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The Ulianov Gravitational Model

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Abstract

This paper presents a new model of gravitation based on Le Sage's 1782 model of gravitational pressure, the Higgs field, and the concepts of Ulianov Wormholes (UWH). This model proposes that the universe is filled with a Higgs Ulianov Perfect Liquid (HUPL) under Planck pressure. Building on historical and contemporary theories, the Ulianov gravitational model integrates and extends the works of Le Sage, Einstein, and Higgs to form the foundational pillars of this new framework. This paper is based in the high pressure of the HUPL, that is reduced by space-times distortions generated by Ulianov Wormholes, and deduce fundamental physical laws, including Newton's law of gravitation and the Schwarzschild metric.

The criticisms of Le Sage's gravitational model are addressed by examining the behavior of the Higgs Ulianov perfect liquid under pressure and the spacetime distortions provided by the Einstein-Rosen bridges.

By addressing the limitations of previous models, the Ulianov gravitational model aims to provide a comprehensive framework that bridges general relativity, quantum mechanics, and Newtonian Mechanics. This model potentially lays the groundwork for a New Unified Theory or Theory of Everything, offering explanations for various observable phenomena and contributing to the advancement of theoretical physics.

Keywords:* *Ulianov Wormholes (UWH); Higgs Ulianov Perfect Liquid (HUPL); Planck pressure

Introduction

This article presents a new version of a gravitational model, the Ulianov Gravitational Model, which builds upon the concepts of the Higgs field and Ulianov Wormholes (UWH). This model can be considered a continuation of Le Sage's [1] gravitational model presented in 1782 and provides continuity to the renowned works of Albert Einstein and Peter Higgs.

Einstein's 1935 paper [2], "The particle problem in the general theory of relativity," attempted to create a Unified Theory or a "Theory of everything" based on the theory of relativity. This paper introduced the concept of spacetime bridges, later popularized as "wormholes" [3]. Although wormholes are not as widely accepted as black holes, the concept has been embraced by science fiction as a means to surpass the light speed barrier in interstellar and intergalactic travel. However, Einstein's work did not progress further as it tried to unify only two forces (gravitational and electromagnetic), excluding nuclear forces. This exclusion highlighted Einstein's skepticism towards nuclear forces, a position that led some contemporaries to critique his later work.

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Peter Higgs' 1964 paper [4], "Broken Symmetries and the Masses of Gauge Bosons," laid the foundation for the completion of the Standard Model of particle physics with the introduction of the Higgs boson, responsible for imparting mass to particles. Despite this, critics argue that the Higgs boson does not facilitate the calculation of particle masses or the deduction of fundamental physical laws.

In 1966, Isaac Asimov [5] introduced a universe model shaped like a four-leaf clover with four parallel universes separated by "time walls" and "space walls." Dr. Ulianov [6] detailed this model in 2007, naming the spaces and associating elastic holes with the walls of time and space. These elastic holes, termed Ulianov Holes (Uholes), expanded to form Planck Ulianov Spheres [7] (PUS). These PUS networks behave as a Ulianov Perfect Liquid [8] (UPL) without viscosity, subjected to Planck pressure and density, and form the fabric of empty spacetime.

In 2024, after completing his model called Ulianov Theory (UT) [9], Dr. Ulianov realized that his model of Uholes continued the Einstein-Rosen proposal by generating Ulianov Wormholes. He discovered that if the mass of the Higgs field were properly calculated, it would generate very high density and pressure, nearly at the order of Planck Pressure (PP).

Thus, the UT model bridges General Relativity (GR), Quantum Mechanics (QM), and Newtonian Mechanics (NM) by using the Higgs boson to generate a Higgs Ulianov Perfect Liquid (HUPL) under Planck pressure. The Higgs field mass and pressure is deduced in the article "A corpuscular theory of gravitation, the particle problem in the general theory of relativity and broken symmetries and the masses of gauge Bosons", which should be read as a basis to understand this paper.

Therefore, this article bridges Le Sage's pressure gravitational model, the Einstein-Rosen bridges model, and the Higgs boson model, potentially laying the groundwork for a new unified theory or Theory of Everything. The criticisms of Le Sage's gravitational model are addressed by the pressure behavior of the Higgs Ulianov Perfect Liquid and the spacetime distortion provided by the Einstein-Rosen bridges.

The Higgs boson model's inability to calculate particle masses or gravitational forces is addressed using the Higgs Ulianov Perfect Liquid pressure to derive Newton's gravitational law, Newton's inertial law, the Schwarzschild metric, and other fundamental laws of physics.

Materials and Methods

The Ulianov Wormhole model

In the context of the Asimov Ulianov Universe, as presented in Figure 1, there are two kinds of walls, and thus two kinds of particles can be defined. These particles are essentially Ulianov elastic holes placed in the walls of time and walls of space. These Ulianov holes can be modeled as Einstein-Rosen bridges or wormholes, and are therefore named Ulianov Wormholes (UWH) of space and time:

- **Ulianov Wormhole in a Time Wall (UWHT):** This is an Einstein-Rosen Bridge that connects two spherical regions of space-time. One side of the "bridge" forms a Black Hole defined in the universe (Nspace) at the space-time (x, y, z, t). The other side forms a White Hole in the parallel universe (Imspace) at the space-time (x, y, z, t^{-}). The UWHT interacts with the Higgs Field and alters the pressure over the HUPL due to changes in space curvature. The Higgs field resists moving the UWHT in space but not in time. Variations in HUPL pressure near the UWHT create a resultant force that tends to attract them, allowing multiple UWHT to stay at the same point in space, generating significant space-time curvature. This type of wormhole creates a hole in the time wall, having a mass property, with the micro UWHT mass defined as −mP (Planck mass=2.17645 × 10^{-08} kg) and the nano UWHT mass defined as −mU (Ulianov unitary mass=1.69290 × 10^{-68} kg). Note that for an anti-UWHT (or UWH $^{-}$, which refers to the other side of the UWHT), an opposite value of mass is observed.

- **Ulianov Wormhole in a Space Wall (UWHS):** This consists of a Black Hole in Nspace connected to a White Hole in Rmspace at (x^{-}, y^{-}, z^{-}, t). The UWHS interacts with the Electron field, altering the "electric pressure" or voltage. UWHS can move freely in space but resists moving in time, acquiring charge when traveling to the past or future. Two UWHS with the same time direction charge repel each other, preventing large space-time distortions. This type of wormhole creates a hole in the space wall, with the nano UWHS having an electric charge property, denoted as qU (Ulianov unitary electric charge = 1.98477×10^{-80} C). In the UWH model, the charge varies with the “temporal velocity” direction; one UWHS moving to the future (forward in time) yields a negative charge (-qU), while moving to the past (backward in time) yields a positive charge (+qU). Note that for an anti-UWHS (or $\overline{\text{UWHS}}$), the opposite value of charge is always observed. As the UWHS can also have imaginary velocity (movement in space defined by imaginary time changing, while the UWHS is frozen in the same real time), it’s kind of move generates an imaginary charge (magnetic field) dipole ± JqU, explaining the absence of magnetic monopoles.

Ulianov Wormholes can also be classified based on their sizes (or pressure changes behavior) into two types:

- **Micro Ulianov Wormhole (µUWH):** An Einstein-Rosen Bridge that connects two spherical regions of space-time in two universes, with each sphere having the same diameter, equal to the Planck Length (LP). A µUWHT interacts with the Higgs field and is connected to the body’s masses. As one UWH connects two space-time spheres, the µUWHT also defines one sphere named the Matter Planck Ulianov Sphere (MPUS) that appears in our universe and another sphere, named the Anti-Matter Planck Ulianov Sphere (AMPUS), that appears in the parallel universe (Imspace). The AMPUS mass is equal to the Planck mass (mP) and the MPUS mass is equal to -mP. The HUPL pressure inside the MPUS is zero and inside the AMPUS is 2PP.

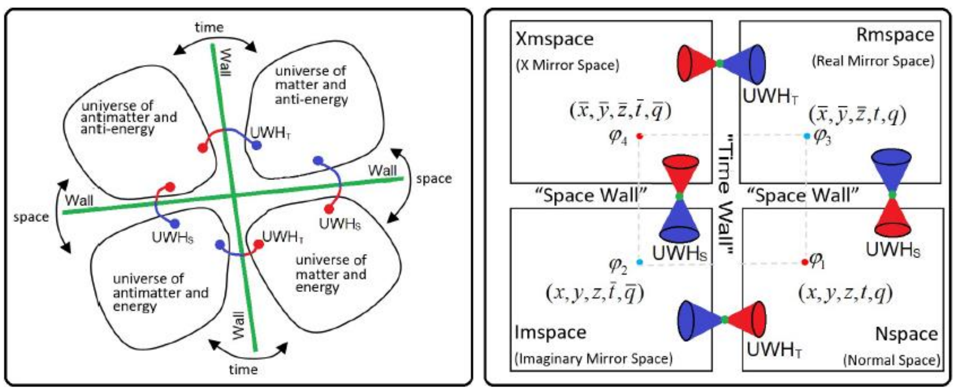

FIG.1. **Asimov Ulianov Universe. (a) Four leaf clover universe proposed by Isaac Asimov, with “time walls” and “space walls” separating the four sub-universes. (b) Formalization of the Asimov model by Ulianov, naming the sub-universes and defining “holes” in the space walls (Ulianov space Wormhole - UW HS) and in the time walls (Ulianov time Wormhole - UW HT).**

- **Nano Ulianov Wormhole (nUWH):** Similar to µUWH, the nUWH has the same size and volume but a very small mass mU (Ulianov unitary mass=1.69290×10^{-68} kg) or a very small electric charge qU (Ulianov unitary electric charge = 1.98477×10^{-80} C). The nUHW does not nullify the HUPL pressure inside it and only reduces HUPL pressure by the Ulianov Pressure value (PU=3.6062×10^{52} Pascal). A nUWHT defines a sphere in our universe named the Matter Planck Ulianov nano Sphere (nMPUS) and a sphere in the parallel universe (Imspace) named the Anti-Matter Planck Ulianov nano Sphere (nAMPUS). The pressure inside these two spheres is defined as: PnMP US=PP − PU and PnAMP US=PP + PU. For simplification, the nMPUS can be modeled as one small sphere, with zero HUPL pressure inside it, and with volume defined as the Ulianov Volume (VU=$3.2839799 \times 10^{-165}$ m^3). One nAMPUS with Ulianov Volume has internal pressure equal to 2PP.

The Ulianov Micro Wormhole and the Higgs Boson Pressure

As presented in Figure 2, the Ulianov micro Wormhole of type “time” (µUWHT) can interact with the Higgs field and generate pressure variations over the HUPL (Higgs Ulianov Perfect Liquid) in space-time that can be modeled as a Higgs Ulianov Ocean full of HUPL at a constant pressure, with the value of the Planck pressure. One µUWHT has two sides: The MPUS (Matter Planck

Ulianov Sphere) and AMPUS (Anti-Matter Planck Ulianov Sphere). As presented in Figure 2a, the pressure of HUPL inside the MPUS is equal to zero and the pressure of HUPL inside the AMPUS is equal to 2PP. Using this approach, the µUWHT can be seen as a water pump that removes liquid from inside the MPUS and throws it inside the AMPUS. However, it is not the Higgs bosons that are being pumped, but space-time itself that is being distorted and transferred from one universe to another.

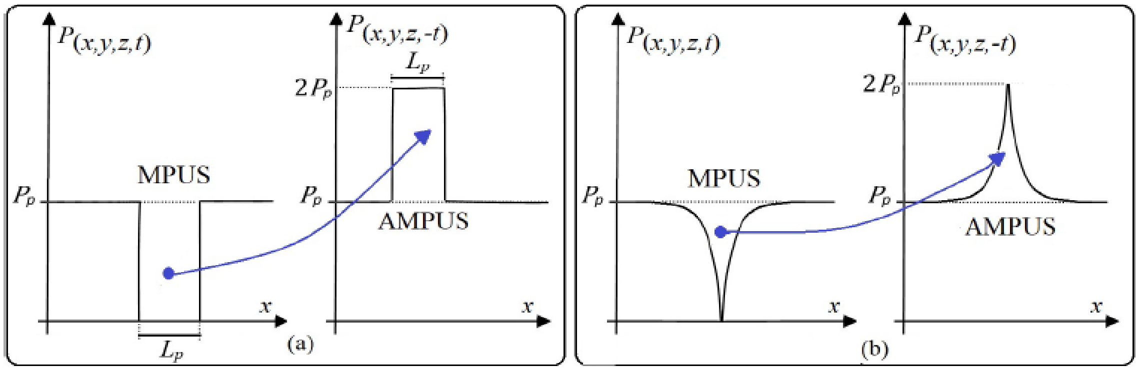

FIG. 2. **One µUWHT placed in the universe generates one MPUS in the universe (Nspace) space- time (x, y, z, t) and one AMPUS in the parallel universe (Imspace) space-time (x, y, z, −t). a) MPUS not collapsed with null pressure inside it and AMPUS not collapsed with pressure 2PP inside it. b) The MPUS and AMPUS are collapsed, creating two singularities and changing the HUPL pressure, creating a pressure curve from zero to PP outside the MPUS and a pressure curve from 2PP to PP outside the AMPUS.**

Figure 3 presents two analogies to better understand the Ulianov Wormhole behavior. The first analogy is a table covered with a sheet of rubber on its top and another sheet of rubber underneath. A hole is made in the table and a circular region of rubber from the upper sheet is pulled into the hole, being transferred to the lower sheet forming a rubber bubble. Thus, the upper sheet will have a circular area with no rubber (rubber density equal to zero, related to null pressure inside an MPUS) and the underside sheet will have a circular area with double density rubber (related to double pressure inside an AMPUS).

Note that in this analogy, we can consider that the hole "pumps" rubber from one side of the table to another, but it's also possible to consider that a circular area over the table was "teleported" from one side to another, generating a hole (an area that cannot contain rubber) on one side of the table and generating an anti-hole (an area where the thickness of the rubber doubles) on the other side of the table. If, for example, the rubber sheet is made up of small black rubber rings organized in a hexagonal pattern (like the honeycomb pattern produced by bees) as presented in Figure 4a, we can paint a circular area over the sheet (turning some rings from black to red). Through the hole in the center of the table, we can start pulling all the rings that are red. On the surface of the table, the remaining black rings will be stretched and increase in diameter, while rings on the edges of the table will not be so stretched, and rings close to the hole will become very large.

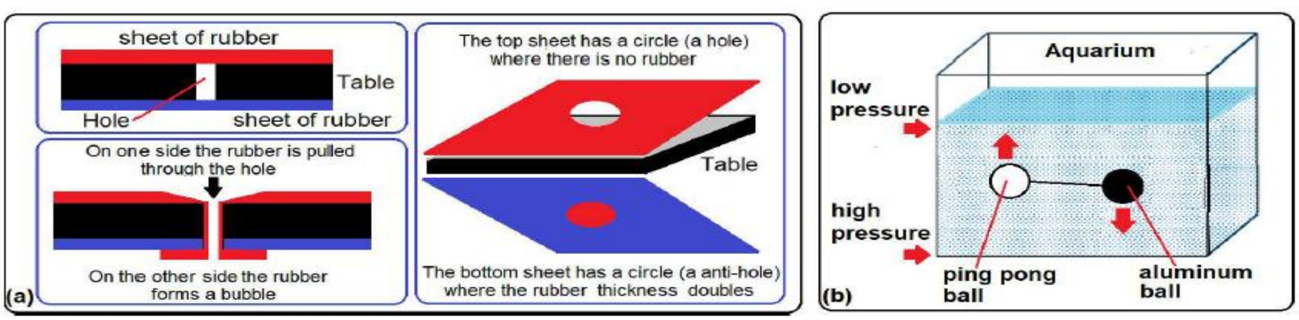

FIG. 3. **Analogies to understand the Ulianov Wormholes. a) Table with two sheets of rubber where a hole pulls the rubber from the top side and transfers it to the bottom side. b) Aquarium with a ping-pong ball (representing a sphere with a vacuum) and an aluminum ball (representing a sphere with water compressed to double its density).**

In this analogy, we can consider two "states" for the hole in the top rubber sheet:

- **Not collapsed representation:** A sheet with no stretching, where all the red rings are cut out of the sheet (forming a hole in the rubber area), as presented in Figure 4b.
- **Collapsed representation:** A sheet with rings stretched, where all the red rings have been pulled out by the central hole (the red area becomes a singularity), as presented in Figure 4c.

Note that if we only need to locate one point (x, y) over the rubber sheet (without worrying about the forces that may be acting on the rubber), both representations can be utilized. However, we need to consider that the points inside the hole (red rings) cannot be accessed because they no longer exist; they were cut out of the sheet or pulled under the table (points inside the singularity). In this way, both representations will generate some problems when using a Cartesian representation considering an (x, y) plane where two axes can be defined. For the not collapsed representation, when a line crosses a hole, the distances inside the hole can be considered null, and we need to get one-line point, split it

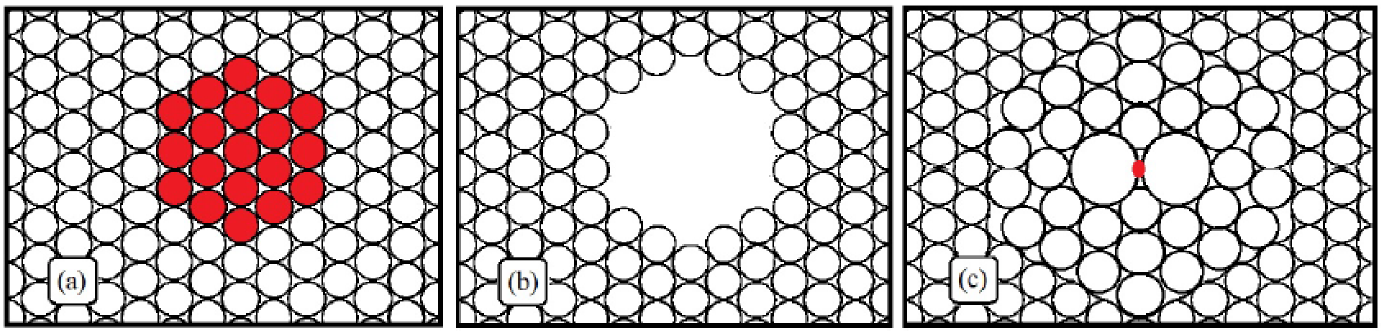

FIG 4. **Analogy with a rubber sheet made of circular rubber rings connected in a hexagonal pattern: a) Some rings are painted in red. b) The red rings are removed from the sheet generating a hole. c) The red wings were pulled through a hole in the center of the sheet and the remaining rings were stretched (this drawing is just an approximation of what actually happens).**

to a circle (the hole border), and join it again to continue the line. All points over this circle need to be considered the same point. Using this approach, the line that crosses a hole will be shorter, generating a non-Euclidean space representation in some areas. For the collapsed representation, things get worse as straight lines will be curved, and parallel lines may touch, generating a non-Euclidean representation over all the space. Therefore, if we want to know where all the things are placed in space-time, we can use a not collapsed representation. Still, to measure distances as they are seen by the photons (light lines), we need to convert the not collapsed representation to the collapsed representation using the Ulianov metric, which will be presented in the next section.

The second analogy, presented in Figure 3, is the aquarium with a ping-pong ball and an aluminum ball placed at its center. If we associate the water with the HUPL, the ping-pong ball has a negligible mass (null density) and represents one MPUS. Considering that the water has unitary density, the aluminum ball has a density equal to two and represents one AMPUS. For example, if we define three balls (including a water ball) with a volume of 1cm3, the aluminum ball will weigh 2g, the water ball will weigh 1 g, and the ping-pong ball has no weight. But if we consider that water has no weight (case of a scale inside a swimming pool), we need to subtract the weight of each ball by 1 g, so the aluminum ball will weigh 1g, the ping pong ball will weigh 1 g, and the water ball has no weight. Note that the negative weight for the ping pong ball is justified by the fact that it floats upwards in the pool. For the MPUS, we have the same case: The Higgs field attributes mass to the matter bodies, but it's a negative mass because its mass is connected with a space-time volume that reduces the Higgs field mass, avoiding the presence of Higgs bosons inside its volume, just as the ping-pong ball avoids the presence of water inside it. This means that the matter bodies also need to float upwards, so when a body with mass Mb (that can be represented by Nb MPUS) is placed in a region of the HUO, where the HUPL has high pressure, it will "float" to a region with smaller pressure due to buoyancy forces that will appear over the HUPL.

As presented in Figure 5, if a large body like a sphere with the same mass and radius as the planet Earth is placed alone in the HUO,

it can be modeled by a large number of MPUS placed at one point in its center, forming a small black hole, where the HUPL pressure becomes zero, meaning that there will be a gradient pressure over the Earth-sphere radius starting from the Planck pressure in the "deep space" (far away from the Earth), with the HUPL pressure decreasing towards the Earth's surface.
By definition, one MPUS has the following parameters:

- MPUS diameter = Planck Length (LP = 1.61624×10^{-35} m)
- MPUS volume = (L^3_P= 4.222×10^{-105} m^3)
- MPUS surface area = (L^2_P= 2.61223×10^{-70} m^2)
- MPUS outside pressure = Planck pressure (P_P = 4.6331×10^{113} Pascal)
- MPUS inside pressure = 0 Pascal
- MPUS energy = - Planck energy ($-E_P = -1.956.098.550$ J)

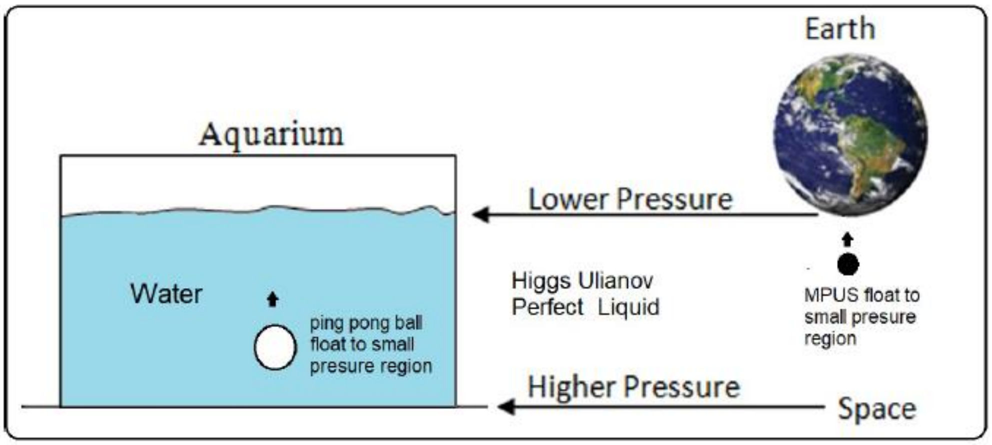

FIG. 5. **Analogies to understand the HUPL pressure. The aquarium top that has a small pressure is related to the Earth's surface where the HUPL pressure falls. The aquarium bottom that has a higher pressure is related to deep space where the HUPL has pressure equal to P_P. The mass body with N_b MPUS floats from space to the Earth's surface in the same way that the ping pong ball floats from the aquarium bottom to the aquarium surface, meaning that if we consider the liquid (water or HUPL) mass equal to zero, the ping pong ball mass and the MPUS mass can be modeled by negative masses.**

- MPUS mass = - Planck mass ($-mP = -2.17645 \times 10^{-08}$ Kg)
- Sum of forces outside the MPUS = Planck force (F_P = 1.21028×10^{44} N)

Observation: The AMPUS has the same parameters but with positive mass mP and positive energy EP. In this article, the AMPUS behavior will not be deeply analyzed due to the complexity of the antimatter theme.

To initiate the analysis of the HUPL pressure variation over the HUO, we will consider only heavy bodies, with a mass greater than or equal to the Planck mass. In this case, a body with mass Mb can be modeled by an integer number N_b of MPUS (with each MPUS related to one side of a µUWHT), and N_b can be calculated as:

$$N_b = \frac{M_b}{m_P} \tag{1}$$

Additionally, when a μUWH_T is placed in an empty HUO, the pressure inside the MPUS is equal to zero, as presented in Figures 2 and 6. Initially, we can consider that the MPUS assumes the not collapsed representation with a L^3_P volume, generating a pressure step inside its sphere. In this case, the MPUS does not affect the HUO pressure, but its volume can interact with pressure gradients that exist in the HUO. Afterward, the MPUS will collapse, generating a singularity. Inside it, the pressure remains zero, but a continuous pressure curve will be generated that will grow with the distance, tending to be equal to the Planck pressure.

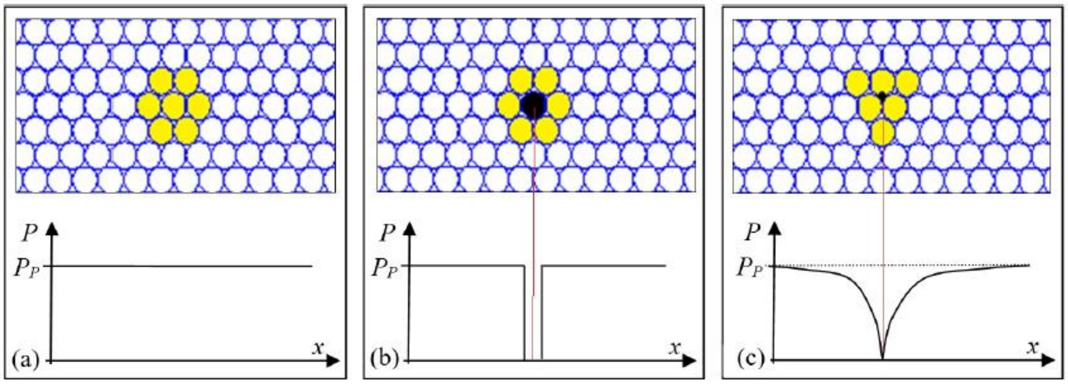

FIG. 6. **One µUWHT placed in the universe: a) Empty HUO with constant pressure PP, the blue circles have a diameter equal to the Planck length and are used as reference. b) An MPUS is placed in the black circle and generates a step in the pressure curve, as inside the MPUS the pressure is zero. c) The MPUS collapses, generating a singularity where the pressure is null. In this case, the MPUS affects the pressure over all the HUO, generating an increasing pressure curve, tending to the Planck pressure a few Planck lengths from the MPUS position.**

In Figure 7, we can see a line of spheres with a diameter equal to the Planck length, which allows the calculation of the pressure curve associated with one MPUS. In this representation, the spheres in the vicinity of the MPUS will present a decreasing pressure variation (ΔP = 1/2, 1/3, 1/4). Thus, considering a distance d=NLP, the value of ΔP is equal to PP /N:

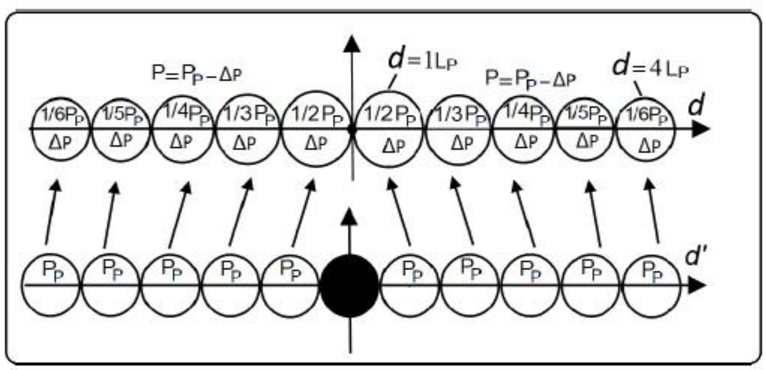

FIG. 7. **Pressure variation in an empty HUO with constant pressure PP, where one MPUS is placed. The black circles represent spheres with a diameter equal to the Planck length (L_P) that initially are subjected to the Planck pressure, but the MPUS changes its pressure to a value P = $P_P - \Delta P$, with the ΔP value presented inside each sphere.**

$P(d) = P_P - \Delta P$

$$\Delta P = \frac{P_P}{N} = \frac{P_P L_P}{d}$$

$$P(d) = \begin{cases} P_P\left(1 - \frac{L_P}{d}\right) & , \text{ for } d \geq L_P \\ 0 & , \text{ for } d < L_P \end{cases} \qquad (2)$$

If we place N_b MPUS at the same point representing a mass $M_b = N_b mP$, Equation (2) becomes:

$$P(d) = \begin{cases} P_P\left(1 - \frac{L_P N_b}{d}\right) & , \text{ for } d \geq L_P N_b \\ 0 & , \text{ for } d < L_P N_b \end{cases} \quad (3)$$

Or considering the body's own mass value M_b:

$$P(d) = \begin{cases} P_P\left(1 - \frac{L_P M_b}{m_P d}\right) & , \text{ for } d \geq \frac{L_P M_b}{m_P} \\ 0 & , \text{ for } d < \frac{L_P M_b}{m_P} \end{cases} \quad (4)$$

As LP /mP = G/c^2, Equation (4) can be defined as:

$$P(d) = \begin{cases} P_P\left(1 - \frac{GM_b}{dc^2}\right) & , \text{ for } d \geq \frac{GM_b}{c^2} \\ 0 & , \text{ for } d < \frac{GM_b}{c^2} \end{cases} \quad (5)$$

Figure 8 presents the space curvature variations where N_b MPUS are placed at the same point. Before the MPUS collapses, we see a uniform flat space (Euclidean space), with a regular grid presented in blue, and the Planck length is uniform and assumes its standard value across the entire 3D space. The Planck time is also uniform, but the red circle defines one sphere with the Ulianov radius, where the pressure inside the sphere is equal to zero. When these spheres collapse, they form a singularity, generating an effect where the presence of mass shrink's space-time, causing the blue grid to curve towards the central point. The black circles near the singularity will increase in size, making it evident that the distortion of spacetime represents local increases in the Planck length values, which are also linked with the Planck time by the equation: $L_P=ct_P$. Since the speed of light is always constant, this means that if the local value of L_P is multiplied by a factor K1, the t_P value is multiplied by the same factor.

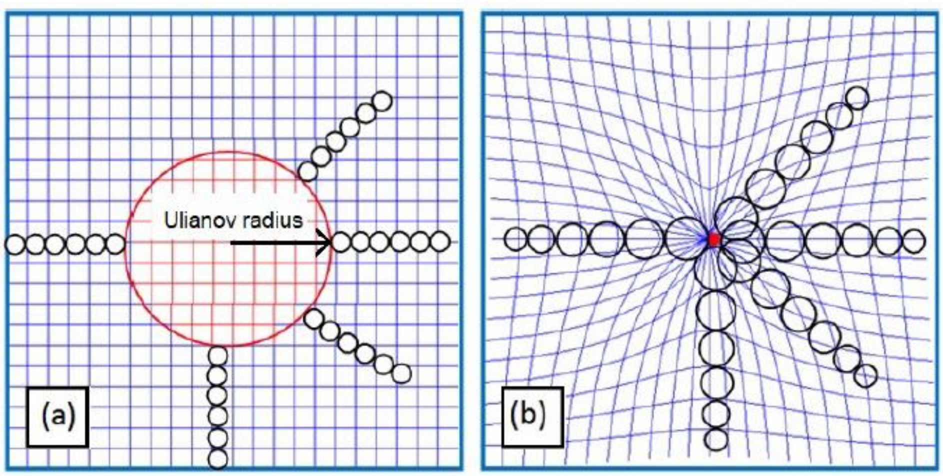

FIG. 8. **Ulianov metric: a) Before the MPUS collapses, the red circle represents one sphere where the HUPL pressure becomes zero, the blue grid has one Planck length between the lines, and the black circles represent the Planck length value at some space points. b) After the MPUS collapses, the red circle becomes a singularity and the blue grid shrinks towards the central point. The black circles continue to represent the Planck length for the same points in space.**

The value GM_b/c^2 defines the Ulianov Radius (RU), presented in Figure 8a. The RU value defines a sphere radius that contains Mb/mP MPUS, with the HUPL pressure inside this sphere being equal to zero. After the MPUS collapses, the RU value becomes zero and the space-time inside this sphere disappears, and the sphere becomes a singularity. We can observe that the Schwarzschild radius, which defines the black hole event horizon, is twice the Ulianov radius value, but it's valid only for the not collapsed MPUS. This relation can be observed in Figure 9 where the Schwarzschild radius is always equal to the Planck length before the MPUS collapses.

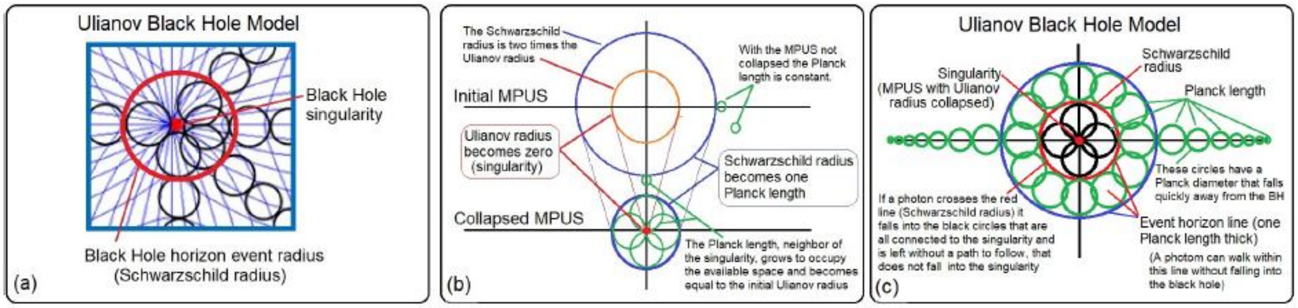

FIG.9. **Ulianov Black Hole Model (UBHM). a) Same Figure 8b showing the value of Schwarzschild radius and the Ulianov Radius becomes a singularity. b) The MPUS before and after the collapse, presenting the variation in the Planck length value, Schwarzschild radius, and Ulianov radius. c) Complete Ulianov Black Hole Model where the event horizon becomes a line with Planck length thickness, surrounding the Schwarzschild radius and forming a spherical shell.**

Equation (5) defines a ΔP pulse that reduces the HUPL pressure over the entire HUO, but it does not occur instantly. As shown in Figure 10, the ΔP pulse is represented by the yellow circle, which is a 2D view of a 3D spherical shell, moving at the speed of light and generating a Gravitational Wave (GW). As the ΔP occurs due to the space distortions generated by the N_b MPUS placed at some space point at a given time, this means that the values of Planck length and Planck time will change over the GW shell. As the Planck length change is very hard to detect (and because of this, physicists have believed until today that the Planck length is a constant value), the GW passage cannot be detected using "space interferometers" like the LIGO detector. Thus, the only way to detect gravitational waves is by using "time interferometers", which can measure the Planck time changes caused by the passage of one GW, using two or three precise synchronized time sources placed at a long distance from each other.

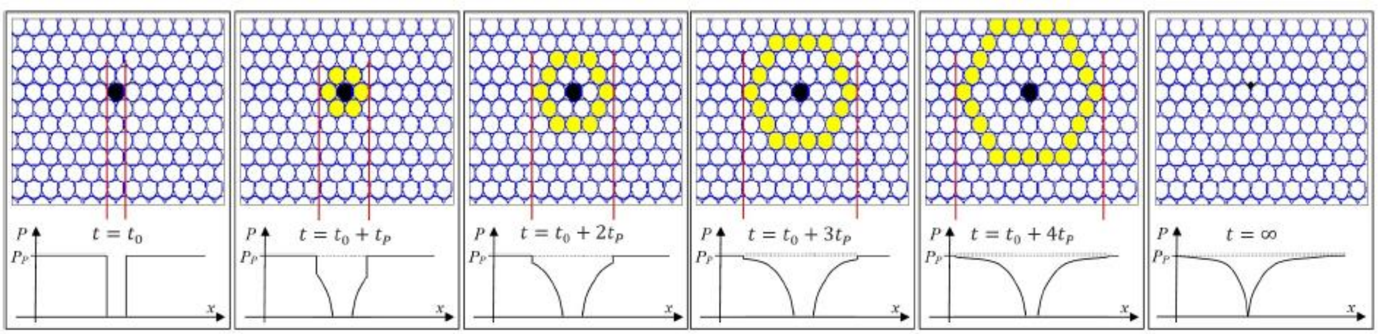

FIG. 10. **Pressure variation in an empty HUO with constant pressure PP, where Nb MPUS are placed. The frames in this figure represent sequences of time, when the pressure steps propagate one Planck length in an interval of one Planck time, moving at the speed of light.**

Deduction of newton's gravitational law

The fact that the acceleration calculated in the previous section is exactly the same value that can be obtained using Newton's gravitational law indicates that this law can be deduced using the concept of Ulianov micro Wormholes placed in our universe generating a MPUS that reduces the Higgs boson pressure to zero.

Let us now consider two bodies of mass M_1 and M_2 separated by a distance d, as presented in Figure 11.

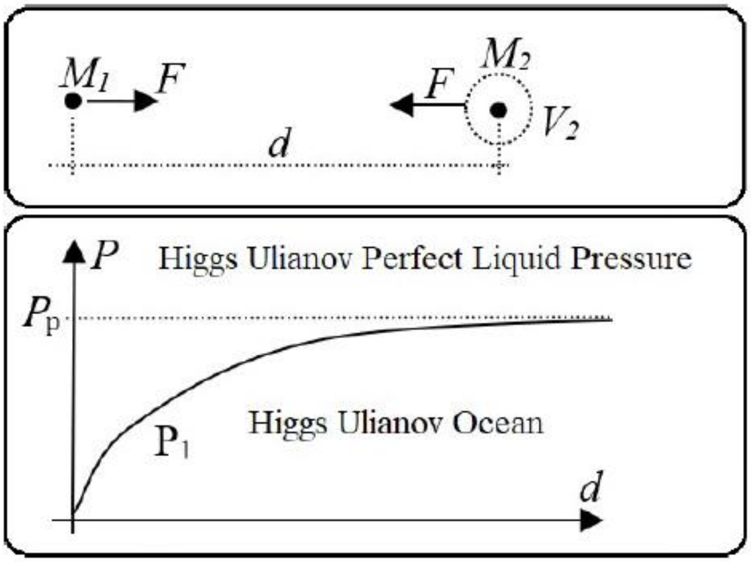

FIG. 11: **Two bodies with masses M_1 and M_2 separated by a distance d. In the upper frame, body M_1 is modeled as collapsed N_1 MPUS that generates a HUPL pressure drop in the HUO, as shown in the lower frame pressure curve. Body M_2 is modeled as not collapsed N_2 MPUS, and any MPUS volume will suffer a buoyant force F to float in the direction of the lower pressure point at M_1.**

Body M_1 generates a pressure reduction defined by Equation (4):

$$P_1(d) = P_P\left(1 - \frac{M_1 L_P}{d m_P}\right), \text{ for } d \geq \frac{M_1 L_P}{m_P} \qquad (6)$$

Each MPUS of body M_2 will then be affected by a force defined by Equation:

$$F = V\frac{\partial P}{\partial d} \qquad (7)$$

That define:

$$F_i(d) = L_P^3 \frac{\partial\left(P_P\left(1 - \frac{M_1 L_P}{d m_P}\right)\right)}{\partial d} \qquad (8)$$

$$F_i(d) = -\frac{M_1 P_P L_P^4}{d^2 m_P} \qquad (9)$$

The negative sign in this equation indicates that the force points in the opposite direction to the point of greatest pressure, that is, in the direction of low pressure which is located at the point where the mass M_1 is placed. So if we draw Fi(d) over an M_2 MPUS in the direction of M_1 (same F presented in Figure 11), the Fi(d) value will be positive. Note that this sign inversion will be obtained automatically if we consider that the value of mass M_1 is negative.

As there are N_2 MPUS in the mass M_2, each one will be subjected to this same force Fi(d), thus the total force F over body M_2 will be given by:

$$F(d) = \sum_{i=1}^{N_2} F_i(d) = N_2 \frac{M_1 P_P L_P^4}{d^2 m_P}$$

$$F(d) = \frac{M_2 M_1 P_P L_P^4}{d^2 m_P^2} \tag{10}$$

Note that this multiplication of forces by N_2 arises independently of whether M_2 mass has a positive or negative value.
Knowing that:

$$\frac{P_P L_P^4}{m_P^2} = 6.67418 \times 10^{-11}\ \mathrm{N\ m^2/kg^2} = G$$

Equation (10) becomes:

$$F(d) = \frac{M_2 M_1 G}{d^2} \tag{11}$$

By coincidence, Equation (11) is Newton's law of gravitation and the values M_1 and M_2 are gravitational masses. Even if we consider that these masses are negative, the gravitational force will continue to be attractive.

Deduction of the second newton law

An additional result can be obtained using the Ulianov Wormhole model and Higgs Ulianov Ocean model is the deduction of the second Newton Law. If we consider a body with mass M represented by N MPUS (N=M/mP) placed in an empty Higgs Ulianov Ocean where the HUPL pressure is constant, and a force F is applied over the body to move it with a velocity v(t) as presented in Figure 12. To analyze this case easily, we can consider that the body is stopped (for example, connected to a fixed point by a rope) and that the HUPL itself is moving at the same speed v(t) but in the opposite direction. Since the HUPL has no friction forces, the force F (applied by the rope to maintain the body stopped) only appears when the liquid passing through the body causes pressure variations over its volume, which occurs only due to changes in v(t). Note that in this new case, the speed v(t) of the liquid has a direction opposite to the direction of force F, and also the liquid acceleration (dv/dt) has the opposite sign to the body acceleration.

In this case, if we apply a force F in order to move a body of mass M in a certain direction, we can apply Bernoulli's law:

$$P + \frac{\rho_0 v^2}{2} = 0 \tag{12}$$

where P is the pressure, ρ_0 is the density of the liquid, and v is the speed of the body relative to the liquid. In the Higgs Ulianov Ocean, the density of the HUPL is equal to the Planck density:

$$\rho_0 = \frac{m_P}{L_P^3} \tag{13}$$

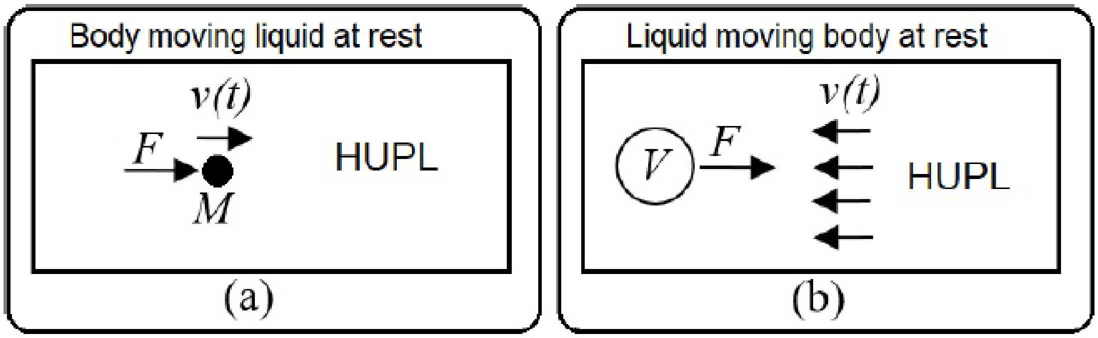

FIG. 12. **Body with mass M in the Higgs Ulianov Ocean. a) The HUPL is stopped and the body is observed as a particle with mass where an applied force F will move the body with a speed v(t) in the same direction as the force. b) The HUPL is moving with a velocity v(t) and the mass of the body is replaced by its N MPUS volume ($V=NL^3_p$) that is stopped in space. To maintain the body stopped, a force F is applied, for example by a rope that connects the body to a fixed point.**

where mP is the Planck mass and LP is the Planck length. Applying Equation (13) in Equation (12) gives:

$$P = -\frac{m_P v^2}{2L_P^3} \quad (14)$$

Furthermore, we can consider the case where the body is stationary and the liquid flows around it, generating a pressure difference. In this way, we can again apply the buoyancy Equation (7) that applied to Equation (14):

$$F = \frac{ML_P^3}{m_P}\frac{\partial\left(-\frac{m_P v^2}{2L_P^3}\right)}{\partial d} \quad (15)$$

$$F = -\frac{M}{2}\frac{\partial(v^2)}{\partial d} \quad (16)$$

As in this case the distance d is defined over the same axis of the velocity v, we can define d = x, and thus the partial becomes:

$$\frac{\partial(v^2)}{\partial x} = 2\frac{dv}{dx} = 2a \quad (17)$$

Applying Equation (17) in Equation (16) with d=x:

$$F = -Ma_{HUPL} \quad (18)$$

where a_{HUPL} is the liquid acceleration that is the same as the body acceleration a with the opposite sign, and so:

$$F = Ma \quad (19)$$

By coincidence, Equation (19) is the Second Newton Law, and M is the inertial mass that is always positive. Note that the value of the inertial mass M used in Equation (19) is related to a volume V of N MPUS ($V=L^3_pM/mP$), and the value of the gravitational mass M_2 used in Equation (11) is related to a volume V_2 of N_2 MPUS ($V_2=L^3_pM_2/mP$). Using this approach, if the number of MPUS is the same ($N=N_2$), the volume is also the same ($V=V_2$), explaining why the inertial mass M is equal to the gravitational M_2 (or

M_1). However, if we can use the true representation for the matter mass (with the gravitational mass becoming negative) or analyze a system that contains antimatter where the gravitational mass of matter and antimatter need to have the opposite sign (for example by defining that antimatter has negative gravitational mass), the Second Newton law becomes problematic, demanding a change in its definition. This can be done in two ways:

- Consider that a body with mass M has two kinds of mass, one inertial mass (M_I) that is always positive, and a gravitational mass (M_G) that can be positive or negative depending on the matter/antimatter sign of gravitational mass definition (with the true definition where matter has negative mass, or the standard view definition where matter has positive mass and thus the antimatter masses are negative). In this way, the generic symbol M or m for the mass value needs to be replaced by the kind of mass required by any equation, and thus the Second Newton law needs to be written as:

$F=M_{Ia}$

And Newton's gravitational law needs to be written as:

$$F = \frac{M_{G1} M_{G2} G}{d^2}$$

- Replace the Second Newton Law by the Newton Ulianov Inertia Law defined as:

$$F = |M| a \qquad (20)$$

Where the modulus function |X| always gives the positive X value. Note that |M| represents the gravitational mass modulus value instead of the value of inertial mass. Using this approach, the adoption of Equation (20) as the complete Inertial Law (valid for matter and antimatter), leads to the elimination of the concepts of gravitational mass and inertial mass, generating a single mass M definition (associated with the volume of N MPUS) for material bodies, which can have a positive or negative sign and generates a new law of conservation of mass.

Deduction of the escape velocity and orbital velocity

One important problem of gravitation is the case of a body with a small mass M_2 orbiting another body with a very large mass M_1 (for example a planet or a star), where a particular case of one perfectly circular orbit, can be described using just two parameters: The radius of the orbit (distance d) and the tangential speed v of body M_2, as shown in Figure 13.

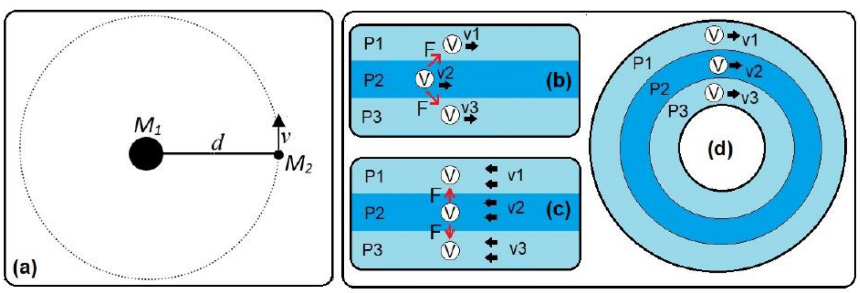

FIG. 13. a**) Body of mass M1 being orbited by a body with much smaller mass M2 at a distance (radius) d with speed v. b) MPUS placed in ducts with different HUPL speeds and pressures, to move the MPUS from one duct to the other a force F needs to be applied, but with the MPUS stopped in the duct no force is applied. c) Same case as (a) but with the HUPL stopped and the MPUS moving at speed vi. d) Same case as (a) but with circular ducts and the MPUS stopped in relation to the HUPL, and the HUPL moving at constant speed vi inside each duct.**

In classical mechanics, this problem is solved by considering that there is a centrifugal force (Fc) in the opposite direction to the gravitational force (Fg) that arises between the two bodies, and the orbital velocity will depend on the distance, M_1 mass, and gravitational constant G:

$$v_{\text{orbital}} = \sqrt{\frac{M_1 G}{d}} \tag{21}$$

This also allows the calculation of the orbit radius d:

$$d = \frac{M_1 G}{v_{\text{orbital}}^2} \tag{22}$$

The orbital velocity (vorbital) in Equation (21) is also related to the the escape velocity (vescape) given by the equation:

$$v_{\text{escape}} = \sqrt{\frac{2M_1 G}{d}} \tag{23}$$

If M_1 is a planet and M_2 is a projectile launched from this planet, considering the atmospheric friction forces negligible, the value escape defines the projectile's launch velocity to escape the planet's gravity well and reach an orbit with radius d. If the body is a photon it's velocity is the light speed, the orbital radius given by Equation (23) will be equal to the Schwarzschild radius, providing a connection between classical mechanics and GR (General Relativity). Note that GR does not apply the concept of gravitational force, explaining the body orbits by the space-time curvature generated by the mass of M_1 body. For example, in the GR view a communication satellite orbit is defined by geodesic lines (the shortest distance between two points) that in a flat space-time are straight lines, but in space curved by the Earth's mass they become circles or ellipses. Thus, GR explains that the satellite's inertia makes it move at a constant speed in a straight line, but the Earth's mass curves the space-time and transforms this straight line into the orbit line to be followed by the satellite.

In the HUO model, Newton's second law was deduced considering a body with mass M (represented by N MPUS volume) at rest in a flow of HUPL (without friction). If the relative velocity (between the MPUS and the HUPL) is constant and no pressure variation occurs in the HUPL, the MPUS will maintain the same velocity and direction, with no force arising over its volumes. As presented in Figure 13b and c, if there are some parallel ducts with HUPL constant velocity and pressure conditions, the force over the MPUS is null and we need to apply a force F to change the MPUS from one duct to another, where the MPUS needs to adapt to the new pressure and velocity until it is in a stable condition (without forces applied over its volume). In Figure 13d, we have a case of circular ducts where the HUPL itself flows at a constant speed inside any duct and the MPUS travels with the HUPL in a circular path, like a ping pong ball traveling inside a water plastic curved pipe, following the water flow. These simple examples show that if the MPUS is moving in a stopped HUPL, or the HUPL is moving and the MPUS is stopped, and also if the MPUS and HUPL are moving together, we have basically the same condition (without speed variation and without forces being applied over the MPUS volume). Moreover, to change the MPUS to a duct with a different pressure or velocity, we need to apply a force over the MPUS volume. This means that the MPUS inertial behavior does not follow a straight line over the HPO, but rather follows the same line of constant HUPL pressure and same relative speed, until some force is applied to it.

In Figure 13d, where the ducts were grouped into concentric circles, the MPUS travels in the same circle following a path of velocity and HUPL constant pressure. In Figure 14, we can see that the M_1 mass generates a variation in the HUPL pressure, and at a distance far away from M_1, the HUPL pressure will be equal to the Planck pressure, but at a distance d (which defines a spherical shell around the body M_1) there will be a constant pressure P_1 which will create a circular duct very similar to the concentric ducts shown in (13) (d), but with a much larger radius, with thousands of kilometers. If a person could walk inside this duct, they would think it was a straight corridor. We can now consider that the HUPL pressure inside the duct with radius d is also associated with a value P_2 because there is HUPL moving inside the duct with a speed v. In this way, by calculating this speed v, we can assume that M_2 will assume a value ΔP defined as:

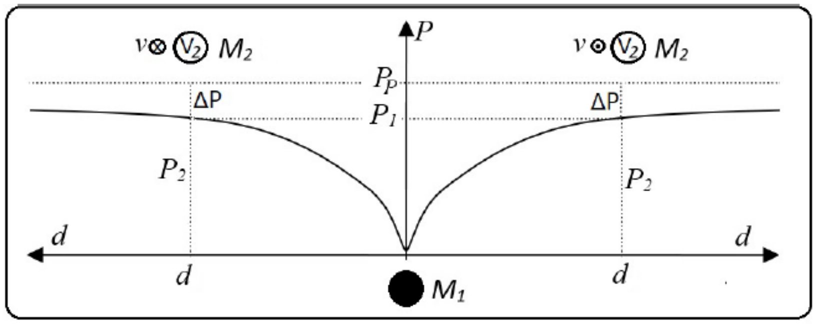

FIG. 14. **Pressure curve as a function of distance from the center of the body with mass M_1, and ΔP over the body mass M_2 that is subjected to a Pressure P_2 associated with velocity v.**

$$\Delta P = P_P - P_2(v) \tag{24}$$

The value of P_1 is defined by Equation (4), and considering that $P_1(d) = P_2(V)$, we obtain:

$$P_1(d) = P_P(1 - \frac{L_P M_b}{m_P d}) = P_2(v) = P_P - \Delta P \tag{25}$$

$$\Delta P = \frac{P_P L_P M_b}{m_P d} \tag{26}$$

The HUPL pressure ΔP is generated by the movement of the mass M_2 at a speed v and can be calculated by Equation (14), replacing the P value by ΔP, which now is the pressure over the body.

$$\Delta P = \frac{m_P v^2}{2L_P^3} \tag{27}$$

Applying Equation (26) to Equation (27):

$$\frac{P_P L_P M_1}{m_P d} = \frac{m_P v^2}{2L_P^3} \tag{28}$$

$$v^2 = \frac{2M_1}{d}\frac{P_P L_P^4}{m_P^2} = \frac{2M_1}{d}G$$

$$v = \sqrt{\frac{2M_1 G}{d}} \tag{29}$$

By coincidence, Equation (29) is the same as Equation (23) that defines the escape velocity related to the orbit with radius d. Note that the same equation was obtained without considering any force acting over the body M_2, as occurs in the GR model, but now we consider that the inertia conducts the body at a constant velocity over a constant pressure line in the space-time surrounding the body M_1. Considering that the HUPL pressure is constant in empty space, the presence of the M_1 mass will curve the space-time and generate geodesic curves with the same curvature that will generate the same HUPL pressure. Using this approach, following a geodesic line and following a constant pressure line means following the same path, and so the HUO/UHW model generates the same formula for escape velocity defined by Newtonian Mechanics and the same orbital path defined by Einstein's General Relativity. Note that in GR, if the body is placed near the planet with zero velocity, the inertial effect (to follow the geodesic lines due to inertia) is lost, and GR needs to consider again the concept of gravitational force to put the body in movement in the direction of the planet, which is a weak point in the model that eliminates gravitational forces used in GR. In the HUPL pressure model, this problem does not occur because a stopped MPUS will be directly affected by the pressure gradient and will “float” in the direction of the lower pressure point at the center of the M_1 body, and if the MPUS moves at high velocity in a constant pressure line (that is like a circular duct with a narrow section and a very large diameter placed around the planet), the small pressure variation that, for example, can move the body to the outside of the duct, will disappear because the duct follows a path of constant pressure for some velocity (small variations in the pressure inside the duct will be compensated due to the duct curvature and by the high speed of the MPUS inside the duct).

Deduction of the HUPL pressure conservation law

Positioning a body $M_b=N_bm_P$ in an empty HUO, the value of $\Delta P(r)$ can be defined as:

$$\Delta P(r) = P_P \frac{N_b L_P}{r}$$
$$\Delta P(r) = P_P \frac{M_b L_P}{m_P r}$$
$$\Delta P(r) = \frac{G m_p M_b}{L_P^3 r} \tag{30}$$

In this case, the energy associated with one MPUS due to r variation from r_0 to r_1 is given by:

$$E_{MPUS} = \int_{r_0}^{r_1} L_P^3 \frac{\partial P(r)}{\partial r}\, dr$$
$$E_{MPUS} = L_P^3 \frac{G M_b}{L_P^3} \left(\frac{1}{r_1} - \frac{1}{r_0}\right)$$
$$E_{MPUS} = G M_b m_P \left(\frac{1}{r_1} - \frac{1}{r_0}\right) \tag{31}$$

And considering N_a MPUS in mass M_a:

$$E_{GMa} = G M_a M_b \left(\frac{1}{r_1} - \frac{1}{r_0}\right) \tag{32}$$

Considering the radius r_1 defines a maximum value for the gravitational energy, we can define a potential gravitational energy E_p that is the energy needed to move the body from radius $r=r_1$ to $r=r_1 + h$:

$$E_{p_{Ma}}(h) = \frac{G M_a M_b}{r_1} - \frac{G M_a M_b}{r_1 + h} \tag{33}$$

This allows defining an energy conservation law valid for body M_a:

$$E_p(h) + E_K(v) = \text{Cte} \tag{34}$$

Applying this law to a system where body M_b is initially in an orbit with radius r_0 and velocity v_0 and moves to an orbit r_1 with velocity v_1, we can apply one energy conservation law that defines:

$$E_p(r_0 - r_1) + E_K(v_0) = E_p(0) + E_K(v_1) \tag{35}$$

$$\frac{GM_aM_b}{r_1} - \frac{GM_aM_b}{r_0} + \frac{M_bV_0^2}{2} = \frac{M_bV_1^2}{2} \tag{36}$$

In this way, from the values M_a, M_b, v_0, and r_0, by Equation (36), the values v_1 and r_1 can be calculated. As for one MPUS, the value of energy associated with the HUPL pressure is defined by:

$$E = PV = PL_P^3 \Rightarrow P = \frac{E}{L_P^3} \tag{37}$$

Equations (33) and (37) can define a potential pressure ΔPh:

$$\Delta P_{h_{Ma}}(h) = \frac{GM_aM_b}{L_P^3 r_1} - \frac{GM_aM_b}{L_P^3(r_1 + h)} \tag{38}$$

And so Equation (33) allows defining a pressure conservation law:

$$\Delta P_h(h) + P(v) = \mathrm{Cte} \tag{39}$$

Applying Equation (38) in Equation (39):

$$\frac{GM_aM_b}{L_P^3 r_1} - \frac{GM_aM_b}{L_P^3(r_1 + h)} + \frac{v^2M_a}{2L_P^3} = \mathrm{Cte} \tag{40}$$

Considering that at an infinite distance ($h \to \infty$) the velocity is zero ($v=0$), Equation (40) becomes:

$$\mathrm{Cte} = \frac{GM_aM_b}{L_P^3 r_1} \tag{41}$$

As $r_1 + h = r$, applying Equation (41) in Equation (40):

$$\frac{v^2M_a}{2L_P^3} - \frac{GM_aM_b}{rL_P^3} = 0 \tag{42}$$

Equation (42) defines a pressure conservation law that is valid when the body Ma has zero velocity at an infinite distance, making the velocity v the escape velocity that allows body Ma to reach an infinite distance. To consider an orbital velocity that defines an elliptical path, this equation becomes:

$$\frac{v^2M_a}{L_P^3} - \frac{GM_aM_b}{rL_P^3} = 0 \tag{43}$$

Deduction of the centrifugal force and Ulianov path force

Considering a body $M_a=N_a$ MPUS, moving at velocity v over a HUO where a body $M_b=N_b$ MPUS is placed in a fixed position. In this case, the body Ma velocity can be associated with an inertial mass which will not follow a straight line as considered in Newtonian models but will follow a uniform HUPL pressure path. This path is also defined as a path where the space-time distortion is uniform (same values of L_P and t_P), which are geodesic curves defined by the General Relativity Theory. In the HUO model, we can define a force associated with a pressure ($F=PL^2_P$) that can be applied to Equation (43), which is a law of conservation of pressure valid for body M_a and can be turned into a law of conservation of forces:

$$\frac{v^2M_a}{L_P} - \frac{GM_aM_b}{L_Pr} = \text{Cte} \tag{44}$$

$$F'_v(v) - F'_G(r) = \text{Cte} \tag{45}$$

Where F′ (r) and F′ (v) are defined by:

$$F'_G(r) = \frac{GM_aM_b}{rL_P} \tag{46}$$

$$F'_v(v) = \frac{v^2M_a}{L_P} \tag{47}$$

Note that the gravitational force is defined by:

$$F_G(r) = \frac{GM_aM_b}{r^2} = F'_G(r)K_G = F'_G(r)\frac{L_P}{r} \tag{48}$$

Applying this factor K_G to Equation (45):

$$K_GF'_G(r) = K_GF'_v(v) \tag{49}$$

Note that Equation (50) defines a centrifugal force (F_C=F_V) that not only appears in circular trajectories but also defines elliptical trajectories. When M_a is in the constant pressure path (defined by the orbit with radius r_1), the F_C cancels the gravitational force, and without forces acting, the body M_a follows the path of constant pressure due to its inertia.

In a general case, Equation (49) can be defined as:

$$F_G(r) = F_C(v) \tag{51}$$

Note that Equation (51) only means that the magnitude of the gravitational force is equal to the magnitude of the centrifugal force, but the force vectors do not need to be in the same direction. In this way, we can consider the vector forces and define the Ulianov Path force:

$$\vec{F}_{UP} = \vec{F}_G(r) + \vec{F}_C(v) \tag{52}$$

Note that the $\vec{F}G(r)$ vector always points to the lower pressure gradient, which in this case is the center of body Mb. The vector $\vec{F}C(v)$ is a generic centrifugal force that is always orthogonal to the body velocity vector and appears when the body crosses equipressure lines (normally defined in a spherical shell with all points at the same pressure). In this way, the Ulianov Path force FP acts to make the body M_a follow an equipressure path, representing the application of the pressure conservation law defined by Equation (43). Two basic conditions can occur: If the Ulianov path force is small, it will only rotate the velocity vector $\vec{v}a$ to point to the path to be followed without changing the speed value. This is the case of circular orbits. If the Ulianov path force is strong, it will change the speed value v_a, increasing or decreasing it, and the body will follow an elliptical path.

Note that the Ulianov path force is a kind of non-acceleration-effect force because it changes the body Ma velocity $\vec{v}a$ without producing acceleration effects, meaning that F_a=M_a dv/dt for dv/dt produced by F_P is null. This occurs because the inertial effect that maintains a body in a circular or elliptical trajectory is essentially generated by the Ulianov path force, and the F_P is at the base of the inertial law (F=M_a) for elliptical trajectories. Therefore, the inertial law itself does not apply to the case of the Ulianov path force changing the body velocity.

Results and Discussion

Le Sage's gravitational theory and Ulianov's gravitational theory

In 1782 Georges-Louis Le Sage [1] proposed a pressure-based gravitation theory, where gravity is caused by a constant bombardment of ultra-microscopic particles, called "corpuscles" or "ultramundane particles," moving in all directions through space. These particles collide with bodies and exert pressure on them.
Le Sage's gravitation theory considers the following mechanism:

- **Radiation pressure:** The central idea is that these corpuscles exert a pressure similar to radiation pressure on bodies. When two bodies are close together, they mutually shadow each other, blocking some of the corpuscles coming from opposite directions.

- **Shadowing:** This shadowing results in less pressure between the bodies compared to the pressure from the outside, pushing the bodies towards each other. Thus, the gravitational attraction is seen as a differential pressure effect caused by the shadowing of the corpuscles.

This theory has the following characteristics:

- **Directionality:** Since the corpuscles come from all directions, the resultant force is always directed inward between the two bodies, explaining the attractive nature of gravity.

- **Proportionality:** The gravitational force is proportional to the product of the masses of the bodies, similar to Newton's law of universal gravitation but based on mechanical interactions.

Le Sage's gravitation theory was discarded because it has some basic problems:

- **Energy losses:** The theory struggles to explain why bodies do not heat up and dissipate energy due to constant collisions with the corpuscles.

- **Weak interactions:** The interactions of corpuscles with matter would have to be extremely weak to avoid significant heating but strong enough to explain the observed gravitational force.

- **Compatibility with relativity:** Le Sage's theory is not compatible with Einstein's general relativity, which describes gravity as the curvature of spacetime rather than a force mediated by mechanical particles.

In 2024, Ulianov proposed a new pressure-based gravitation theory that builds upon the concept of high pressure within the Higgs Ulianov Perfect Liquid (HUPL), which is reduced by the presence of Ulianov wormholes. The Ulianov Pressure Gravitational Model can be associated with a new kind of Le Sage's gravitational model where the corpuscles are actually Higgs bosons acting as a perfect liquid and generating pressure in all directions. However, unlike Le Sage's model, in the Higgs bosons case there is no collision energy that would heat a body, similar to how a body submerged in an ocean of water experiences pressure without heating.

Additionally, the shadowing effect in Le Sage's model is replaced by a pressure reduction effect caused by the expansion of the spacetime fabric itself, an effect aligning with relativity theory but not anticipated by Le Sage. Thus, the Ulianov gravitational model, based on the extremely high pressure of the Higgs field generating the HUO model, combined with spacetime distortion caused by Einstein-Rosen bridges (Ulianov wormholes), represents an innovative idea, but it also reinvents Le Sage's gravitational model, which, as early as the 18th century, suggested that gravitational forces could be modeled by pressure variation equations, meaning that new ideas can, in fact, be very old ideas with new clothes. However, it is worth noting that when Dr. Ulianov developed his gravitational model he did not know Le Sage's model, and the relationship between the two models was later pointed out by some colleagues who read this article and it was updated to include this reference to Le Sage's gravitational model.

The Ulianov path force acting as a gravitational shield

The gravitational model of Einstein's General Relativity Theory (GRT) is more complex than the Newtonian gravitational model. Despite not being the simplest explanation, GRT replaced the Newtonian model because there are several aspects where Newtonian Mechanics (NM), though simpler, fails:

- In NM, the action of gravity is instantaneous, whereas GRT shows that gravity is generated by gravitational waves that travel at the speed of light.
- In NM, space is Euclidean, but GRT shows that mass distorts spacetime, making it non-Euclidean.
- In NM, the action of gravitational force is always in a straight line, but GRT shows that the distortion of spacetime caused by matter transforms straight lines into geodesic lines, which are curved and yet the shortest distance between two points in non-Euclidean space.

GRT eliminates the concept of gravitational force acting at a distance and defines that inertia, which makes a body move in a straight line at constant speed in Euclidean space, causes the body to move along a geodesic curve generated by mass distortion. This geodesic becomes a circular or elliptical path that the body follows as if it were a straight line.

However, there is a case where GRT's approach to eliminating gravitational force fails: when a smaller mass body Ma is stationary in space relative to a larger body M_b. If only space-time distortion is considered, the body will not start moving. In this case, GRT needs to step back and resurrect the concept of gravitational force to make the smaller body move towards the larger one.

In this specific case, as shown in Figure 15a, the body starts with v_0=0 and FG acts directly towards body M_b, causing body M_a to move in a straight line until collision. Note that since this is the case where GRT fails (unable to handle the initial condition of M_a being stationary), it is generally accepted that due to FG, body Ma will accelerate in a straight line until colliding with M_b, even though straight lines in NM are distorted in the presence of mass.

In this context, the Ulianov Gravitational Model (UGM) presents an interesting proposal as grav- itational force is modeled as a fluctuation force pointing towards the region where the Higgs Ulianov Perfect Liquid (HUPL) has the lowest pressure, which in this case is the center of Mb where HUPL pressure is zero. Thus, with a stationary body, UGM generates a force that moves the body, but the action of this force depends on pressure waves generated in M_b that are not instantaneous but travel at the speed of light. Moreover, UGM defines that inertia does not move a body in a straight line but along a constant pressure path, which can be circular or elliptical.

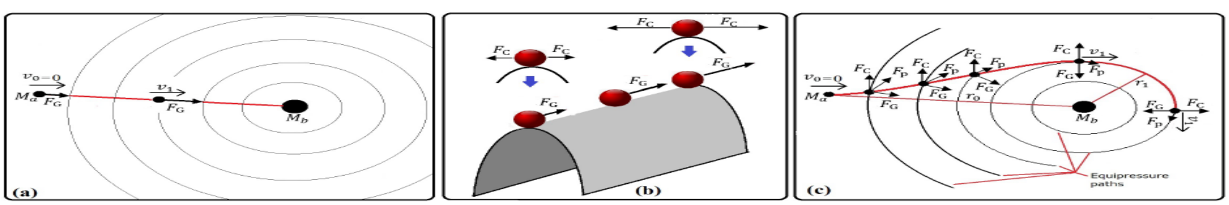

FIG. 15. **Ulianov Path Force in the two bodies problem. a) Newtonian model: A small body Ma with initial velocity equal to zero is attracted by the large mass of body Mb in a straight line. As there is only the action of gravitational force, the body Ma collides with Mb. b) An analogy where a sphere goes in a straight line at the top of a gently inclined cylindrical surface (with a parabolic cross-section and a straight line at the top of the surface), pulled by gravitational force. In the Ulianov gravitational model, passing through equipressure paths generates centrifugal forces with a magnitude equal to the gravitational force. c) Ulianov gravitational model: A minimal random deviation is enough for the centrifugal force equilibrium to "collapse" and act to one side, generating a Ulianov path force that deflects the straight trajectory and takes the body Ma into a circular or elliptical orbit.**

Based on the pressure conservation law (combining dynamic pressure generated by body Ma's velocity and static pressure variation generated throughout space by body Mb), UGM defines a generalized centrifugal force with a magnitude equal to the gravitational force. In the case of a circular orbit, these two forces cancel each other. According to UGM, this centrifugal force arises whenever the body crosses equipressure paths, but if the body's movement is exactly perpendicular to the spherical shell defining the constant pressure line, the centrifugal force will be spread in a plane around the body. This can be observed in the analogy presented in Figure 15b, where a sphere is placed at the top of a cylindrical surface (with a parabolic cross-section and a straight line at the top of the surface) that is slightly inclined, causing the ball to move in a straight line and accelerate. In this analogy, it's as if there are two equal centrifugal forces pulling the ball to both sides simultaneously, but this is an extremely unstable equilibrium because a minimal deviation from the trajectory will cause the ball to fall off the top of the surface.

Thus, the straight-line trajectory shown in Figure 15a is similar to the body traveling along the top of the cylindrical surface. From NM's viewpoint, this can occur because only FG is considered, and it acts in a straight line. However, from GRT's perspective, this straight line can be distorted by spacetime curvature. Therefore, UGM predicts that the ball will fall off the top of the cylindrical surface, meaning a minimal deviation from the straight line will cause the centrifugal force to act in a specific direction (perpendicular to F_G) with a magnitude equal to F_G. The vector sum of F_G and F_C creates the Ulianov Path Force (F_P), which is a force that changes the velocity vector's direction, attempting to make the body follow a constant pressure path compatible with its current velocity. Note that the use of F_P eliminates F_G and F_C (*i.e.*, F_P incorporates the combined effect of gravitational force interacting with centrifugal force), aligning with GRT models where F_G also doesn't exist, and the body is moved by inertia along geodesic lines.

Thus, in UGM, F_P aligns with a concept of force that is "behind" inertia, and in the presence of pressure variation paths in HUPL, FP makes the body follow constant pressure lines as if it were following a straight line, similar to how a ping-pong ball (massless and with volume) placed inside a circular glass tube follows the water flow, moving with the liquid in a circular trajectory, without hitting the duct walls or being subjected to any additional force.

We can observe that HUPL pressure changes because the distortion created by matter varies the Planck length value, meaning a constant pressure path will have the same Planck length values, which means the same space-time distortion, equivalent to a geodesic line defined in GRT.

In summary, we can observe Figure 15c, which shows the behavior of a body Ma with zero initial velocity, attracted straight to the lowest pressure point in HUPL. However, as it moves, a minimal trajectory variation (caused by quantum fluctuations) causes the centrifugal force to take a random direction perpendicular to F_G, generating F_P, which tries to make the body enter a constant pressure trajectory. Thus, FP arises mainly when constant pressure lines are crossed by the body, deflecting the body laterally until it finally assumes a circular or elliptical trajectory instead of colliding with body M_b as predicted in the Newtonian model for this case.

Thus, FP acts as a gravitational shield, deflecting the smaller body from the collision path and trying to put it into orbit. Note that the greater the mass Mb, the greater the value of FP and the greater the deflection effect. It should be noted that this analysis was done for body Ma initially stationary relative to Mb, and if, for example, Ma is at high speed directly towards Mb, FP may not be sufficient to avoid the collision. On the other hand, there will be a range of initial velocities where the Newtonian model, which applies forces only in the direction of body Mb, predicts a collision, and the action of FP deflects the body, avoiding the collision (an effect that should also be achieved using the GRT model with the body moving at a certain speed greater than zero).

From the Newtonian perspective, considering two planetary bodies with large masses (like Earth and the Moon) in a space region containing smaller bodies (asteroids), it is expected that they will be attracted in a straight line with a greater force towards the larger mass body. Thus, Earth should receive more asteroid collisions than the Moon. In UGM, a different perspective arises because the larger mass body generates a greater FP and deflects more asteroids, being less impacted. Indeed, the Moon has many craters and appears to be more impacted by meteorites than Earth, even taking into account that meteorite craters on Earth are erased by climatic forces (rain, wind, rivers, and oceans). Despite this, the number of collisions with Earth seems lower than with the Moon, even though Earth has a larger impact area and stronger gravitational force. This simple example seems to indicate that the Ulianov path force (which can also be seen as a result of the centrifugal force acting in a more generalized manner) acts as a shield that can prevent direct asteroid collisions.

Note that this also applies to the formation of the solar system itself, where planets may form from clusters of matter that were at low velocities and gained speed as they were attracted by the sun. Instead of colliding, they entered elliptical orbits. Considering the Newtonian model with only gravitational forces (which would tend to draw the planets in a direct line to the sun) acting, it would be easier for the planets to fall into the sun than to enter orbit. In the UGM model, the sun's large mass generates very high path forces, thus planets, asteroids and comets are deflected from direct attraction lines to the sun and placed in elliptical orbits. Consequently, due to the sun's strong gravity, it is unlikely for anybody to collide with it because FP in this case is extremely high and completely shields the sun from direct collisions, placing all bodies falling towards the sun into elliptical orbits.

Resolving the balance problem

In classical mechanics, the balance problem involves understanding how different forces act on a balance to maintain equilibrium. A balance consists of a central fulcrum and two arms on which weights can be placed. For the balance to be in equilibrium, the product of the weight and the distance to the fulcrum (torque) must be equal on both sides:

$W_1 \cdot d_1 = W_2 \cdot d_2$

where, W_1 and W_2 are the weights on the two arms of the balance and d_1 and d_2 are the distances from the weights to the fulcrum. The equilibrium of the balance arms could theoretically be maintained at any angle if the forces and torques are equal. However, a balance with equal weights always settles in a horizontal position, which cannot be fully explained by considering only the forces and torques.

To show how the HUO model solves this problem, let's use an analogy involving two ping pong balls submerged in a swimming pool: Consider a seesaw (or balance) submerged in water, as presented in Figure 16, with two identical ping pong balls placed at equal distances from the center. In this scenario, equilibrium is maintained when pressure symmetry is achieved. If one ball is deeper than the other, it will experience a greater buoyant force because the pressure in the water increases with depth. This increased force will push the deeper ball upwards, and the seesaw will tilt until both balls are at the same depth, where the buoyant forces are equal.

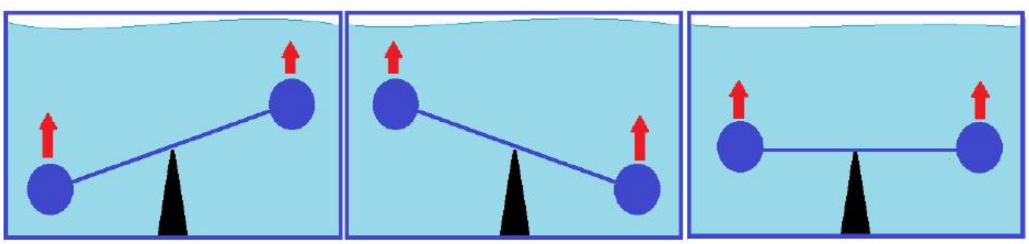

FIG. 16. **Ping pong balls in a submerged seesaw analogy. The buoyant forces adjust to achieve equilibrium by equalizing the pressure on both sides.**

Using this analogy, we can understand how the balance problem is resolved in the HUO model, where we introduce a similar concept of pressure variations to explain gravitational forces. This model provides a novel solution to the balance problem, which classical Newtonian mechanics and Einstein's General Relativity do not fully address.

Thus, the Higgs Ulianov Ocean model, using the Einstein-Rosen-Ulianov Bridge (Ulianov Worm- hole) particles model, for the first time in the history of physics, resolves the balance problem by in-corporating the concept of pressure-driven equilibrium in gravitational systems modeled by the Higgs Ulianov Perfect Liquid pressure.

This approach not only offers a deeper understanding of how forces and HUPL pressures interact to maintain equilibrium in various physical systems but also provides a robust framework for analyzing complex quantum fields and gravitational interactions.

Conclusion

The Ulianov Gravitational Model offers a transformative perspective on gravitation and the structure of the universe, incorporating concepts from the Higgs field and Ulianov Wormholes (UWH). This model unifies classical mechanics, quantum mechanics, and general relativity by introducing the Higgs Ulianov Perfect Liquid (HUPL) under Planck pressure. The integration of these ideas allows for the derivation of fundamental physical laws, providing a cohesive explanation for phenomena traditionally segmented across different physical theories.

In addition to explaining observable phenomena, the Ulianov Theory introduces several innovative concepts such as the Higgs Ulianov Ocean (HUO), the Einstein Rosen Ulianov Bridge (Ulianov Wormhole), and the Strong Gravitational Contact Force (SGCF). These concepts address long-standing criticisms and enigmas in modern physics, offering solutions that challenge the necessity of nuclear forces and supporting Einstein's initial intuition that such forces are unnecessary for a unified theory. The potential of the Ulianov Theory extends beyond theoretical physics. By proposing a new model for space-time and matter interaction, it opens new possibilities for practical applications, such as the development of atom simulators. These simulators could revolutionize fields like chemistry, biochemistry, materials science, and the development of superconductors and nuclear fusion reactors by providing a more accurate representation of atomic structures and their interactions.

The Ulianov Theory's ambitious scope and innovative approaches suggest a new path toward a unified theory of everything. It challenges 49 paradigms of modern physics, potentially redefining our understanding of fundamental forces and particles. However, the acceptance of this theory may face significant resistance due to its radical departure from established models, implying a major shift in scientific thought.

Despite these challenges, the Ulianov Theory represents a pivotal step in the ongoing quest to unify the fundamental forces of nature. Its ability to integrate and extend existing theories underscores the importance of revisiting and combining historical scientific ideas with modern innovations. The insights derived from this work highlight the potential for future discoveries and advancements in our understanding of the universe.

In conclusion, the Ulianov Gravitational Model not only provides a comprehensive framework for explaining gravitation and the structure of the universe but also paves the way for groundbreaking developments in theoretical and applied physics. Its transformative potential underscores the need for continued exploration and collaboration within the scientific community to fully realize the implications of this new paradigm.

References

1. Einstein A, Rosen N. The particle problem in the general theory of relativity. Phys Rev. 1935;48(1):73.
2. Li LX. Two open universes connected by a wormhole: exact solutions. J Geom Phys. 2001;40(2):154-160.
3. Higgs, P. Broken symmetries and the masses of gauge bosons. Phys Rev Lett. 1964;13(16):508.
4. Yōshin Ulianov P, Mei X, Yu P. Was LIGO's gravitational wave detection a false alarm? J Mod Phys. 2016;7(14):1845-1865.
5. Gravitational SC. LIGO experiments cannot detect gravitational waves by using laser Michelson interferometers. J Mod Phys. 2016;7:1749-1761.
6. Abbott BP, Abbott R, Abbott TD, et al. Observation of gravitational waves from a binary black hole merger. Phys Rev Lett. 2016;116(6):061102.s
7. Ulianov PY. Explaining the formation of the 36 smallest known atomic isotopes: From hydrogen to krypton. Mater Sci Eng Int J. 2024;8:39-47.
8. Ulianov PY. Comparison of pauling and ulianov electron distribution models. Mater Sci Eng Int J. 2024;8:49-54.
9. Ulianov PY. How can we observe waves without seeing the ocean? the witte-ulianov time interferometer: a gravitational-wave detector without a lower frequency limit. Curr Res Stat Math. 2023;2(1):44-54.