro body exists in three-dimensional space system. Actions of forces in each of the plane, passing through the macro body, are separate from their actions in other planes. Resultant, of inertial actions in different planes, on the macro body depends on the combination of all actions in different planes. Linear forces, acting at different points on a macro body, not only produce linear motions of the body but they also may cause couples causing torque on the macro body. Therefore, we shall consider the interactions between two concurrent linear forces, acting on a macro body in two separate cases. In one case, the linear forces are concurrent and coplanar. We shall analyse the additional matter field distortions in the 2D energy field of the plane of action. In the second case, the linear forces are concurrent but not coplanar. For convenience, we shall resolve one or both the forces with respect to a reference and consider the forces as acting in separate 2D energy fields in perpendicular planes. Separate inertial actions on the matter particles of the macro body, in perpendicular planes, combine to produce the resultant inertial motion of the macro body.

### **Coplanar forces:**

Thickness of a plane in 3D space system is so minute that it cannot be represented in three-dimensional measurements. Forces act through 2D energy fields, which are two-dimensional. Hence, it is practically impossible for a 2D force to be represented in 3D space system. A force in 3D space system is combination of forces in many planes, simultaneously, acting in as many 2D energy fields. In this paragraph, we shall deal with a component of the force in one plane only. The term 'force' is used in its general sense to mean an effort or a cause. Depending on the angular difference between the directions of actions, the coplanar concurrent forces or their resolved components may be further classified into three classes.

### **Unidirectional forces:**

These include the forces or their resolved parts, applied in the same direction. Let there be two external unidirectional forces, applied on a macro body. Both of them tend to introduce corresponding additional distortions into the matter field of the body. Larger of the two forces, introduces greater and faster moving distortions. These additional distortions push at the body's 3D particles to move the body at the acceleration provided by the larger external force. Smaller force also tries to introduce additional distortions into the matter field of the body. However, additional distortions by the smaller force are unable to be formed in the matter field due to the faster motion of the latticework distortions, developed by the larger external force. Thus, in cases where two co-linear forces are simultaneously applied on a body, only the larger force is able to act on the body.

Only condition when both of the two co-linear, unidirectional, external forces can act on the body is when they are exactly of equal magnitude in the same direction. These forces share the effort. Equal magnitudes of distortions are put-in by both the forces. Action of a force is related to the speed of the force-applying mechanism. In order to apply equal forces, their force-applying mechanisms have to move at equal speeds. It is like two horses pulling a cart. Effort to pull the cart is shared, equally, by the horses only when they are moving at the same speed and in the same direction. There can be no relative motion between the horses. Should they differ in their speeds of motion; a relative motion between the horses develop and whole of the effort, to pull the cart, is taken up by the faster moving horse. The result is that though both horses are applied to the cart, only the faster moving one is acting to pull the cart. Effort, put-in by the faster moving horse, is used to do the work and the slower moving horse does not put-in any effort.

Highest possible speed of movements of quanta of matter in the 2D energy field latticework corresponds to the critical linear speed of a photon. Hence, the highest linear speed at which the 2D energy

field distortions can be transferred in linear direction is the linear speed of light. This linear speed,  $V_{\max}$ , corresponds to the highest linear speed a matter body can be moved through space. If a matter body is already moving at linear speed  $V_{\max}$ , no external force in the direction of its linear motion can act on it. For an external force to be fully effective, the matter body has to be (absolutely) static with respect to the force-applying mechanism.

Knowing the magnitude and directions of the external forces, acting on a body, alone is not sufficient to find the ‘resultant magnitude’ of the forces acting on the body. Speed or ability of the ‘force-applying mechanisms’ to act on the body also needs to be considered. Efficiency of action of a force,  $\eta$ , depends on the highest possible speed,  $V_{\max}$ , and the present speed,  $V$ , of the force-applying body.

$$\text{Efficiency of a force, } \eta = \frac{(V_{\max} - V) \times 100}{V_{\max}} \%$$

Efficiency of the force is highest (100%), when the speed of the force-receiving body is zero. Efficiency of external force is zero or it is unable to act on the force-receiving body, when the force-receiving body’s speed becomes equal to the highest possible speed (in the direction of motion) of the force-applying body. This property of force gives rise to the phenomenon of relativistic mass. As the linear speed of the force-receiving body approaches the linear speed of light, efficiency of external force to act on the body greatly reduced. This fact is misinterpreted to show that the energy, put-in by the force-applying body, is converted into mass (of the body) and hence, it cannot accelerate the body according to mathematical equation that describe relation between force and acceleration.

### Opposing forces:

These include forces or their resolved parts, applied in the opposite directions. This condition develops when a macro body is acted upon by two equal but opposite external (inertial) forces. In case, they are unequal, equal components of both inertial forces act, as given below. Surplus magnitude of one of the external force can be considered as independent inertial force acting /applied on the body.

Equal and opposite components of (both) the external forces act on the macro body to introduce equal magnitude of the distortions in the matter field of the body. The external forces being in opposite directions, distortions introduced by them are also in opposite directions. Both the distortions overlap each other and they being equal and opposite, neutralize their translational actions on each other, within the matter field. Additional translational distortions introduced in one direction is nullified by additional translational distortions introduced in opposite direction. This phenomenon is the neutralization of the forces. This does not mean that the distortions or the energy developed by them are nullified. The external forces introduce equal magnitudes of distortions in the opposite directions (of each quantum). Latticework squares of the matter field are compressed from both sides to distort them. Latticework squares change their shapes to parallelograms. Distortion in the latticework squares stores energy in the form of (compressive) pressure energy within the macro body. Total additional distortions in the matter field are not translational but compressive. This does not change the state (of motion) of the body and the body maintains its state of rest or constant motion, irrespective of stored pressure energy.

Matter field distortions, introduced from opposite directions, tend to compound each other. Distortions in each plane, containing the direction of the forces, increase. The body suffers a reduction in its length in the direction of the forces and the body enlarges in the directions perpendicular to the direction of forces. Should the expansion of the body in the perpendicular direction is restricted; the forces are no more able to distort the latticework squares, as required. Instead of creating angular distortions of the quanta, the forces tend to compress the quanta to reduce their lengths. Thus, the effort is now utilized to store the energy within the quanta in the form of pressure energy. The body develops internal pressure within the quanta as well as in the inter-particle spaces. A macro body may develop internal pressure only when its expansion due to opposing external forces (in the direction perpendicular to the direction of the external forces) is restricted. This phenomenon is the compression of a body.

In the case of mutual neutralization of translational motions by opposing forces, though the external forces are continuously and simultaneously applied on the body, they stop inertial actions on the body, after the matter field of the body develops sufficient reactive force to oppose both the external forces. External forces are no more able to introduce additional distortions into the matter field of the body after the body develops sufficient reactive forces during the initial stage. Hence, no displacement of the body or

quanta in its matter field can be produced after the initial period of the development of the reactive forces within the matter field. Work-done, transferred into the matter field of the body, during the initial stage is stored within the matter field and it is exhibited as internal pressure and associated pressure energy. Matter field of the body is additionally distorted as if compressed by the forces. Hence, two equal and opposite external forces applied on a body are able to compress the body, rather than producing a linear motion of the body.

Length of the macro body, in the direction of the forces, is reduced. External forces on the body remain being applied but they are inactive after the initial period of compression. This state of the body may be considered as a neutral state, for the forces. They may act on the body again only when the internal pressure within the matter field is varied for any reason. Though the forces applied on the body seem to neutralize each other, as long as the forces are applied, the body is maintained in a different state of internal pressure. This is not accepted as a change in the state of the body. Hence, only their further actions are neutralized. The work, already put-in to compress the body, remains within the body.

If the magnitudes of inertial forces, acting on a body in opposite directions in the same straight line are different, the resultant inertial force on the body that may produce its motion is equal to the algebraic sum of the forces and its direction is the same as that of the larger force.

### **Forces in perpendicular directions:**

Generally, the forces applied on a point in a macro body may be at different angles. In order to find their resultant action, it is convenient to resolve the forces into perpendicular components with respect to a reference. Hence, we may analyse two concurrent forces applied in perpendicular direction with respect to each other.

Consider a macro body, moving in a straight line at a constant speed. This body is under inertial actions of the 2D energy fields. It will continue to maintain its (steady) state of motion until acted upon by an external force. Let an external force act on the body in a direction other than its direction of motion. This external force may be resolved (analytically) into two components. A component of the external force, in direct assistance or opposition to inertial actions of the matter field of the body, modifies body's (linear) inertial actions. The component, in perpendicular direction to the inertial motion of the body, has no effect on the present (linear) inertial action of the body's matter field. However, it will introduce its own inertial actions in the matter field, at right angle to the present (linear) inertial action. Distortions, introduced by the (component of) force in perpendicular direction, modify the distortions already existing matter field of the macro body. Matter particles of the macro body modify their direction of motion corresponding to the present status of the distortions.

The macro body modifies its course of motion to the resultant of these two inertial actions. Resolution of a force, into components at right angles to each other, is a mathematical operation. In actual cases, this does not happen. Each force introduces its own inertial actions into the matter field of a body, in its own direction. Matter particles of the body are susceptible to additional distortions from both sources of forces. Initially, the body tends to move as dictated by both the forces. Before long, as the body shifts away from its line of motion, it loses the distortions in its matter field that are producing the inertial actions from both the forces. From then onwards, the matter particles of the body are influenced by the resultant distortions generated and contained within macro body's matter field. As the line of motion of the body move away from the lines of action of the forces, work introduced by the forces to produce the motions of the body, is gradually lost from the matter field of the body into space. Appropriate distortions in its matter field are being re-created to provide new inertial actions to the matter field of the body.

Due to the latticework structure of the 2D energy fields, a distortion field in it, even if it is of angular (or radial) nature, is transmitted only in straight-line direction. If there are more than one external force, acting on a macro body, each distortion field is transmitted in the direction of action of the force. The macro body is moved in a resultant direction due to combined actions of the forces. This necessitates that the macro body move away from the directions of action of all external forces. Distortions introduced into macro body's matter field cannot change their direction of transfer. Hence, as and when, the macro body moves out-of-line with the direction of transfer of distortions, corresponding magnitude of distortions are lost from the macro body, into the space. Distortions, left in the matter field of the macro body, are only those required for the macro body's steady state of motion in the resultant direction. This is the reason, why the momentum of a macro body, moving in a circular path, is maintained constant irrespective of the

constant action of an external force on it. This phenomenon also helps to move a planetary body at a constant radial velocity (in addition to its linear velocity), irrespective of its continuous and constant acceleration under the action of central force.

Work, invested into the matter field of a macro body takes certain time (inertial delay) to stabilize itself and provide the macro body with a constant linear speed. This is true even after the external force is terminated. Work, introduced into the matter field of the macro body and not yet stabilized before the termination of the external force, continues its stabilization in the normal course of time. In other words, a macro body remains under the action of an external force, even after the external force is removed, until all work introduced by the external force has stabilised in its matter field and the macro body has attained its final constant linear velocity.

Fictitious forces (like the centrifugal force, currently called as inertial forces), invoked by an observer to maintain the validity of present theories and apparent forces, related to different frames of reference, are not considered as real forces, in this concept. They serve for easier but irrational explanations and understanding of various phenomena.

## Conclusion:

Action of a force is simple mechanical re-arrangements of quanta of matter in a macro body's matter field, which is the work-done. Rate of work-done, with respect to the displacement of the body in unit time, is the force. All forces, irrespective of their origin, are recognized by inertial action on 3D bodies in 3D space system. Forces act in 2D energy fields. 2D energy fields being two-dimensional, actions of forces in each 2D energy field are independent of their actions in other planes. Two forces with an angular difference, acting in the same plane on a macro body, produce the body's inertial straight-line motion in the resultant direction and each of the forces causes its own torque on the body.

## References:

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