The nature of reality through the unification of physics and science

Editor's note: the diagram Technical Applications towards the end of the ISF website explains the vast potential for applications of this new understanding of the Zero Point Energy technology.

A Message from Nassim Haramein

We live at a critical time in history.

It is a time when humanity and our evolution have exceeded the capacity of our biosphere to remain sustainable. New technological developments in energy production and transportation are critical at this point in order to overcome the ecological challenges the world is facing today.

The International Space Federation marks a new step in human evolution.

A deeper understanding of the nature of reality through the unification of physics and science generates a direct engineering path to significant energy production: from the structure of quantum vacuum fluctuations and the alteration and control of the spacetime curvature to yield gravity control.

These discoveries open up a beautiful and bright future for humanity to thrive and harmonize its technology with the fundamental wheelworks of nature.

Understanding the deep underlying nature of gravity and the control thereof will lead humanity in becoming a true space-bound civilization; exploring and establishing multiple different worlds, and having access to an almost infinite amount of resources.

This is the true future of humanity.

About Nassim Haramein

Nassim Haramein has spent more than 30 years researching and discovering connections in physics, mathematics, geometry, cosmology, quantum mechanics, biology and chemistry as well as anthropology and archeology. These studies led Haramein to groundbreaking theories, published papers and patented inventions in unified physics, which are now gaining worldwide recognition and acceptance. Haramein's findings are based on a fundamental geometric quantization of spacetime, formalizing a unification between the quantum scale and cosmological-sized objects, including the universe itself. Haramein's seminal paper "Quantum Gravity and the Holographic Mass" was published in the peer-reviewed journal Physical Review & Research International in 2013. Utilizing a generalized holographic principle, the paper predicted a precise value of the charge radius of the proton which disagreed with the Standard Model by 4%. --- Read more at ResonanceScience.org

A 115-minute video discussing the International Space Federation's findings:

Building a NEW FUTURE for Humanity | Quantum Vacuum Energy & Gravity Control (youtube.com)

The International Space Federation (ISF) is humanity's first space exploration organization based on the development of gravity control as propulsion & quantum vacuum energy as a power source.

International Space Federation | ISF | Exploring space for humanity

Paper explaining the technical background to ISF's findings.

The complete paper can be downloaded from the ISF website, as above.

The Origin of Mass and the Nature of Gravity

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Abstract

From the early explorations of thermodynamics and characterization of black body radiation, Max Planck predicted the existence of a non-zero expectation value for the electromagnetic quantum vacuum energy density or zero-point energy (ZPE). From the mechanics of a quantum oscillator, Planck derived the black body spectrum, which satisfied the Stefan-Boltzmann law with a non-vanishing term remaining where the summation of all modes of oscillations diverged to infinity in each point of the field. In modern derivation, correlation functions are utilized to derive the coherent behaviour of the creation and annihilation operators.

Although a common approach is to normalize the Hamiltonian so that all ground state modes cancel out, setting artificially ZPE to zero, zero-point energy is essential for the mathematical consistency of quantum mechanics as it maintains the non-commutativity of the creation and annihilation operators resulting in
the Heisenberg uncertainty principle. From our computation, we demonstrate that coherent modes of the correlation functions at the characteristic time of the proton correctly result in the emergence of its mass directly from quantum vacuum fluctuation modes. We find as well that this energy value is consistent with a Casimir cavity of the same characteristic distance. As a result, we developed an analytical solution describing both the structure of quantum spacetime as vacuum fluctuations and extrapolate this structure to the surface
dynamics of the proton to define a screening mechanism of the electromagnetic fluctuations at a given scale.

From an initial screening at the reduced Compton wavelength of the proton, we find a direct relation to Einstein field equations and the Schwarzschild solution describing a source term for the internal energy of the proton emerging from zero-point electromagnetic fluctuations. A second screening of the vacuum
fluctuations is found at the proton charge radius, which accurately results in the rest mass. Considering the initial screening, we compute the Hawking radiation value of the core

Schwarzschild structure and find it to be equivalent to the rest mass energy diffusing in the internal structure of the proton. The resulting pressure gradient or pressure forces are calculated and found to be a very good fit to all the measured values of the color force and residual strong force typically associated to quark-antiquark and gluon flux tubes confinement.

As a result, we are able to unify all confining forces with the gravitational force emerging from the curvature of spacetime induced by quantum electromagnetic vacuum fluctuations. Finally, we applied the quantum vacuum energy density screening mechanism to the observable universe and compute the correct critical
energy density typically given for the total mass-energy of the universe.

Introduction

General relativity demonstrates a relationship between mass-energy and the structure of spacetime that has real physical effects called gravity where massive objects, made of elementary particles producing their mass, curve spacetime resulting in a gravitational force. However, application of the same principles at the particles level yields gravitational forces that are so infinitely small that they are found to be insignificant. Yet, at the proton nuclear scale, extremely large confining forces are found which would require extremely high energy levels (or masses) to produce such a force in the context of general relativity. In fact, those very high levels of energy were actually predicted by early quantum field theory (QFT) resulting in the so-called ’bare mass’ of particles but renormalized by modern quantum electrodynamics (QED) and quantum chromodynamics † International Space Federation laboratory Email: research@spacefed.com

(QCD) utilizing quantum vacuum fluctuations as a shielding mechanism [1]. Consequently, one could ask the question in a different way than generally approached, that is, instead of why gravity is so weak, that has no meaning at the quantum level, but why is the proton mass, which is most of the mass of the material world, so small? This change in reasoning was eventually mentioned by others such as Franck Wilczek [2].

Furthermore, from deep studies of QFT and the divergence of the bare mass, one can ask a more fundamental question: is quantum vacuum fluctuations responsible for the bare mass shielding or is it the source of mass
itself and resulting forces?

The general idea that mass is some kind of immutable value independent of forces and energies was dispelled in the early 1900 by the event of special and general relativity, when it was found that there is a fundamental equivalence between the concept of mass, energy and the geometry of space. General relativity establishes fundamental gravitational forces, which agglomerate particles and organized matter such as galaxies, stars, solar systems and planets, as the result of the curvature of the structure of space itself. However, this curvature results from an undefined source of energy, called mass, emerging from quantum entities we called particles. On the other hand, we have developed theories that describe these particles and energy structures as quantities emerging from very high energetic fields resulting from a fundamental oscillation of space itself we call quantum vacuum fluctuations, or ground state. These fields of ’virtual’ particles are at the source of many of our modern particle theories of QFT, one of them being the Higgs field with a non-zero vacuum expectation value producing mass which only predicts $\sim 1-5\%$ of the mass of the proton [3, 4], or for the explanation of

orbital perturbation of an electron as in the Lamb shift. Consequently, both cosmological gravitational theory and quantum theory imbues very physical values to the structure of space itself with effects which have very fundamental and measurable attributes and which is intrinsically related to the
concept of mass-energy.

Vacuum fluctuations or zero-point energy are predicted by the most precise theories in modern physics such as QFT, QED and QCD. However, the description of the electromagnetic vacuum fluctuations is still debated since the progressive and longstanding development from the early works from Planck and Einstein in early 1900 to recent publications providing further insights on the calculation of the vacuum fluctuations energy density as well as demonstrating its necessity for the mathematical consistency of quantum mechanics [1] and matter stability [5]. Confusion around vacuum fluctuations or zero-point energy (ZPE) arises from its many different uses throughout physics. Yet, their effects are measured experimentally (Casimir effect [6–8], Lamb shift [9], Vacuum Birefringeance [10], etc.) and ZPE is considered as the source of creation and annihilation for real (spontaneous emission [11], electron-positron [12], Schwinger effect [13]) or virtual pairs (dressed particles, Feynman diagrams) of particles, and it corresponds to a ground state energy fields (Black body
radiation [14]) or even a background field interacting with particles as in Lamb shift or electron self-energy (QED loop).

Here, we demonstrate that energy densities and thus masses are emerging properties of the fundamental dynamics of electromagnetic vacuum fluctuations. We reconcile these two views of the structure of space and demonstrate that mass-energy is an emergent property of spacetime at the quantum level that unifies gravity, the strong force at all scales under one mechanism 1 . 1 Note to the reader: In this paper, we keep all units and do not utilize the common convention of reducing all the physical constant to one (where $G = c = \hbar = 1$). While mathematically it could be convenient, it represents a loss of information and can lead to confusion [15]. Also, in certain cases, we do not reduce equations so that the physical meaning can be extracted clearly.