

[Mathematics of the Cosmos.](#)

Brian Strom.

email: brianstrom999@aol.com

<https://www.facebook.com/brian.strom.750>

blog: <https://edisconstant.wordpress.com/>

[Abstract:](#)

The forces of nature are reviewed and analyzed from first principles, without any pre-conceptions. The review is based on the earlier analysis of Energy Fields around conductors, solenoids, permanent magnets and rotating bodies [1]. Here we continue the analysis of interactions between **Potential** energy fields, **Orbital** energy fields and **Rotational** energy fields. The proposals may provide an explanation for the forces within the cosmos – including the so-called ‘**fifth**’ force.

[1. Introduction:](#)

Simple physics experiments have been conducted over the centuries, and elaborate theories have been proposed to explain the observations (e.g. magnetic and electromagnetic theories). These theories have become dominant and, in the modern era, they generally go unchallenged. This paper re-examines some fundamental aspects of physical behavior and proposes alternative explanations for the interactions in nature.

Here we analyze the behavior of energy fields which are seen to interact with each other, and to turn or move, if free to do so. The energy fields are seen to move to positions of lower total field strength, which also appear to be the configurations for lower total energy.

It is assumed that the strength of an energy field reduces, in some way, with distance from the centre of the body.

[2. Potential energy fields:](#)

We first look at examples of interactions between energy fields around non-moving objects. By observation, we believe every concentration of matter (“mass”) has an energy field surrounding it, presently called the “gravitational” field. This energy field can be visualized as a three-dimensional potential energy well, with the field strength reducing by some function of the distance from its centre.

From observation of “gravitational” behavior in the cosmos, we believe that two potential energy fields will tend to move together along the field gradients - see Figure 2:

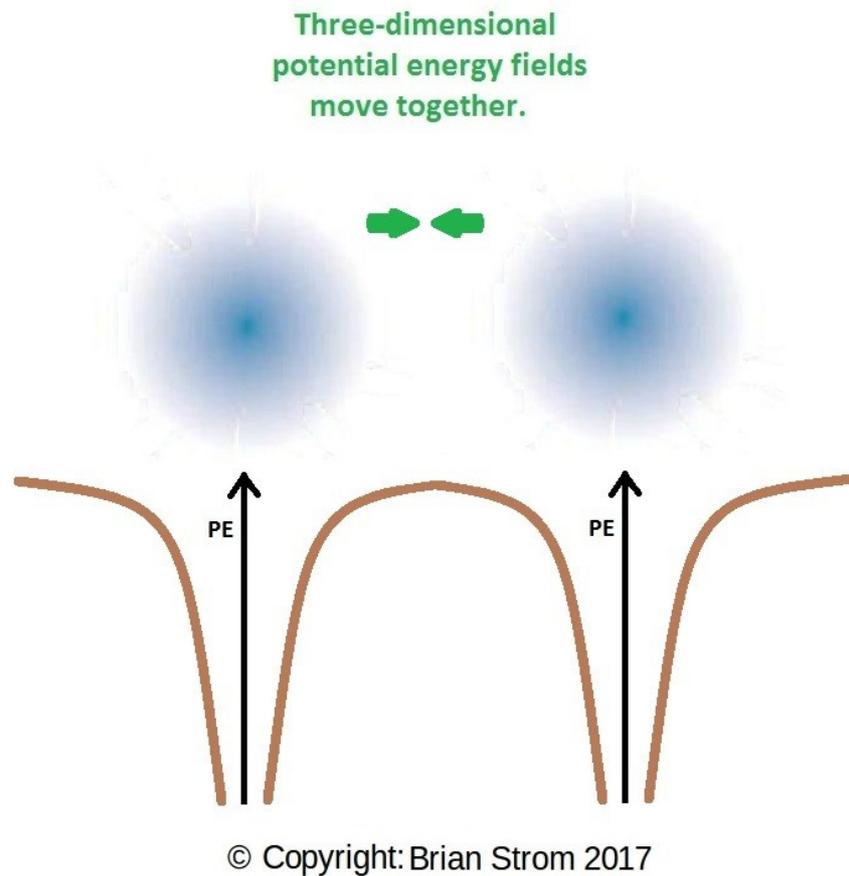


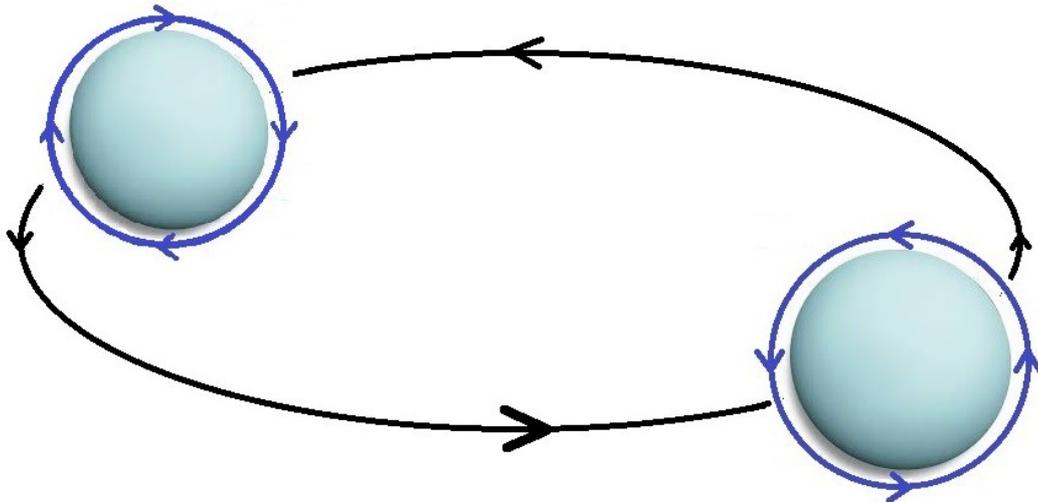
Figure 2: Potential energy fields of two bodies.

3. Orbital energy fields:

Whatever its path, a **flow** of energy will have an energy field around it [1]. This applies to a flow of electrons in a conductor or to the movement of an orbiting body - see Figure 3a and Figure 3b:



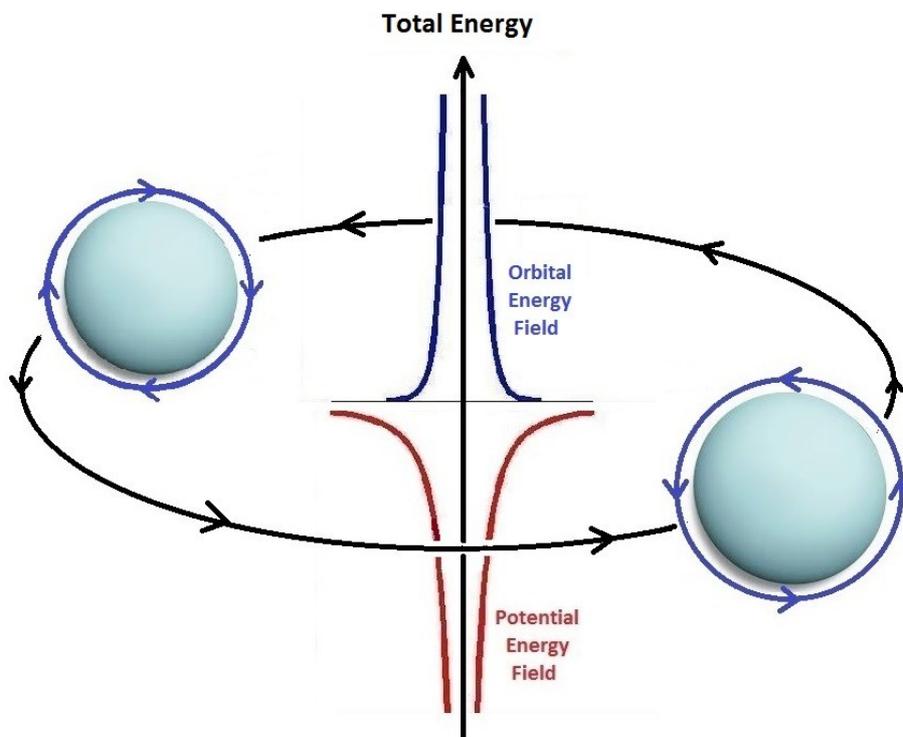
Figure 3a: Energy field of a moving body.



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Figure 3b: Orbital energy fields of two bodies.

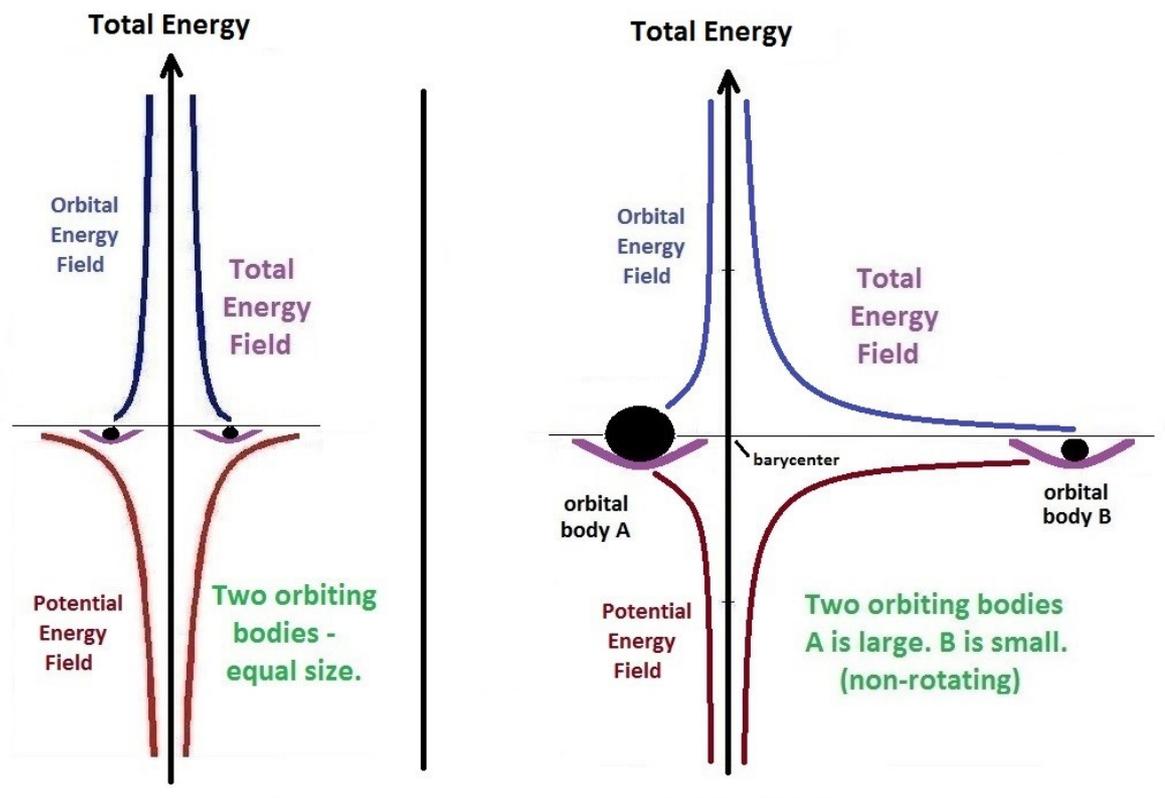
The **orbital** energy fields for two bodies will be additive in the central area between the two bodies. The net orbital energy field will act to keep the two bodies further apart, whilst the potential energy field will act to bring the two bodies closer together – see Figure 3c:



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Figure 3c: Potential and Orbital energy fields of two orbiting bodies.

The **potential** energy field and the **orbital** energy field combine to give a net energy field. The two bodies can be seen to be in a stable equilibrium at a distance apart where the total energy is at a minimum. The diagrams for two orbiting bodies of the same size, and of different sizes, are shown in Figure 3d:



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Figure 3d: Energy fields of two orbiting bodies, same size and different sizes.

4. Rotational energy fields:

A rotating body will have a **rotational** energy field around it [1].

For two rotating bodies, if the rotations are in the same direction (the rotational vectors pointing the same way) the rotational energy fields will be additive between the two bodies. The stronger net field strength between the two bodies will act to keep the bodies apart, whilst the potential energy field will act to bring the bodies together. The two bodies will stabilize in a minimum energy position - see Figure 4a.

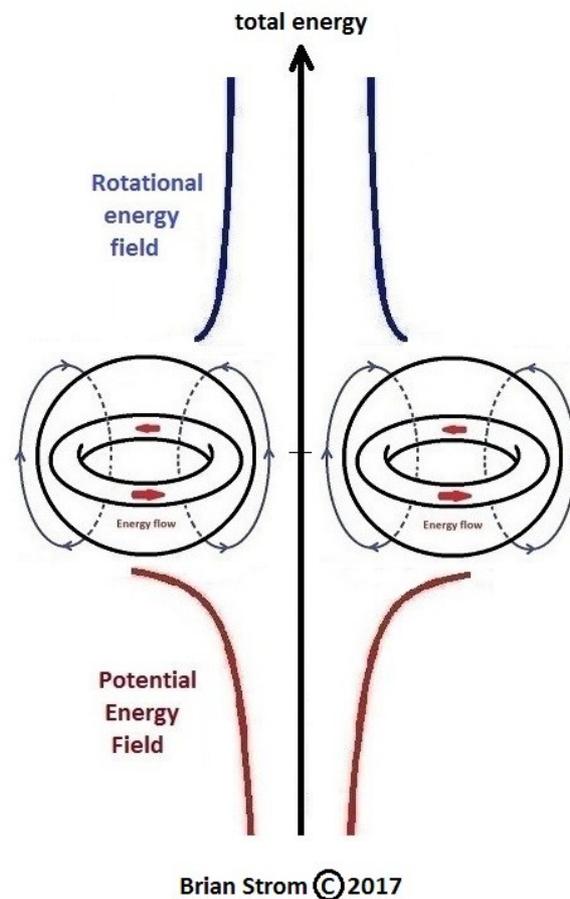
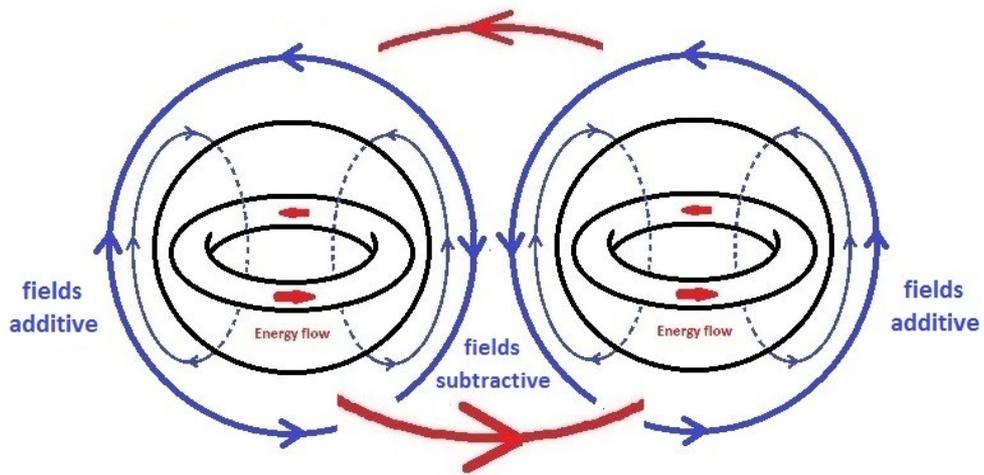


Figure 4a: Potential plus rotational energy fields of two bodies.

For two rotating bodies, if the rotations are in the opposite directions, the rotational energy fields will be subtractive between the two bodies. The weaker net field strength between the two bodies will act to bring the bodies together, whilst the potential energy field will also act to bring the bodies together. The net effect will be for the two bodies to collide and coalesce in some way.

5. Interaction between energy fields - potential, orbital and rotational:

The combined potential, orbital and rotational energy fields can be considered together. If the **orbital** direction and **rotational** direction are in the same sense (e.g. both clockwise when viewed from below), the orbital and rotational energies will be subtractive in the central area and, therefore, the weaker net field will mean the equilibrium orbital diameter is smaller – see Figure 5a and Figure 5b:



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Figure 5a: Rotation in same sense as orbital - bodies closer together.

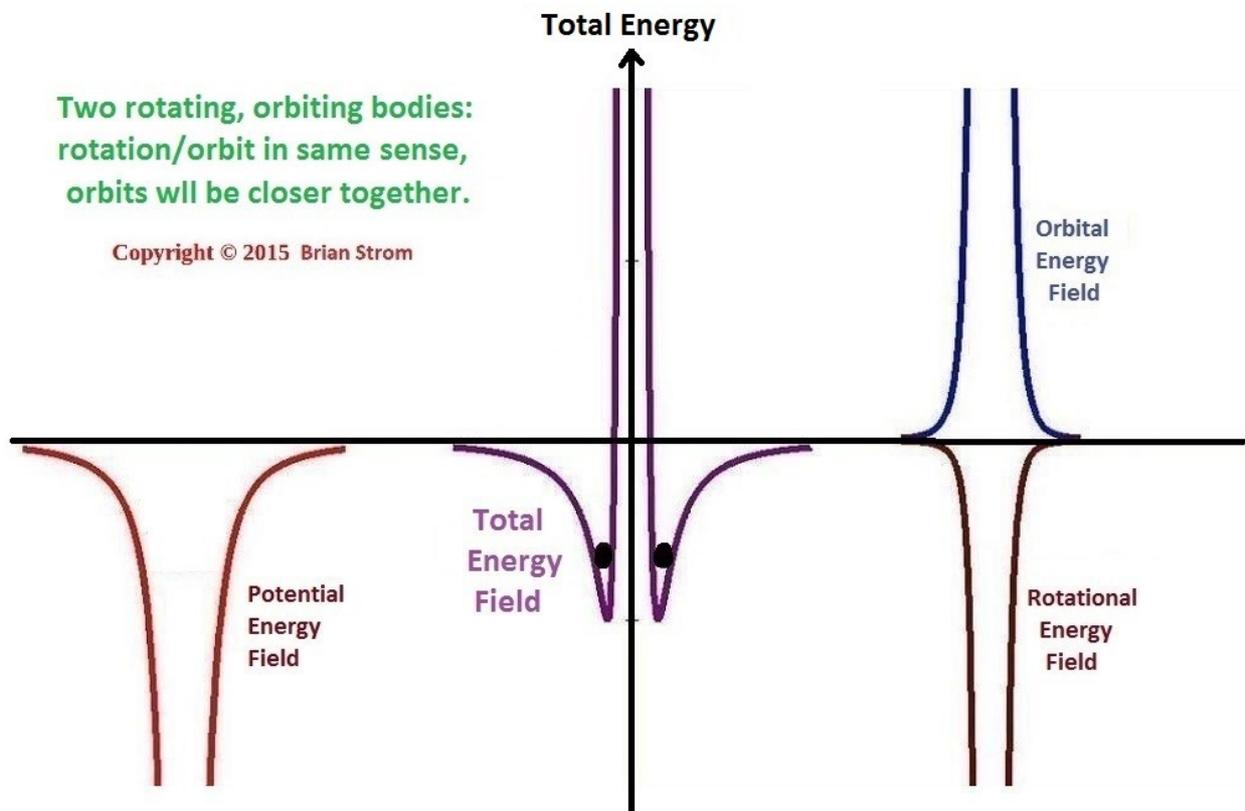
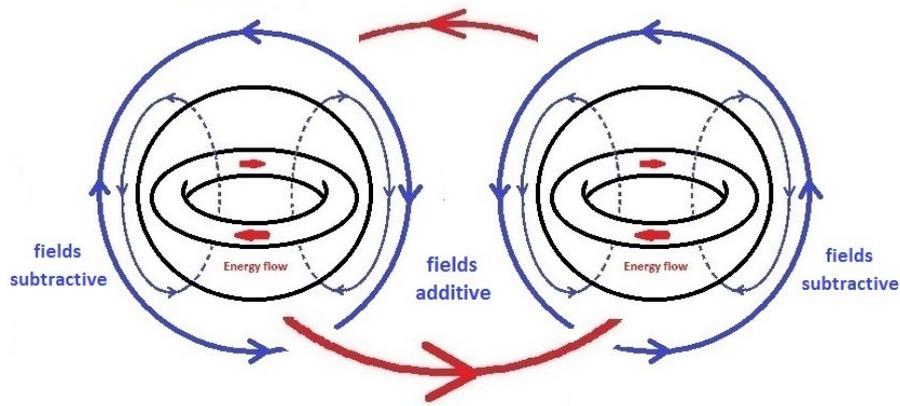


Figure 5b: Energy fields keep the two orbiting bodies closer together.

If the **orbital** direction and **rotational** direction are in the opposite sense (e.g. when viewed from below), the orbital and rotational energies will be additive in the central area and, therefore, the stronger net field will mean the equilibrium orbital diameter is larger – see Figure 5c and Figure 5d:



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Figure 5c: Rotation in opposite sense to orbit - bodies further apart.

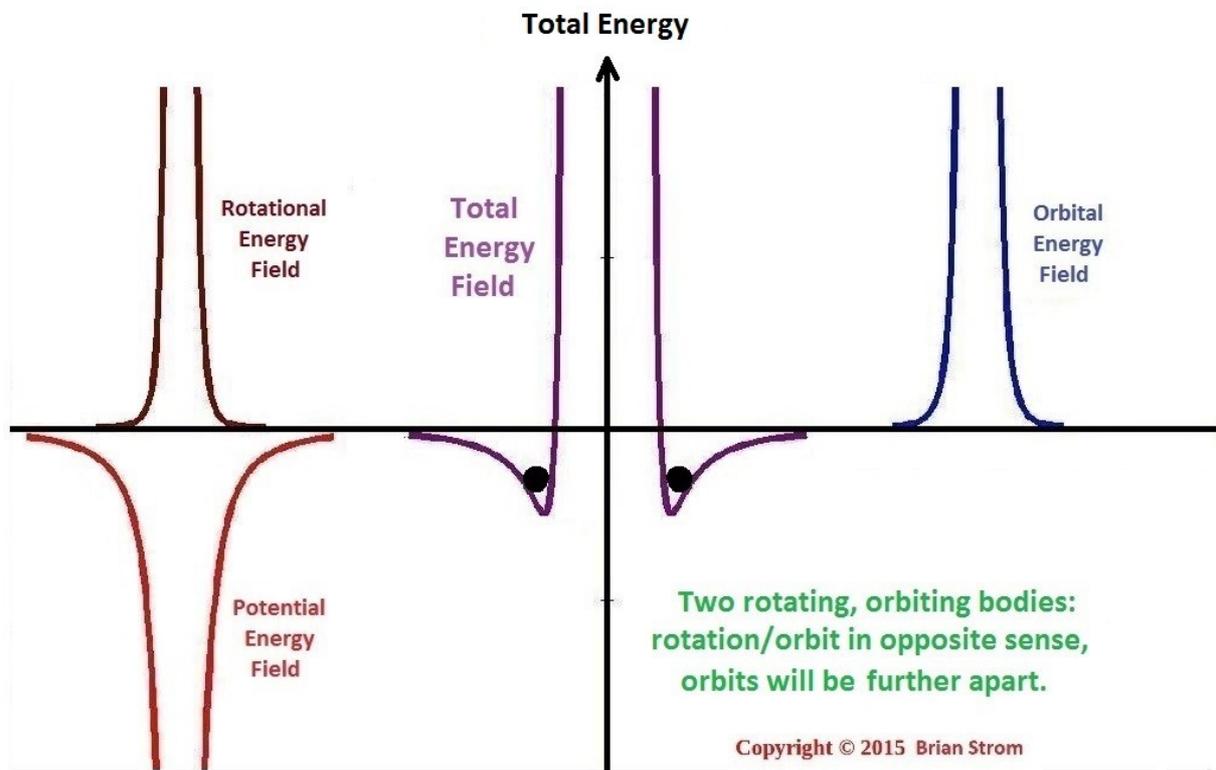


Figure 5d: Energy fields keep the two orbiting bodies further apart.

6. Mathematics of energy fields:

The equilibrium relationship between the **potential** energy field, **orbital** energy field and **rotational** energy field can be represented as a mathematical equation.

The potential energy field is dependent upon the mass of a body.

The orbital energy field is dependent upon the mass of a body and its velocity.

The rotational energy field is dependent upon the mass of a body and its rotational velocity.

Generally, the strength of an energy field reduces inversely with r^x where r is the distance from the effective centre of the object, and x is a power usually between 2 and 3.

From observational studies, we do not know the values of x at the galactic scale. The value of x may be higher or lower.

The simplified Energy wave-function may be of the form:

$$\text{Total Energy Field} = \text{Potential Field} + \text{Orbital Field} + \text{Rotational Field} = \\ -aM_1d_1^{-x} \pm -aM_2d_2^{-x} \pm bM_1v_1d_1^{-y} \pm bM_2v_2d_2^{-y} \pm cM_1\omega_1R_1^{-z} \pm cM_2\omega_2R_2^{-z}$$

Where a , b , c , and x , y , z are constants.

M_1 is the internal energy (mass) of body 1.

M_2 is the internal energy (mass) of body 2.

d_1 is the orbital radius of body 1 from barycenter.

d_2 is the orbital radius of body 2 from barycenter.

v_1 is the velocity of body 1.

v_2 is the velocity of body 2.

ω_1 is the rotational angular frequency of body 1.

ω_2 is the rotational angular frequency of body 2.

R_1 is the radius of body 1.

R_2 is the radius of body 2.

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Note 1: The values will need to be determined by experimentation and calculation based on the observed results.

Note 2: The Rotational energy field may have components in all three orthogonal planes.

7. Who needs dark matter?

For multiple bodies orbiting together (e.g. in a galaxy), the net orbital field between the bodies will tend to weaken and will act to bring the bodies closer together, **and help them “stick” together**. This may be a significant factor within star systems and galaxies, affecting the orbital speeds of bodies and affecting the orbital mathematics of these systems – see Figure 7:

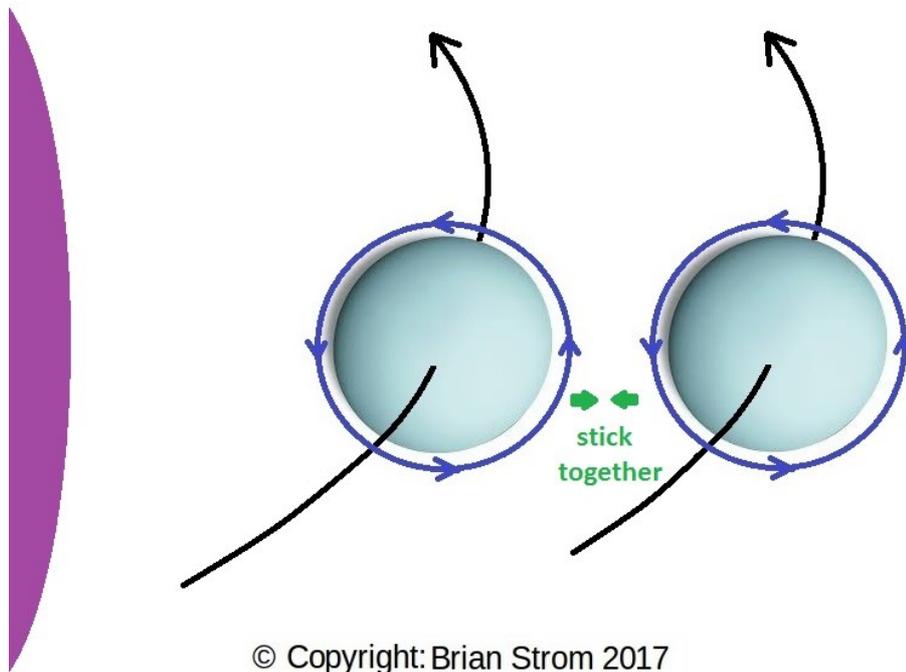


Figure 7: Energy fields help the two orbiting bodies to stick together.

8. Summary and Conclusions:

In this paper, we have analyzed the interactions between **potential** energy fields, **orbital** energy fields and **rotational** energy fields, and proposed the nature of these interactions within the cosmos.

The analysis is based on the earlier studies of energy fields [1] based on observations that energy fields will turn or move, if free to do so, to reduce the net field between them and thereby reduce the total energy to a minimum.

The **potential** energy field is presently called the “gravitational” energy field which can be seen to act between two or more bodies at the scale of stars and planets.

Orbital and **rotational** energy fields can be seen to be similar forms of the same phenomenon; both are caused by an energy flow or the movement of a potential energy field.

The strengths of energy fields appear to vary by orders of magnitude, but the sizes and distances between bodies can also vary by orders of magnitude. Whilst one or other energy field may appear to dominate, it does not mean that other energy fields are not present, at lower strengths.

This study of the interactions of energy fields may provide an explanation for the forces within the cosmos and, in particular, the so-called '**fifth**' force.

Further information is available on the Blog: <https://edisconstant.wordpress.com/>

9. References:

[1] **Brian STROM.** “AI Physics – Energy Fields - Part 1.” **viXra: 1902.0421** February 2019. This paper includes a summary of the simple interactions between energy fields.

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