

# The Universe explained in terms of ENERGY.

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## Abstract:

This paper builds on the results of a series of papers analyzing the foundations of physics, from first principles. Artificial Intelligence and pattern recognition have been used in the studies. The summation of the findings on atomic and molecular structure, potential energy wells and energy fields has led to this new ENERGY conjecture. In the conjecture there is no need for ‘electrical charge’. The movement and behavior of electrons is explained in terms of potential energy and potential gradient. The flow of energy creates energy fields. Photons are potential energy waves. Particles are potential energy standing waves. Particles have rotational energy (spin). Potential energy wells, treated as black-boxes, could be the key to the universe.

## 1. Introduction:

Physics has entered a new era where Artificial Intelligence can be used to enhance our knowledge. AI can uncover the hidden secrets of the atom. It can analyze complex images from particle colliders. It can analyze complex images from space telescopes. It can improve our understanding of science.

It is time to shake off the guesswork and conjectures from 100 years ago:

The Pauli Exclusion Principle is an old conjecture – it is pure guesswork.  
The Heisenberg Uncertainty Principle is an old conjecture that adds confusion.  
Relativity is a conjecture and space-time is an unnecessary complication.  
Quantum theory is a conjecture – there are alternative, logical explanations.  
Time dilation is a conjecture which cannot be proven with atomic clocks.  
(Atomic clocks cannot be proven to be accurate at different points in the universe.)

This new conjecture is that ENERGY is the fundamental entity.  
All concentrations of energy (particles), radiated energy (photons) and energy fields are manifestations of this fundamental entity. All observations can be explained in terms of energy.

ENERGY is the underlying entity that governs the behavior and existence of all things. It allows for a unified understanding of the universe. It provides a common framework to explain the interconnectedness and interdependence of all things.

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## KEY POINTS:

- a) The conjecture of '*electrical charge*' is false.
- b) The parameters - *mass, weight, gravity and momentum* – are false.
- c) A photon is a potential energy wave.
- d) A particle is a potential energy standing wave.
- e) A particle is surrounded by a potential energy well.
- f) A flow of energy creates an energy field.
- g) A particle has rotational energy (spin).

## 2. The potential energy wave (photon):

The concept of 'charge' is an old conjecture. There is no proof that 'charge' exists.

*Reference [1]: Electrons have Potential Energy not 'charge'.*

*Brian Strom: Paper: 2301.0008 download at: <https://vixra.org/abs/2301.0008>*

In this ENERGY conjecture, photons are not electro-magnetic waves. Photons are potential energy waves that propagate through the fabric of space at the speed of light. A change in the local potential energy level can create a potential energy wave which radiates energy away in one, two or three dimensions.

The local potential energy level changes when, for instance, there is a flow of energy (in a radio transmitter), or the excitation level of an atom changes, or when objects collide.

A potential energy wave may be linear - radiating in one dimension with constant amplitude.

It may radiate in two dimensions - expanding as a circular disturbance, with the amplitude reducing with distance (as the inverse of the circumference of the circle).

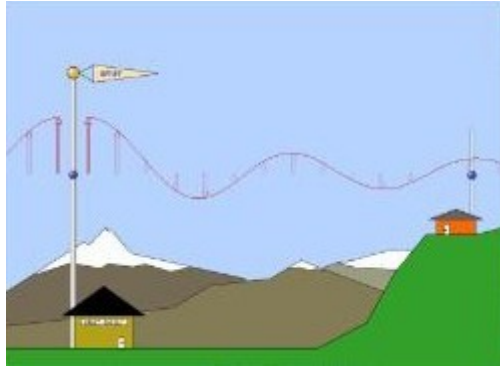
It may radiate in three dimensions - expanding as a spherical disturbance, with the amplitude reducing as the square of the distance (as the inverse of the surface area of a sphere).

The potential energy wave may radiate as a mix of these alternatives.

It may also be polarized in two dimensions.

It may also rotate as a helical waveform.

See Figure 1.



[Figure 1: The radio wave is a potential energy wave.](#)

Photons are potential energy waves that propagate through the fabric of space at the speed of light.

If a measuring device is placed in the path of the wave, the act of measurement will take energy from the wave, and will change its characteristics.

Examples of Potential Energy waves are shown in Section 7.

### [3. Potential energy standing wave \(particle\):](#)

*Reference [2]: 'A new conjecture linking particle size and particle energy'.  
Brian Strom: Paper: 2203.0175 download at: <https://vixra.org/abs/2203.0175>*

A key aspect of this Energy conjecture is the 'potential energy standing wave' (PESW) that manifests as a localized and concentrated region of energy. It may also be referred to as a 'concentration of mass' or as a 'particle'.

The 'energy standing wave' theory has been postulated by others including Milo Wolff, Gabriel LaFreniere and Geoffrey Haselhurst.

The conjecture is that a particle is a potential energy standing wave, where the internal frequency is proportional to the particle's energy.

The potential energy standing wave is an oscillating potential energy wave that remains confined within a specific region, creating a stable, coherent structure.

The potential energy standing wave possesses specific frequencies, and occupies distinct regions of space in a state of equilibrium.

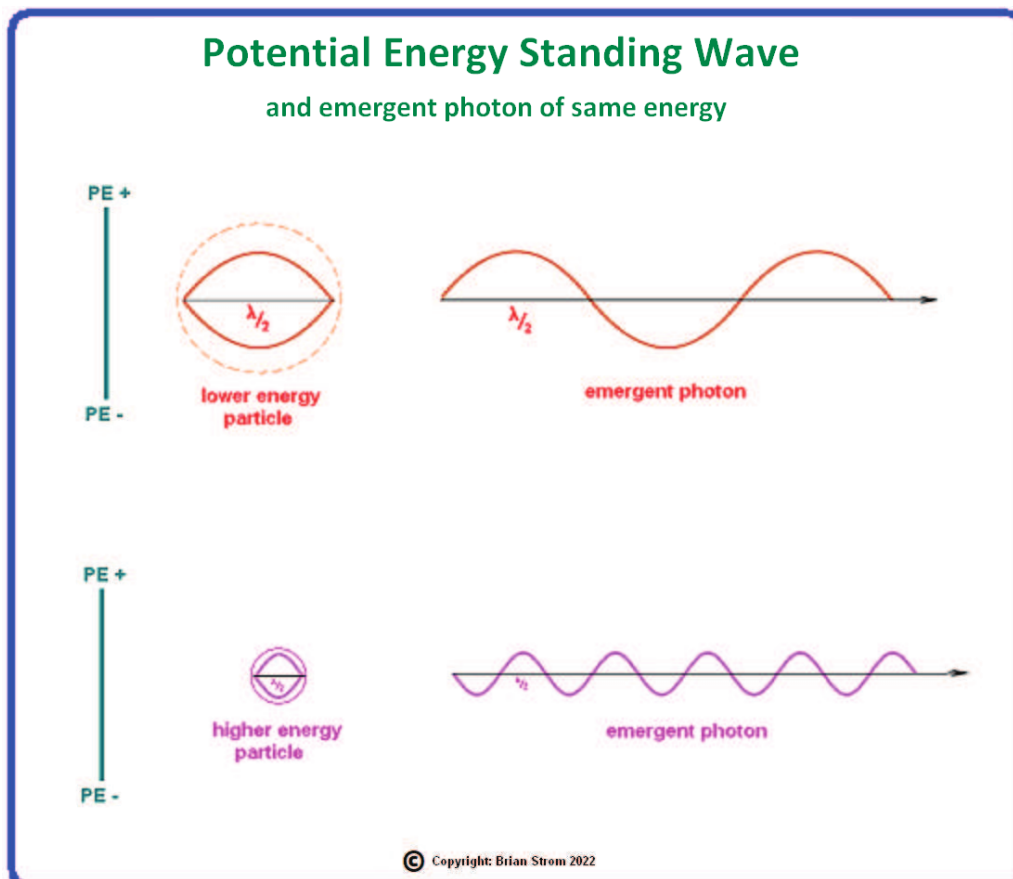
According to this concept, particles, which are the fundamental building blocks of matter, are not discrete, solid objects. They are packages of energy which can have the characteristics of solid objects.

The potential energy standing wave can be described as a “wave-particle”, noting the possibility of dual wave and particle behavior in a ‘quasi-quantum’ world.

The PESW can have the characteristics of both a wave and a particle:- duality.

The PESW can transform into a potential energy wave, and vice versa, following the maxim that ‘mass’ is equivalent to ‘energy’.

Figure 2 shows the diameter of the wave-particle as half its wavelength. If a wave-particle transposes into a photon, the emergent photon will have a wavelength of twice the particle diameter.



[Figure 2: The Potential Energy Standing Wave and its emergent photon.](#)

The concept of particles as potential energy standing waves provides a unified perspective that bridges the gap between the wave-like and particle-like nature of matter and energy.

It suggests that all objects, from elementary particles to cosmic entities, can be understood as manifestations of these potential energy standing waves, in different configurations and arrangements.

The total intrinsic energy of an object is the sum of the particles and atoms that make up the object.

By expanding this conjecture, we can delve deeper into the fascinating world of matter and energy at the smallest scales. We can continue to explore and refine our understanding of the fundamental nature of particles, their interactions, and the underlying wave-particle duality that characterizes the ‘quasi-quantum’ world.

#### 4. The potential energy well:

From observations and measurements within our universe, particles and objects are seen to create ‘depressions’ in space, and have surrounding 3-dimensional potential energy wells.

The “depth” of the PE well is dependent on the total intrinsic energy (the total mass) of the particle or object.

The atom is a PE well where (*non-electrically-charged*) electrons surround protons in the nucleus and fill the PE well. The PE well of the proton is 1836 times deeper than that of an electron. (*But electrons are 1836 times larger than protons.*)

Hence, electrons are strongly bound in the PE well of the nucleus – (equivalent to the strong nuclear force in the Standard Model).

*Reference [3]: ‘AI Physics - Atomic Structure (Part 1)’*

*Brian Strom: Paper: 1811.0162. download at: <https://vixra.org/abs/1811.0162>*

*Reference [4]: ‘AI Physics - Atomic Structure (Part 2)’*

*Brian Strom: Paper: 1911.0159. download at: <https://vixra.org/abs/1911.0159>*

*Reference [5]: ‘The Blueprint for the Atom.’*

*Brian Strom: Paper: 2212.0104. download at: <https://vixra.org/abs/2212.0104>*

“The ‘depth’ of the atomic PE well is directly proportional to the number of protons in the nucleus, but is not dependent on the number of neutrons...”

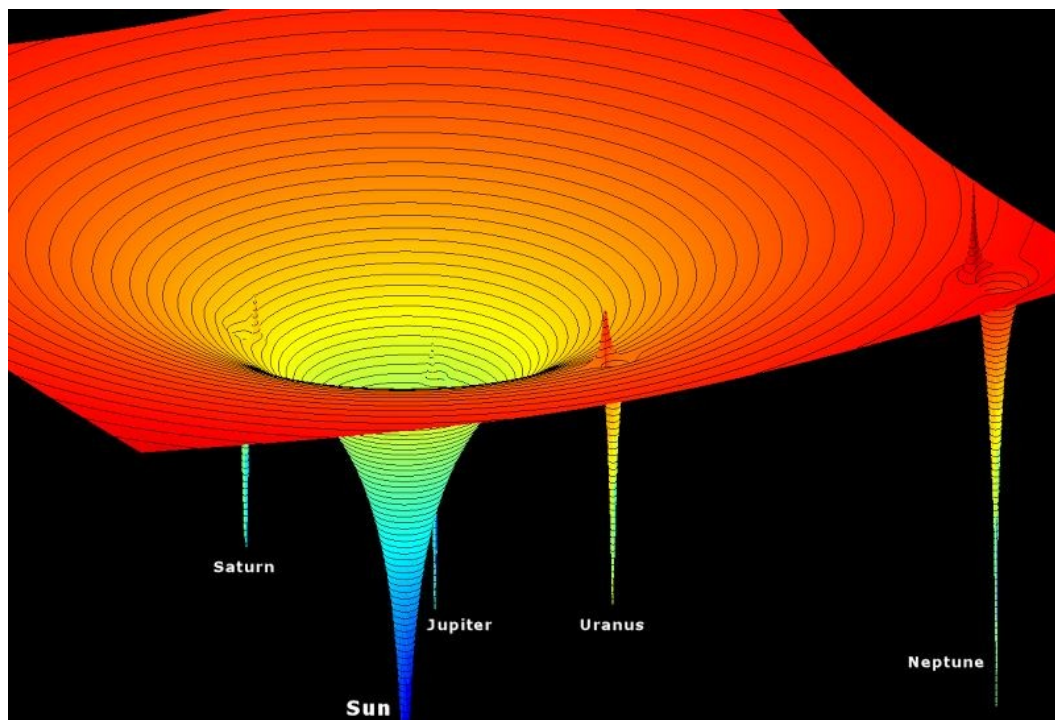
*Note: The modern convention is that a Potential Energy well is ‘negative’.*

Other objects or particles that enter the vicinity of this PE well will experience its effects. This can be observed in the orbital motion of planets around the stars, the motion of celestial bodies in the universe, and the bending of light etc.

Particles will be accelerated by a potential energy gradient - electrons move from areas of surplus to areas of deficit. Free protons will be replaced by these electrons and so will be observed to move in the opposite direction.

Figure 3 represents the larger PE wells of our solar system. The planetary objects sit at various levels in the large PE well of the Sun.

The depths of the PE wells are in proportion to their intrinsic energy (mass).



[Figure 3: The Potential Energy Wells within the solar system.](#)

Observations of PE wells in the universe indicate that movement tends to be orbital. Most objects are seen to be orbiting other objects.

The distance-related forces between objects can be pictured as 'stretching' an object. Hence the ocean on one side of the Earth is pulled towards the Moon (and Sun), and the ocean on the other side of the Earth is pulled less, so it bulges away from the Moon (and Sun).

See Section 9 for the characteristics of Potential Energy wells.

## 5. The energy field:

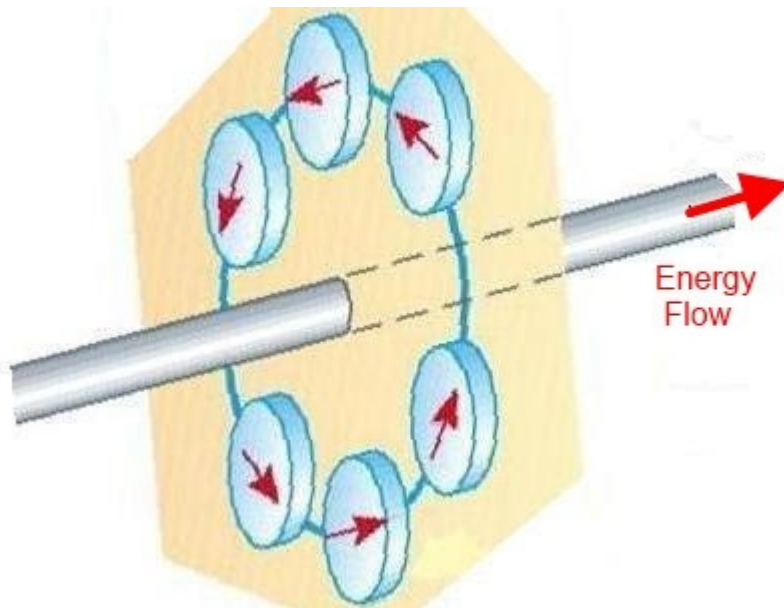
*Reference [6]: 'AI Physics - Energy Fields (Part 1).'*

*Brian Strom: Paper: 1902.0421. download at: <https://vixra.org/abs/1902.0421>*

The conjecture is that whenever there is a flow of energy, an energy field is formed. Historic experiments on energy fields (presently referred to as magnetic and electromagnetic fields) reveal patterns in the behavior of energy fields and the interactions between those energy fields.

The characteristics of an energy field can be examined by observing its interactions with another energy field – the one that surrounds the permanent magnet of a compass needle – see Figure 4:

*Note: The direction of the energy field is by convention. It is only important to keep to the chosen convention.*



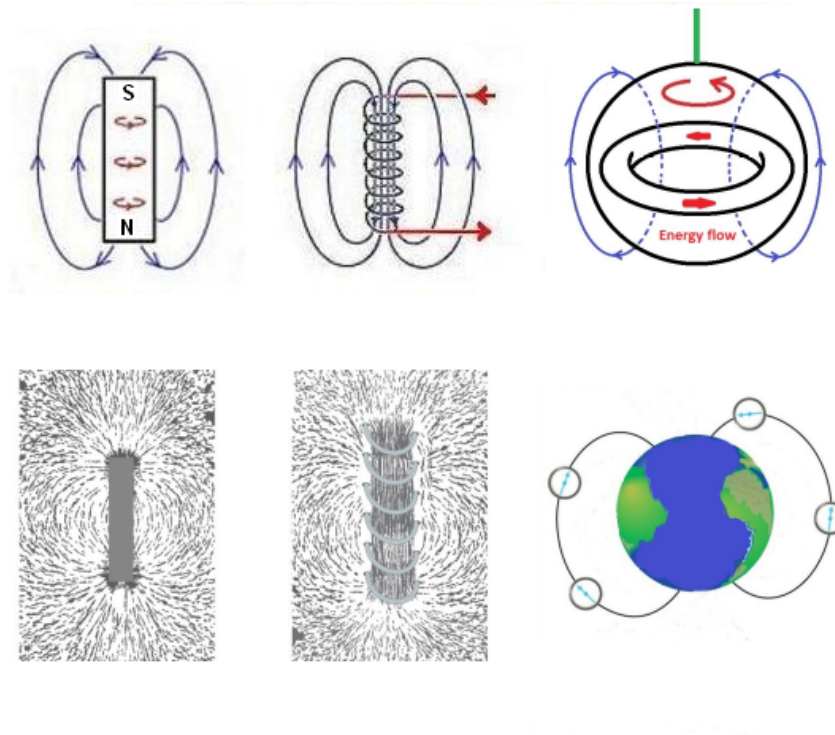
[Figure 4: An Energy Field revealed by a compass needle.](#)

In this first paper on energy fields, AI was used to analyze the similarities between energy fields around conductors, solenoids, permanent magnets and rotating bodies (such as the Earth) - see Figure 5:



The observations on the interactions between energy fields indicate that they will turn or move, if free to do so, to reduce the net field between them. From the behavior of permanent magnets, it is assumed that this movement will also reduce the total energy of the combined energy fields to a minimum.

Similarities in Potential Energy Fields around permanent magnets, coiled conductors and rotating bodies.



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Figure 5: Similarities between Energy Fields.

## 6. Rotational energy:

Reference [7]: 'AI Physics – Energy Fields (Part 2)'

Brian Strom: Paper: 1903.0495 download at: <https://vixra.org/abs/1903.0495>

A key aspect of this Energy conjecture is a particle's 'rotational energy' (also known as 'spin').

Rotational energy (RE) is a fundamental property of particles, and has important implications for their interactions with other particles and with PE fields.

RE is not the physical rotation of a particle, in the usual sense, but can be envisioned as the rotational energy of the potential energy standing wave.



Our present understanding of RE is incomplete. From observation, such as the deviations of particles in the Stern-Gerlach experiment, RE can be seen to be a reality. Hence RE cannot be categorized as a 'quantum symmetry' issue.

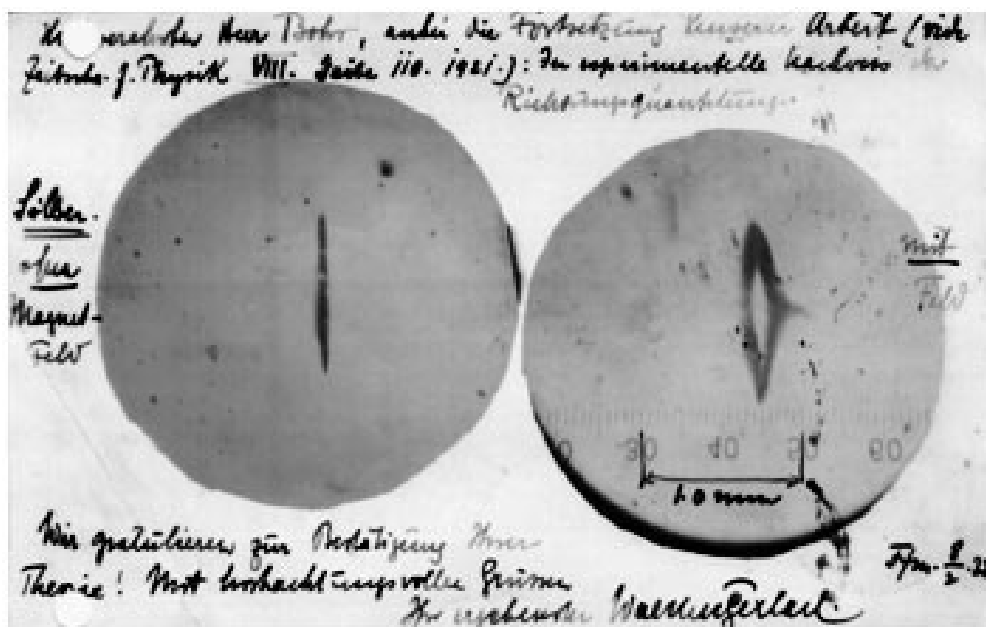
The RE of a particle can be observed by its interactions with other energy fields (presently called magnetic or electromagnetic fields):

a) Precession: For a stationary particle in the presence of an energy field, atomic resonance and other experiments indicate that a particle will 'precess' in various ways, depending on its RE and the applied field.

b) Deviation: When a particle with RE passes through an applied energy field, the particle can be observed to deviate from its original trajectory.

The Stern Gerlach Experiment can be interpreted in a number of alternative ways. It shows that most particles have finite values of RE, either positive or negative. Particles with different RE appear to deviate by different amounts. The deviation changes when the applied field changes - see Figure 6:

*Note: The conventional interpretation of the Stern-Gerlach experimental results was to support the conjecture of 'quantum theory' and 'quantized spin'. This old interpretation is dubious, to say the least. There is no proof in the S-G experiment that 'spin' has the value of plus or minus one half.*



[Figure 6: Observational results of the Stern-Gerlach experiment.](#)

More characteristics of Rotational Energy are shown in Section 10.

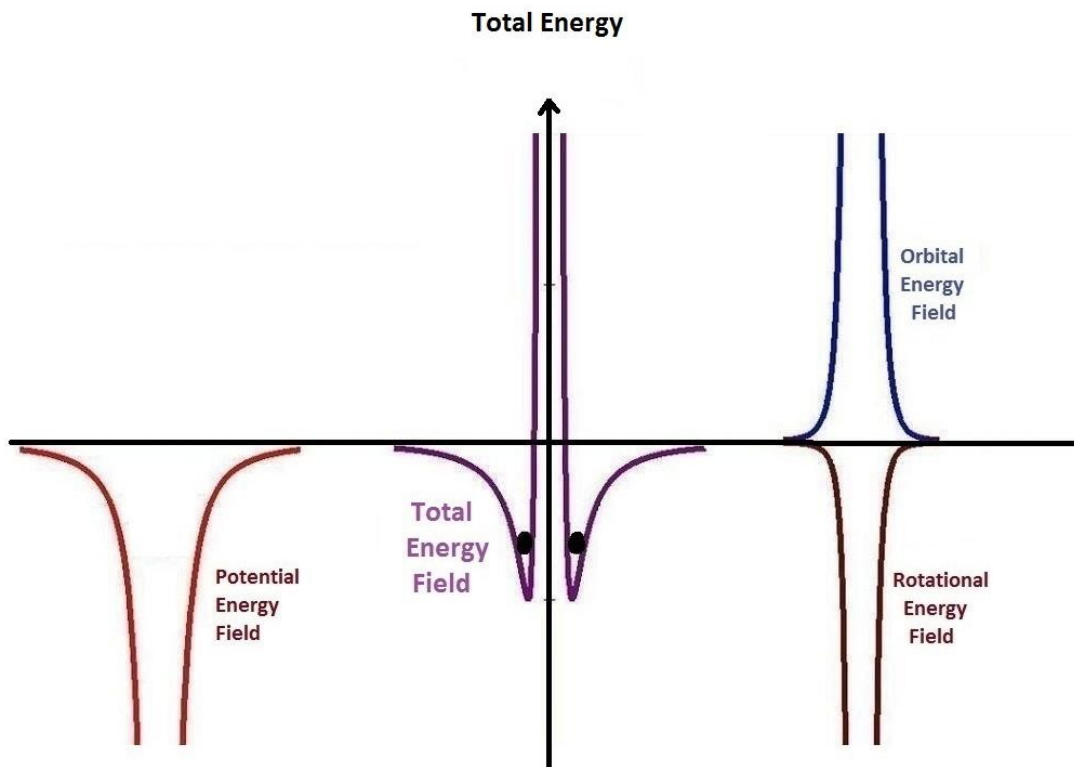
## 7. Total energy field: potential + orbital + rotational:

*Reference [7]: 'AI Physics – Energy Fields (Part 2)'*

*Brian Strom: Paper: 1903.0495 download at: <https://vixra.org/abs/1903.0495>*

In this second paper on energy fields, AI was used to analyze the interactions between potential energy fields, orbital energy fields and rotational energy fields, and to propose the nature of these interactions throughout the universe, from the galactic scale to the sub-atomic scale.

These findings may provide an explanation for the so-called missing 5th force, an alternative explanation for the forces at the galactic level, and an alternative explanation for the forces at the sub-atomic level – see Figure 7:



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Figure 7: Total energy field: potential + orbital + rotational.

*Reference[8]: 'AI Physics - Energy Fields (Part 3).'*

*Brian Strom: Paper: 1906.0492. . download at: <https://vixra.org/abs/1906.0492>*

In this third paper on energy fields, AI was used to analyze the complex interactions between energy fields. The proposals are astonishing:

*The results may provide an explanation for passive-counter-rotation, super-conducting-levitation, an alternative approach to particle collider physics, an alternative explanation for the forces at the sub-atomic level, an alternative explanation for the 'magnetic' fields of the planets, and an alternative explanation for the MOND theory of forces at the galactic level - the so-called 5th force.*

## 8. Examples of potential energy waves:

Potential Energy waves may be one-dimensional, two-dimensional or three-dimensional.

They may be polarized in a particular plane.

They may also have rotational energy - as a helical wave.

### 8.1. Radio waves:

The forced (powered) movement of electrons in a radio antenna is a transformation of stored potential energy (in a battery) to an oscillating flow of electrons in the antenna. The fluctuating potential energy levels create potential energy waves (radio waves) around the antenna, which radiate through the fabric of space.

The frequency of the emitted potential energy wave corresponds to the applied frequency of the oscillation of the electrons.

The potential energy wave will radiate in one, two or three dimensions, depending on the shape and design of the antenna.

If the energy is a focussed beam (one direction, one dimension), its amplitude will remain constant, until it is absorbed by a receiving antenna.

If the energy radiates in two dimensions, the amplitude of the potential energy wave will reduce with the distance from the transmission antenna.

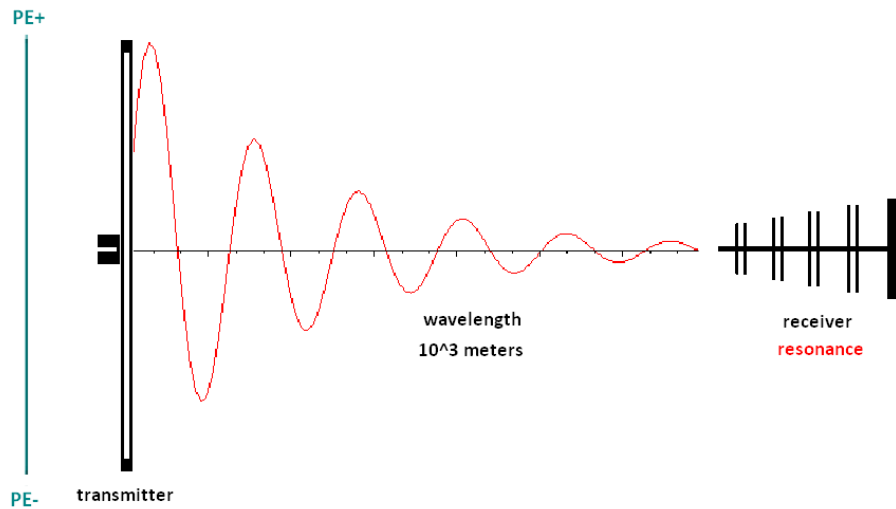
If the energy radiates in three dimensions, the amplitude of the potential energy wave will reduce with the square of the distance from the transmission antenna.

The ripples in the fabric of space caused by potential energy waves will interact with any resonant particle or object in their path. For resonance – the absorption of energy - the particle or object will have a similar dimension to the wavelength of the potential energy wave.

The potential energy waves may reach a receiving antenna, where potential energy is transferred to electrons in the antenna, by resonance. The receiving equipment can then amplify the signal - see Figure 8:

## Examples of Potential Energy Waves

Radio transmission: aerial to aerial.

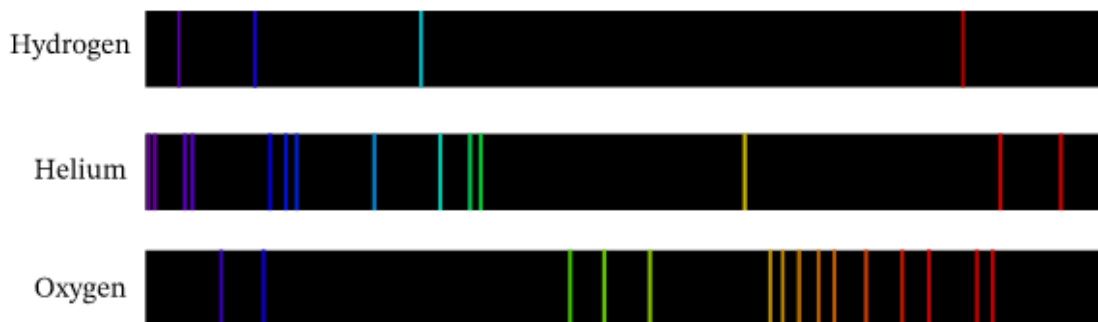


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[Figure 8: Potential Energy Waves of a radio transmission.](#)

### [8.2. Atomic emission spectra:](#)

Changes in the potential energy (excitation) of an atom, in its nucleus or in the surrounding electrons, can result in the radiation of potential energy waves of various energies, ranging from the low-frequency hydrogen emission spectrum up to much higher frequencies – see Figure 9:



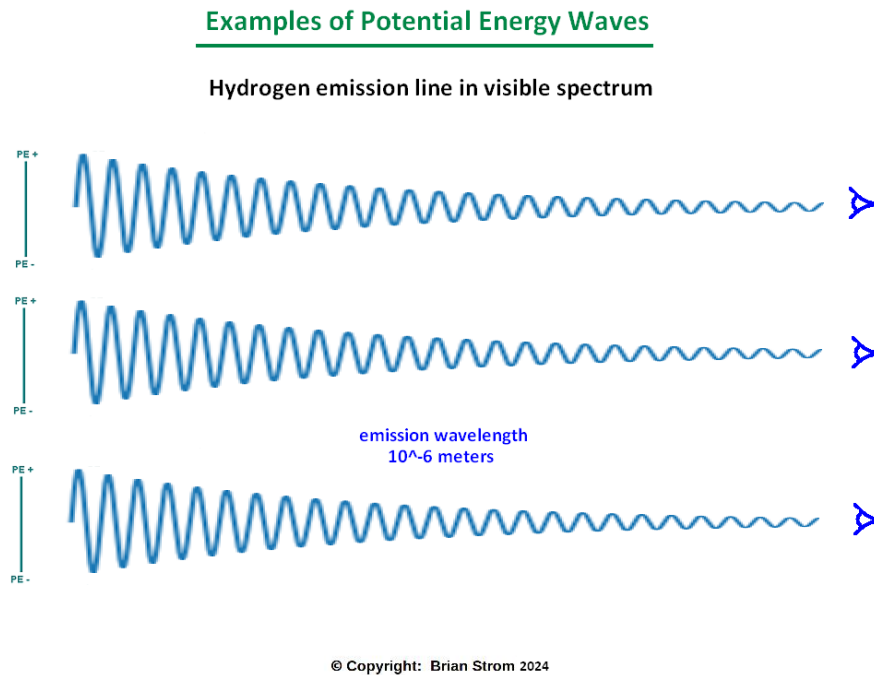
[Figure 9: Examples of emission spectra.](#)

These potential energy waves propagate through space. The intensity of the emissions reaching an observer will depend on the distance and on the number of emission events.

The energy of each event, and therefore the photon frequency, will depend on the potential energy step-change of that event.

Multiple transitions in adjacent atoms create random and incoherent potential energy waves. Some photons will tend to reinforce, some will tend to cancel each other.

The net sum total of super-imposed potential energy waves will dictate the POWER of the emission at that frequency – see Figure 10:



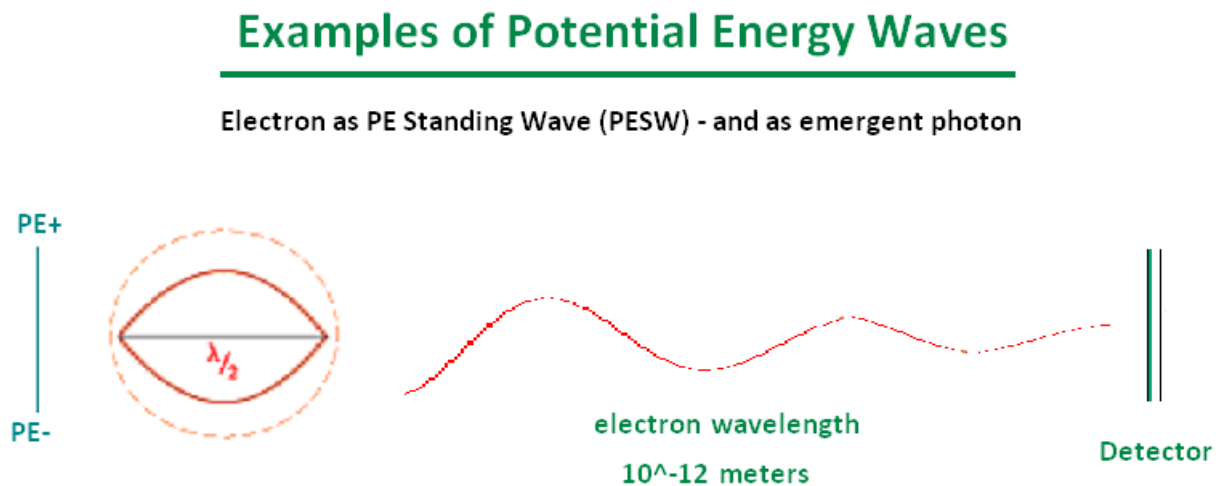
[Figure 10: Atomic emission spectra as Potential Energy Waves.](#)

The electrons in a hydrogen atom can be given energy either by a collision from an external particle, or by absorption of a photon, or by interaction with an applied energy field.

The atom will absorb energy and become more energetic or ‘excited’, and one or more electrons will move higher in the potential energy well of the atom. An electron may immediately fall back into the atom and collide with other electrons, sharing its Kinetic Energy (as heat), or emitting a photon. Also, an excited electron may go into orbit around the nucleus.

### 8.3. Particle-to-Energy conversion:

In a PET scanner, we believe an electron and positron are converted into 511 keV potential energy waves (photons), which can be detected in the scanner. The wavelength of these potential energy waves is typically  $10^{-12}$  meters – see Figure 11:



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[Figure 11: Conversion of a particle into a Potential Energy Wave.](#)

### 8.4. Cosmic collisions:

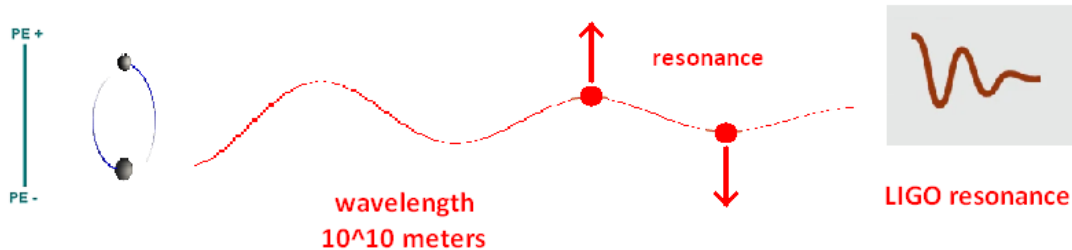
On a cosmic scale, celestial bodies (stars, galaxies, black holes) sometimes collide, resulting in large changes to the surrounding potential energy levels.

Energy may be released forming potential energy waves which will propagate away from the point of disturbance, through the fabric of space. Typically, energy is transformed into long wavelength, low-frequency potential energy waves (also known as gravity waves).

The initial amplitude of the potential energy wave will be dependent on the energy released in the collision. The amplitude of the potential energy wave will reduce as a function of distance – see Figure 12:

## Examples of Potential Energy Waves

Potential Energy Wave from binary black holes.



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[Figure 12: Cosmic potential energy waves.](#)

For resonance, a large-dimension detector (LIGO) will be required. The dimensions will need to be of similar size to the wavelength of the potential energy wave.

### [9. Particles and their potential energy wells:](#)

“Every particle (and object) is surrounded by a 3-dimensional potential energy well.”

Various theories, including Einstein’s General Theory of Relativity, propose the distortion of the fabric of space by objects, creating potential energy wells. But how and why does this happen?

#### [9.1. Energy and Inertia:](#)

In this conjecture, particles are packages of energy in the form of Potential Energy Standing Waves. These packages have **INTRINSIC ENERGY** - commonly known as ‘mass’.

These ‘concentrations of energy’ also have the property of **INERTIA**, whereby the particle has ‘resistance to change in velocity’. Inertia is a measure of how difficult it is to accelerate or decelerate a particle.

For its velocity (speed and/or direction) to change, the particle will need an addition, or a subtraction, of energy. From our basic laws of physics, for a change in energy, there will be a ‘force’ required - see Figure 13.

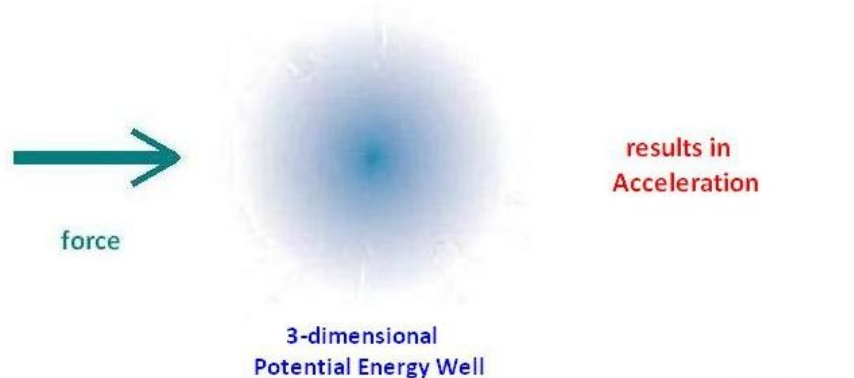


Energy will be transferred to or from another particle or energy field. The total energy will be conserved. Additionally, in an enclosed system, the velocity of the Center of Energy (center of mass) will not change.

*Note: This principle aligns with Newton's first law of motion, often referred to as the law of inertia. According to this law, an object at rest will remain at rest, and an object in motion will continue moving at a constant velocity unless acted upon by an external force.*

### A force on a Potential Energy Well - results in acceleration.

The Potential Energy Well resists the change in velocity.



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[Figure 13: Force on a potential energy well.](#)

Summary:

The **WEIGHT** of a particle, or collection of particles, is relative to where and how an object is weighed.

Outside the influence of any Energy Field (the Earth's 'gravitational' field for example), a particle or object will have zero weight.

But the particle still has its **INTRINSIC ENERGY** (mass).

Hence, the particle still has **INERTIA** whereby a force is required to change its velocity (speed or direction). The resistance to this change in velocity is directly proportional to the Intrinsic Energy (mass) of the particle or object.

*Note: the MOMENTUM of a particle is an approximation.*

*The dimensions of momentum are not mathematically meaningful.*

*It is the ENERGY of a particle that is the accurate parameter.*

*Reference: <https://edisconstant.wordpress.com/2015/11/10/momentum/>*

## 9.2. Potential Energy Wells attract one another.

*Reference [9]: 'The Interaction of Potential Energy Wells.'*

Brian Strom: Paper: 2110.0170. download at: <https://vixra.org/abs/2110.0170>

In this universe, we observe that potential energy wells ATTRACT one another.

The force between two potential energy wells will pull them together so they merge together or go into orbit around each another - see Figure 14:

### **Two Potential Energy Wells deflecting each other.**

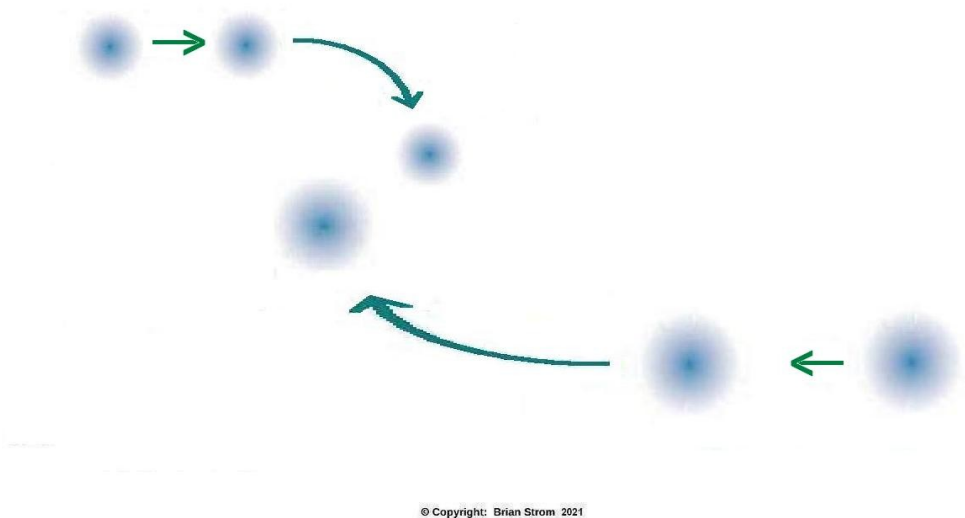


Figure 14: Potential energy wells attract one another.

The attractive force between two potential energy wells (objects) is a function of the intrinsic energy (mass) of each object -  $E^1$  and  $E^2$  - and the distance between them 'r'.

From observation, and from Newtonian mechanics, the force is shown to be proportional to the product of their intrinsic energies (masses) and inversely proportional to the square of the distance between them:

$$\frac{E^1 \times E^2}{r^2}$$

As two potential energy wells approach one another, some potential energy is converted into kinetic energy. Upon collision, the two (negative) potential energies will combine into one deeper (negative) PE well. The kinetic energies will also combine, and the total KE will increase. The increased average kinetic energy will give an increased temperature measurement - see Figure 15:

This process explains how cosmic dust can gradually clump together into a larger body. As the temperature increases, a critical level may be reached whereby a nuclear reaction will begin, and a star is formed.

### The merging of two Potential Energy wells

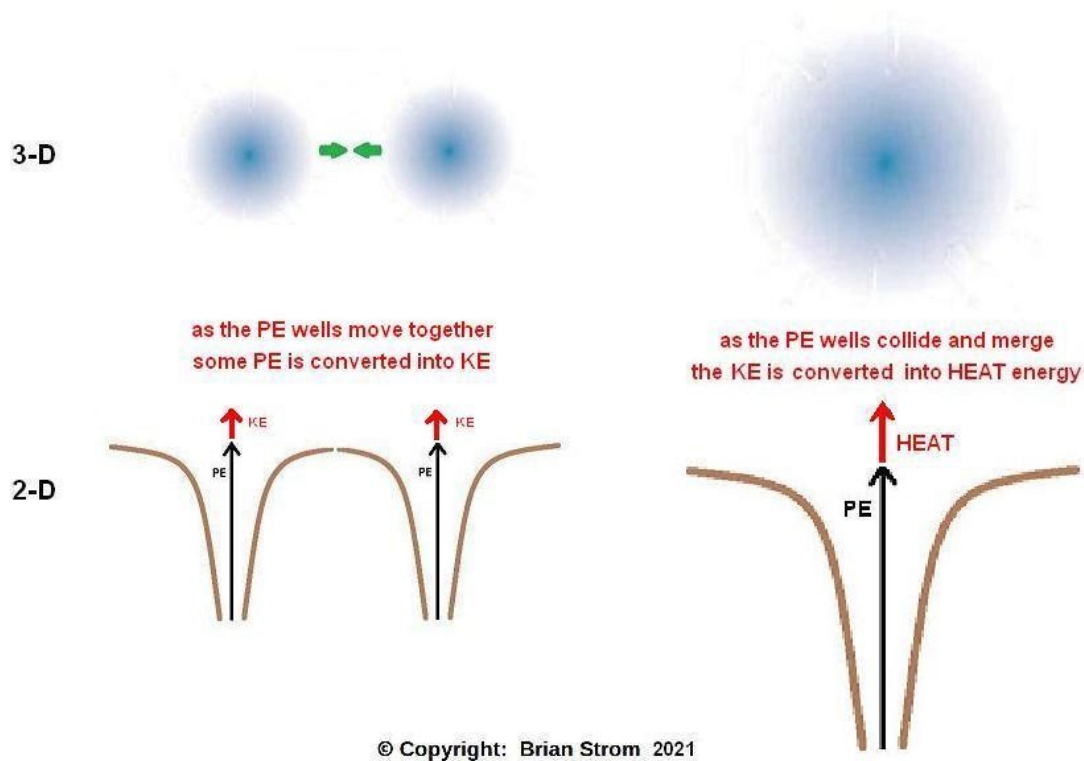


Figure 15: [Merging of potential energy wells.](#)

### [9.3. The Mystery of potential energy wells:](#)

*Reference [10]: 'The Mystery of Potential Energy Wells.'*

Brian Strom: Paper: 2109.0046. download at: <https://vixra.org/abs/2109.0046>

Einstein and others proposed the distortion of the fabric of space by an object, creating a potential energy well. But how and why does this happen?

For an object orbiting a potential energy well, the assumption is that energy is transposed between potential and kinetic, but the total energy remains constant. How does this happen?

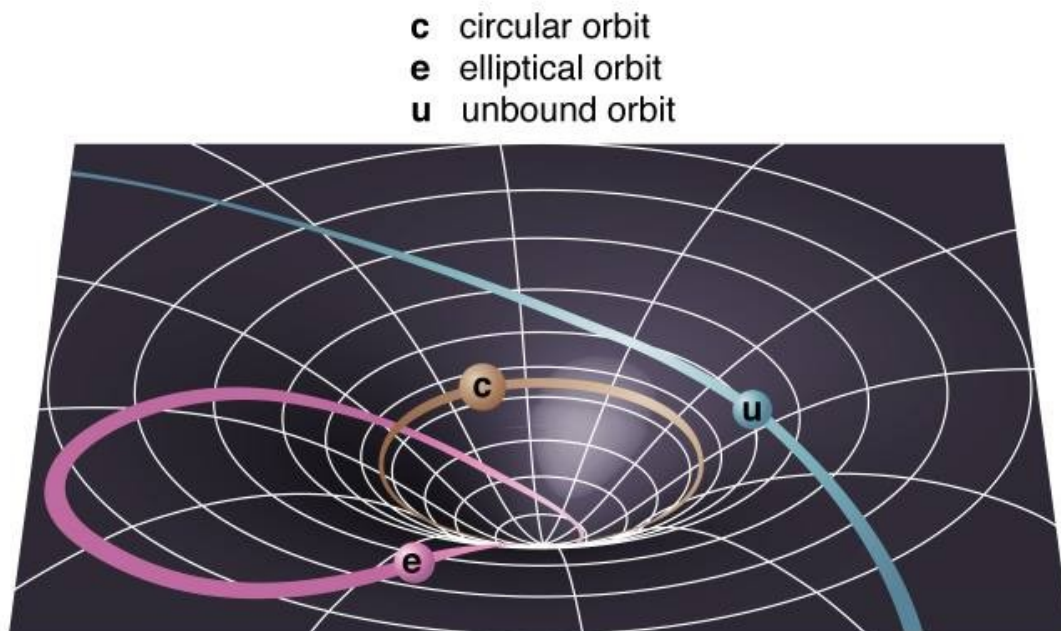
An astronaut in a spaceship seems to feel no force when in free orbital motion around the Earth. Yet the spaceship changes velocity (direction and speed) as it proceeds in its orbit. How does this happen?

From observation, for a large object such as the Earth, the ‘forces’ on the side nearer the “barycenter” in the potential energy well of the Sun, will be greater than the ‘forces’ of the other side of the Earth. This explains why there are tidal movements of the oceans on both sides of the Earth, and two tides in approximately 24 hours. The Earth becomes ‘stretched’ because of the different forces at different levels in the Sun’s potential energy well.

How can these magical properties of the potential energy well be explained?  
And what is orbital motion? - see Figure 16:

Perhaps an energy equation would be more useful than a “force” equation to explain orbital motion: e.g.  $KE + PE = \text{Constant}$ .

Why is this energy equation not named as the 4<sup>th</sup> law of orbital motion?



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[Figure 16: The mystery of Potential Energy Wells.](#)

#### [9.4. Thought experiment to explain Orbital motion:](#)

*Reference [10]: ‘The Mystery of Potential Energy Wells.’*

*Brian Strom. Paper: 2109.0046. download at: <https://vixra.org/abs/2109.0046>*

Imagine an asteroid in orbit around the Sun. Its orbit brings it too close to the Earth and it falls into the influence of the Earth's potential energy well. Its orbit around the Sun will be changed.

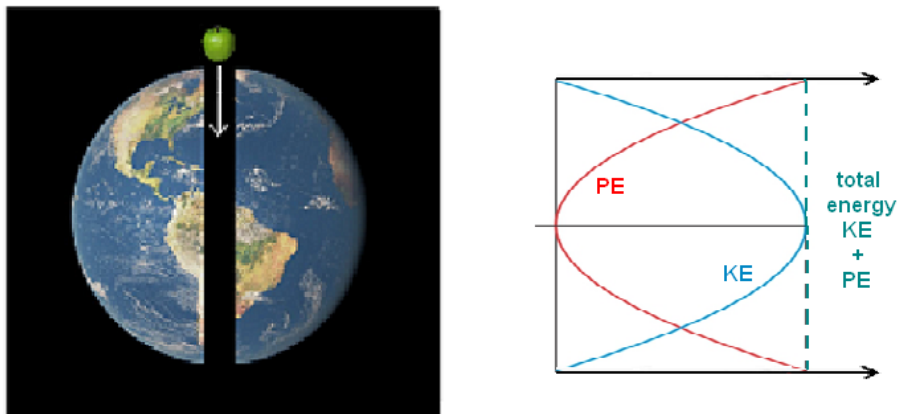
The asteroid could go into orbit around the Earth. Alternatively, it could collide with the Earth and, upon impact, give up its kinetic energy to the Earth. In this latter case it will then be held in a stationary position of constant potential energy at the Earth's surface. The asteroid has simply been stopped in its “orbital” path.

This is where Newton looked at the local Earth environment and thought of mass, weight and gravity etc. In fact, the asteroid is held at the Earth's surface by an upward force that prevents it from continuing its orbital path around the center of the potential energy well (of the Earth). Remove the constraint, and the asteroid will resume its journey. It will resume its orbit around the Earth's center.

The principle can be represented by a thought experiment whereby an object “falls” through a trap-door into a mine-shaft through the center of the Earth. The object will follow a simple sinusoidal motion – see Figure 17:

$$\text{Total Orbital Energy} = \text{KE} + \text{PE}$$

hypothetical "linear" orbit



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[Figure 17: Hypothetical linear Earth orbit.](#)

## [9.5. Hubble - Doppler effect:](#)

*Reference [11]: ‘Potential Energy Blue/red Shift and Hubble Tension.’*

*Brian Strom: Paper: 2111.0110. download at: <https://vixra.org/abs/2111.0110>*

From observations of the universe, potential energy waves (photons) emitted by hydrogen atoms, often appear to be frequency-shifted.

Part of the frequency-shift can be explained by the Hubble theory - the Doppler effect when the atom is moving relative to the observer.

### 9.6. Hubble - Potential Energy levels throughout the universe:

In addition to the Doppler effect, hydrogen atoms may reside at different potential energy levels in the universe. Hence the blue/red shift may also be dependent on the potential energy level of the atom relative to that of the observer - see Figure 18:

*Note: For photons leaving or reaching the potential energy well of a star, Einstein and others have predicted a red or blue shift in the emission spectra. Is this a change in frequency because of a change in photon speed, as though a photon is a particle with variable speed in a 'gravitational' gradient? Or is there a change in photon frequency (and energy) as the photon moves through a potential gradient? But where would this energy go to, or come from? The explanation is not logical.*

An alternative, more logical, explanation is in the Brian Strom conjecture:

*Reference [12]: 'A new conjecture linking particle size and particle energy.'*  
Brian Strom: Paper: 2203.0175. download at: <https://vixra.org/abs/2203.0175>

## **Energy x Diameter = Constant**

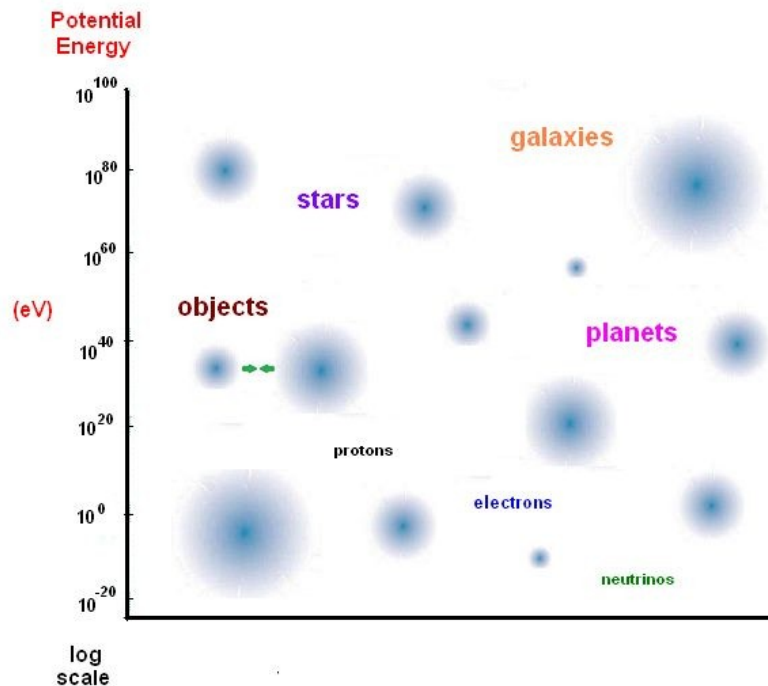
There are a number of consequences of the  $ExD=C$  conjecture:

- a) Just as a crystal oscillates at a different frequency at different potential (gravity) levels on Earth, so the atomic emission spectra would be at different frequencies when the atoms are at different potential energy levels in the universe.
- b) Adding energy to an object makes it 'heavier', and its intrinsic energy increases. This is an alternative explanation for observations of a 'relativistic' effect.
- c) In addition, with this conjecture, adding energy to an object makes it 'smaller'.
- d) In a particle collider, protons are accelerated and become super-heavy protons. When the protons collide, do they break into 'constituent' parts representing the origins of universe. Or are these constituent parts explained in the  $ExD=C$  equation?
- e) Time measurement may be misleading, as atomic clocks may NOT operate at a constant rate throughout the Universe. Therefore, the whole concept of 'time dilation' may be wrong.

The conclusion is that atomic emission spectra are NOT constant, and that the emission frequencies vary with different potential energy levels – see Figure 18:



## A universe of Potential Energy wells single wave-particles and collections of wave-particles



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[Figure 18: Potential Energy levels in the Universe.](#)

### [9.7. The Potential Energy Well as a “Black-Box”:](#)

*Reference [2]: ‘A new conjecture linking particle size and particle energy.’*

*Brian Strom: Paper: 2203.0175. download at: <https://vixra.org/abs/2203.0175>*

For an object moving under the influence of a potential energy well, the assumption is that energy is transposed between potential and kinetic, but the total energy remains constant.

The proposal is that the entire potential energy well should be treated as an enclosed Black-Box, whereby the Total Energy of the potential energy well includes the kinetic energy and rotational energy of all the particles and objects within the well.

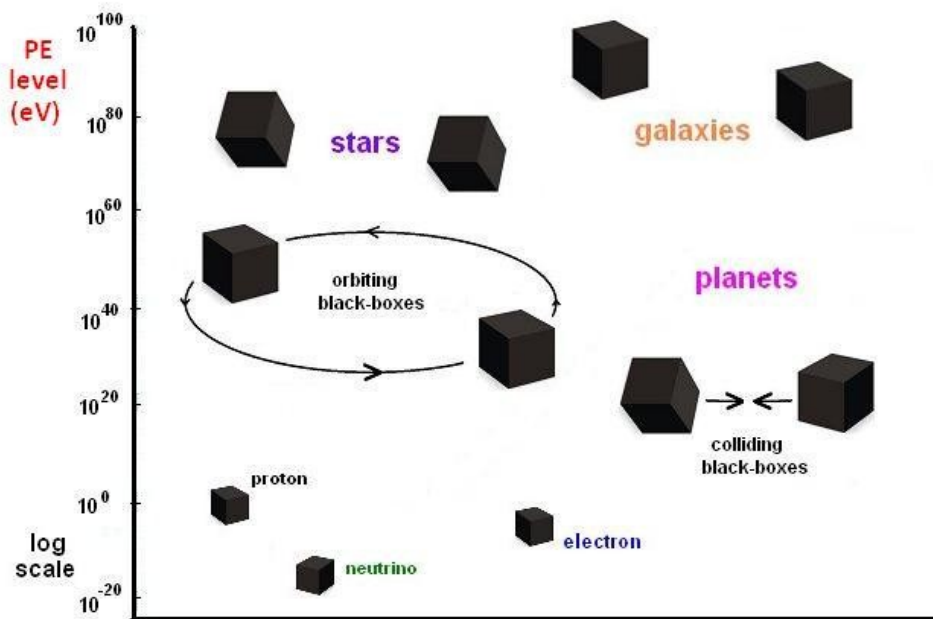
In this conjecture, the kinetic energies of particles and objects are transient and temporary. Particles and objects may be orbiting a central core, or ‘bubbling’ up and falling back into the central core.



Similarly, component parts of the black-box will have Rotational Energy of different vectors and amplitudes. The total Rotational Energy will be the vector sum of all the rotational energies, both spin and orbital. Within the black-box, the total Rotational Energy will remain constant.

The universe can be sub-divided into these multiple fragments - see Figure 19:

## A universe of Black-Box Potential Energy Wells



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[Figure 19: The Potential Energy Wells within the solar system.](#)

For example:

One black-box (the Earth plus Moon) is part of the solar system black-box. The solar system black-box is part of the galaxy black-box. The galaxy black-box is part of the Milky Way black-box. The Milky Way black-box is part of the Universe black-box. And so on to infinity.

For the reducing scale, atoms can be treated as black-boxes. Perhaps the component parts of the atom can be subdivided into smaller black boxes. And so on to infinity.

The 'black box' concept may help our understanding of the mysterious nature of Potential Energy Wells. This may be one of the "keys to the universe".

## 9.8. Temperature:

In this conjecture, it is the total energy - potential energy plus kinetic energy (rotational and orbital) - that is the important parameter. Some potential energy may be temporarily transformed into kinetic energy, but the total energy of an enclosed system will not change.

This total energy principle could apply to a galaxy, a star and its planets, a planet and its moons, or an atom (its protons and electrons).

For example, an atom may be considered as a black-box PE well where the electrons are stationary at absolute zero. At higher temperatures, the electrons will be 'excited' and bubbling away from the atom, then falling back into the atom. Some electrons may go into an orbital motion before colliding with other electrons and redistributing their energy.

For another example, the Solar System can be considered as a black-box PE well that encompasses the Sun and its planets, moving around at various speeds.

The measured 'temperature' of the black-box is the average 'speed' of particles within the black-box.

*Note: The average temperature of the sun represents the average velocity of the particles within the body of the Sun. Higher velocity particles may leave the Sun's surface and become part of the Sun's corona. These particles will have higher average velocities, which will give a higher temperature measurement for the corona.*

## 10. Characteristics of Rotational Energy Fields:

Particles have Rotational Energy which can be observed in a number of ways:

### 10.1. Precession:

*Reference [12]: 'Particle Physics and Energy Fields.'*

*Brian Strom: Paper: 1908.0291. download from: <https://vixra.org/abs/1908.0291>*

Atomic resonance experiments (NMR and ESR) and gyroscopic theory indicate that when particles sit in an externally applied energy field, particles with rotational energy can be expected to 'precess' - see Figure 20:

Precession of a particle with RPE - in an applied PE Field.

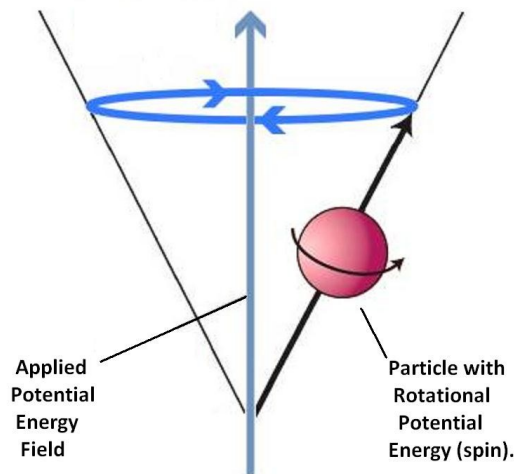


Figure 20: A particle with RE will 'precess' in an applied energy field.

## 10.2. Deviation:

From Energy Field Theory, when particles with a rotational energy field MOVE through an applied energy field - such as the "magnetic" field within a particle collider - the particles will tend to deviate from their trajectory - see Figure 21:

*Note: Conventional theory is that particles and anti-particles (matter and anti-matter) will turn in different directions. This view is challenged:*

*Reference [13]: 'Anti-matter.'*

*Brian Strom: Paper: 2301.0078. download at: <https://vixra.org/abs/2301.0078>*

*Note: Conventional theory is also that particles with different "charge" (positive and negative) will turn in different directions. This view is challenged:*

*Reference [1]: Electrons have Potential Energy not 'charge'.*

*Brian Strom: Paper: 2301.0008 download at: <https://vixra.org/abs/2301.0008>*

For particles moving through an applied energy field, a particle having a rotational energy field with a subtractive vector will turn in a different direction to a particle having a rotational energy field with an additive vector.

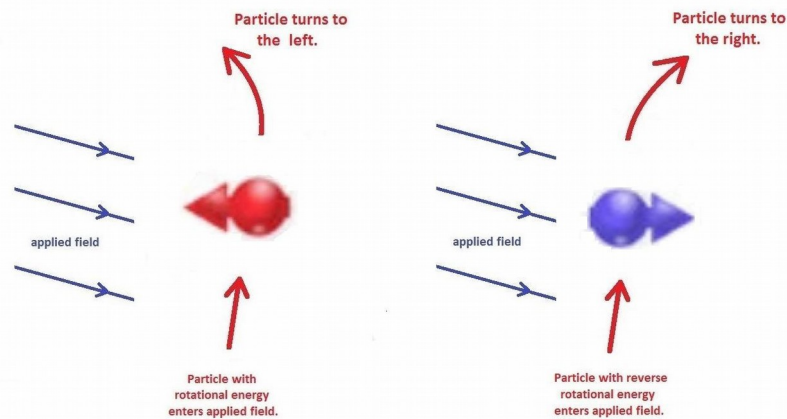
In any given environment, there is no magical reason why rotational energy field vectors for particles should be exactly aligned, or exactly counter-aligned. In all probability, the energy field vectors will be in random directions. With the addition of the applied field, the net energy field vectors will be in different directions and at

different strengths. Some particles will, therefore, be deflected more than others.

This may be an explanation for the complexity of Particle Collider observations and, hence, the difficulty in identifying particles and explaining their behavior.

The future use of AI for pattern recognition may help with this analysis and possibly show how to simplify and rationalize the number of particles in the Standard Model.

### Particles with Rotational Potential Energy moving through the Applied Field of a Particle Collider.



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[Figure 21: Particles with contrasting RE will diverge in an applied energy field.](#)

These concepts are fundamental and have wide-ranging implications for our understanding of the behavior and properties of particles.

### [10.3 Rotational Energy leads to the pairing of particles:](#)

*Reference [6]: 'AI Physics - Energy Fields (Part 1).'*

*Brian Strom: Paper: 1902.0421. download at: <https://vixra.org/abs/1902.0421>*

From observation, atomic resonance experiments (NMR) only produce results with single protons (the hydrogen atom) or with atoms having an odd number of protons or neutrons.

Similarly, for electron resonance experiments (ESR), the conjecture is that results are only produced with an 'unpaired' electron.

These experiments suggest that most particles tend to co-exist in 'entangled' pairs.

The lowest energy configuration for a pair of particles appears to be when they have equal and opposite Rotational Energy - see Figure 22:

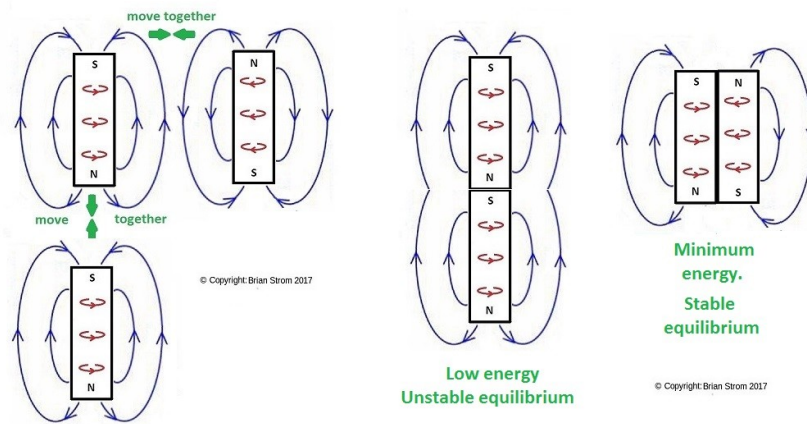


Figure 22: Minimum energy configurations for energy fields.

It is proposed that particles will tend to pair with particles of equal and opposite Rotational Energy, always resulting in minimum net field strength.

#### 10.4. Allotropes:

*Reference [8]: 'AI Physics - Energy Fields (Part 3).'*

Brian Strom: Paper: 1906.0492. download at: <https://vixra.org/abs/1906.0492>

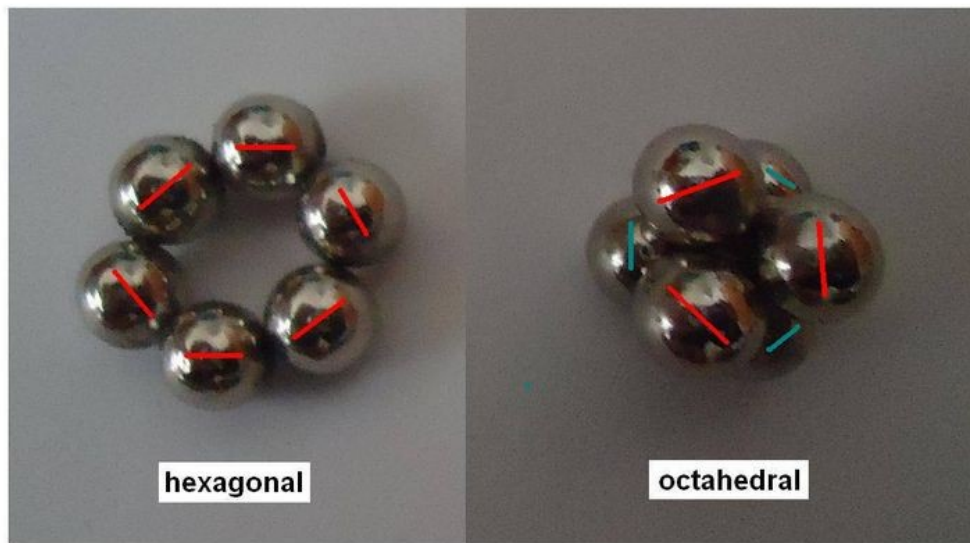
This paper provides an alternative explanation for the existence of allotropes - the different forms of an element.

AI modelling of protons in an atomic nucleus shows how their Rotational Energy vectors can be arranged in a number of stable configurations. It is proposed that allotropes are created by these different arrangements of protons.

The AI modelling provides images of the probable proton configurations for each allotrope. It is proposed that each allotrope is the lowest energy configuration for the temperature and pressure at the time of its formation. Different allotropes will have atoms which assemble to form different crystal structures.

Here are two common allotropes of Carbon: Graphite created at low temperature and pressure, and Diamond created at high temperature and pressure – see Figure 23:

Carbon nucleus: 6 protons: two different allotropes.



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Figure 23: Allotropes: Alternative arrangements of proton RE vectors.

## 11. Summary:

In this paper we propose a new conjecture:  
The fundamental entity in the universe is ENERGY.

The new conjecture disagrees with many previous conjectures from the earlier history of scientific research. The old conjectures of Bohr, Heisenberg and others, from 100 years ago, have been challenged using more recent knowledge and observations.

Changes or transformations in the levels of energy lead to the formation of energy fields or the emission of potential energy waves that propagate through the fabric of space, at the speed of light.

The conjecture is also that electrons have potential energy but not “charge”. Particles can be accelerated by a potential energy gradient whereby electrons move from areas of surplus to areas of deficit. Free protons will be replaced by these electrons and so will be observed to move in the opposite direction.

There are potential energy fields - not magnetism and electromagnetism. There is “matter” and there is “counter-matter”. But not “anti-matter”. There has been no need to invent magical ‘virtual’ particles.

Particles have rotational energy (spin). Atomic resonance experiments (NMR and

ESR) show how particles tend to exist in 'entangled' pairs. This may explain some of the 'quasi-quantum' effects of 'entangled' particles.

The velocity and energy of an individual particle are important parameters, but 'temperature' is less so. Temperature is just a measure of the average speed of particles.

It is hoped that this new conjecture will help scientists review their theories from different perspectives and, perhaps, reach different conclusions and make scientific progress. It may help physicists understand the behavior of atoms - especially 'quasi-quantum' behavior.

Similarly, the theory of energy fields in rotating bodies is an alternative to the MOND (modified newtonian dynamics) theory. It may help cosmologists to understand the motion and behavior in distant galaxies, without the need for magical 'dark' materials!

The concept of potential energy waves may provide a unified framework to explain the observations of physical phenomena. Exploring these ideas further could lead to new insights and a deeper understanding of the fundamental nature of our universe.

The investigation of the mysterious nature of potential energy wells may lead to an alternative to the old space-time conjecture.

The concept of potential energy wells as 'black boxes' may provide some answers.

It may be one of the "keys to the universe".

## 12. References:

*Reference [1]: Electrons have Potential Energy not 'charge'.*

*Brian Strom: Paper: 2301.0008 download at: <https://vixra.org/abs/2301.0008>*

*Reference [2]: 'A new conjecture linking particle size and particle energy'.*

*Brian Strom: Paper: 2203.0175 download at: <https://vixra.org/abs/2203.0175>*

*Reference [3]: 'AI Physics - Atomic Structure (Part 1)'*

*Brian Strom: Paper: 1811.0162. download at: <https://vixra.org/abs/1811.0162>*

*Reference [4]: 'AI Physics - Atomic Structure (Part 2)'*

*Brian Strom: Paper: 1911.0159. download at: <https://vixra.org/abs/1911.0159>*



*Reference [5]: 'The Blueprint for the Atom.'*

*Brian Strom: Paper: 2212.0104. download at: <https://vixra.org/abs/2212.0104>*

*Reference [6]: 'AI Physics - Energy Fields (Part 1).'*

*Brian Strom: Paper: 1902.0421. download at: <https://vixra.org/abs/1902.0421>*

*Reference [7]: 'AI Physics – Energy Fields (Part 2).'*

*Brian Strom: Paper: 1903.0495 download at: <https://vixra.org/abs/1903.0495>*

*Reference [8]: 'AI Physics - Energy Fields (Part 3).'*

*Brian Strom: Paper: 1906.0492. download at: <https://vixra.org/abs/1906.0492>*

*Reference [9]: 'The Interaction of Potential Energy Wells.'*

*Brian Strom: Paper: 2110.0170. download at: <https://vixra.org/abs/2110.0170>*

*Reference [10]: 'The Mystery of Potential Energy Wells.'*

*Brian Strom: Paper: 2109.0046. download at: <https://vixra.org/abs/2109.0046>*

*Reference [11]: 'Potential Energy Blue/red Shift and Hubble Tension.'*

*Brian Strom: Paper: 2111.0110. download at: <https://vixra.org/abs/2111.0110>*

*Reference [12]: 'Particle Physics and Energy Fields.'*

*Brian Strom: Paper: 1908.0291. download at: <https://vixra.org/abs/1908.0291>*

*Reference [13]: 'Anti-matter.'*

*Brian Strom: Paper: 2301.0078. download at: <https://vixra.org/abs/2301.0078>*

## **Annex: Research Chronology:**

2001: Analysis of physics textbooks and theories.

2004: Conclusion: Old physics conjectures are dubious.

2007: New conjecture: Energy x Diameter = Constant.

2011: New conjecture: Charge is an unnecessary creation.

2012: EdisConstant conjectures: Atomic Structure.

2018: Brian Strom conjectures: Energy Fields.

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