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STRONG GRAVITY VERSUS WEAK GRAVITY: FIBER TRANSFORMS GRAVITY- BUNDLE - STRINGS: PRELIMINARY RESULTS

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ABSTRACT

We currently will concentrate on quantifying gravity in terms of fiber transforms bundle strings. Strong gravity will all be like rope braided closed bundle strings system acting like rope pulling large weight as one unit, hence having the stress tensor to pull object towards the center of gravity. Weak gravity maybe like stranded open fiber transforms strings system observed as a horizontal force on tangential plane of a stratified geodesic like earth having spherical concentric equidensity-matrix that is stratified towards the center of the mass like a sphere approximately. Spatial geometrically it will have increasing pressure (hence density matrix) towards gravity center. Strong gravity is like acceleration due to gravity, whereas weak gravity is like normal acceleration. Gage_velocity links weak gravity to strong gravity through equivalence principle.

Interpretations with physics discussing explaining Propositions of strong and the weak gravity aspects have been expounded here. String Theory analogy to open string geometry like a metric rank2 tensor gage field to quantify weak gravity, while closed string (loop) geometry like topological field to quantify strong field has been advanced. Fermions, Bosons, and Phonons have been hypothesized to fit into open and closed string regime as well as fibrational combinatorial of topological, and metric fields. Geometry of space in relation to possible dimensions of various entities making up the universe are listed to introduce dimensional range, entities, and their expected properties. Generalizing Feynman-like diagram enabling graphing wave particle by incorporating wavefunction, and the gage field function with phase angle to gage field calibration, and the wavefunction evaluations are detailed as well. The effect of gravity measurable as weight of an object is extended by the author to quantify discontinuum physics (DCP) parameter of proposed discontinuum energy field (DEF) by having algorithm of modeling observable measurable parameters of gage velocity and the weight to estimate bundle gravity transforms using computable programming simulations.

Strong gravity and the weak gravity conditions are gaged to allow modeling in the form of four vector string matrices like {open, loop, gluon, metrix} strings. String-gravity-fields are related by analogy to stitching elements like needle acting like rigid string gradient helping to thread strings, with the strings representing curl of gauge fields rotational aspects of the (2 × 2) point matrix tensor fields. Propositions advanced here also will be explored further to progress beyond the preliminary results.

Keywords: Quantifying gravity, fiber transforms' bundle strings, strong and weak gravity, gage velocity, equivalence principle, equidensity matrix, force, stress tensor, string-gravity-fields, discontinuum physics, computing simulations, observable measurement parameters.

INTRODUCTION

Our previous work provided comparisons of currently available theoretical framework per literature (Markoulakis *et al*., 2019; Iyer *et al*., 2020, 2022, 2023; Iyer, 2021a, b, c; Iyer and Markoulakis, 2021; Malaver *et al*., 2021), see also the books by Randall (2013) and Hossenfelder (2022) and the review paper by Zakharenko (2020), as well as in (TEKNET EARTH GLOBAL SYMPOSIA TEGS website: All ongoing LIVE STREAM PHASE-II YOUTUBE RECORDINGS of EPISODES are available at URL: https://www.youtube.com/@teknet_earthglobal2923/streams. All videos of the PHASE-I YOUTUBE RECORDINGS of EPISODES are available at URL: https://www.youtube.com/@teknet_earthglobal2923/videos). Because currently the paper consists primarily of preliminary results, only short literature relevantly is referenced here. A full paper having literature surveys

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with more references will appear in later publications of written articles.

Quantifying gravitational physics dense fibers transforms propositions

- Strong gravity will act like a rope which is a braided (closed) bundle of strings system able to pull large weight, whereas weak gravity will act like a stranded (open) or string pulling.

- Weak gravity may be observed as a horizontal force on tangential plane of a stratified geodesic like the Earth having spherical concentric equidensity-matrix stratified towards the mass center like a sphere approximately, increasing pressure (hence density matrix) towards gravity center. Weak gravity models as fiber transform (open) strings pulling object.

- Strong gravity will all be like rope that is closed braided bundle strings' system pulling large weight by acting together with rope as one unit, hence having the stress tensor to pull object towards center of gravitational mass.

- Weak gravity is like normal acceleration, whereas strong gravity is like acceleration due to gravity. Gage_velocity links weak gravity to strong gravity. Equivalence principle thus will apply linking weak gravity to strong gravity.

- While there is a gravitational acceleration linking strong gravity, there is normally conjugate acceleration associated then the weak gravity.

- Quantum density matter-energy field spreads away object influence onto environment to almost infinity.

- Causality of the weak gravity particle-particle collision interaction of density fields of object influence on other environmentally separated objects produces chaining of concomitantly sequential action reaction processes naturally happening.

- Strong gravity high-density fields lead to warping to eventual causality curving the geometry of space-time to form, for example, black holes.

- weak gravity timeline interweaves strong gravity worldline carrier waves.

- earth is affected by curving of interweaving worldline with timeline events.

- Table 1 shows how cosmic microwave background radiation, a.k.a. (CMBR) informs us of weak gravity, while gravitational waves give us more information on strong gravity, such as events that were happening in a blackhole. Once we quantify weak and the strong gravity using propositions alongside strings-fields-gravity modeling per paradigm ongoing here, CMBR and the gravitational waves measures may be metrics for strong/weak gravity physics.

Table 1. Strong gravity versus weak gravity.

more with weak gravity	more with strong gravity
cosmic microwave background radiation	gravitational waves

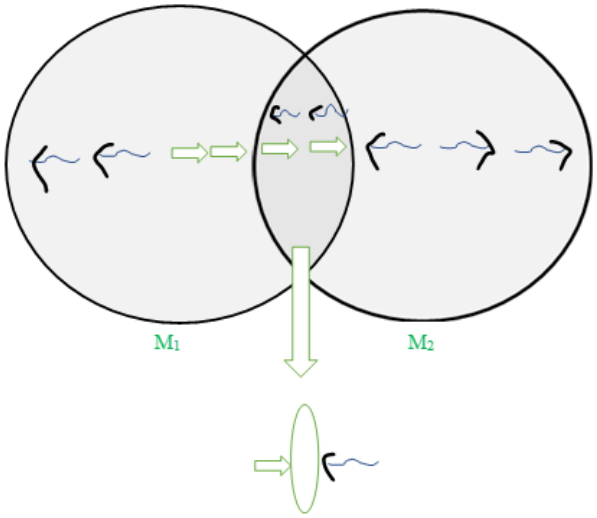

Fig. 1. The spreading of the density matrix from M_1 and M_2 massive objects pulling them towards center of gravity (COG).

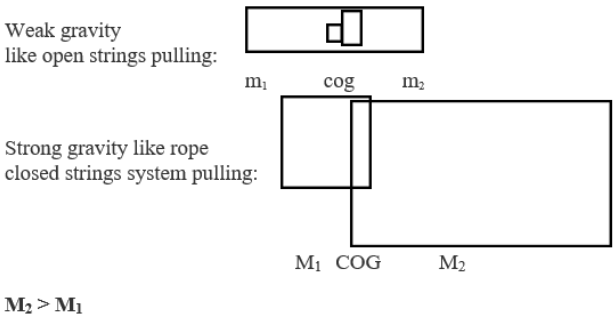

Fig. 2. The matter masses m_1 and m_2 are like open strings pulling on each other, represent weak gravity. Matter masses M_1 and M_2, with $M_2 > M_1$ are like rope constituting braided bundle of the strings together, i.e., pulling on each other acting like closed strings system to represent strong gravity.

Explaining interpretations physics discussing propositions

Figure 1 shows how matter spreads mass forming distributed density matrix over space. Then each object will have its own sphere of influence interacting through density matrix, having attractive versus repulsive forces to occupy space. We know that non-bosonic (nonlight) matter will not overlap occupation of space, meaning one particle, such as fermions occupying one point in space displace another particle trying to occupy its space. This will generate the action-reaction sequence of collisions, like thermodynamics of ideal gas particles, creating center of gravity (COG). while equilibrium of motion vectors culminates resultants at intersecting regions balancing opposing vectors, shown as lenticular region at interaction intersection of the two objects' spheres of influence. With this scheme, we can deduce that massive objects having larger density matrix will typically have relatively stronger spheres of influence over lighter objects having a smaller density matrix. The pulling towards COG will be a resultant of opposite vectors cancelling one another. Note that actual vector alignment is not drawn explicitly. However, translational property of vectors will imply equilibrium with balance of density matrix vector forces.

Figure 2 shows how types of force pulling on one another towards COG can create strong gravity versus weak gravity. To demonstrate simply weak gravity, one can test with a single strand string to pull certain object; it can only pull weakly. Whereas strong gravity will act like a rope braided multiple strands of strings that can pull heavily. Here, strong gravity works analogous to closed strings that are joined at the ends and hard to break or stretch out. Weak gravity works analogous to open strings that are loose at the ends and easier to break or stretch out.

String Theory analogy will interpret open string geometry like a metric field, metric rank2 tensor (Waner, 2005; Gauss, 1965) and (https://math.stackexchange.com/questions/2856754/what-is-the-relationship-between-a-metric-tensor-and-a-metric; also check Wikipedia) to quantify curve length of an open string; while the closed string (loop) geometry may be interpreted like topological field (Więsław, 1988). Thereby, fermions that are, for example, electrons that may form the metric fields like stranded bundle of the open strings and bosons that are, for example, photons that form topological fields like braided bundle of the loop (closed strings) are thus propositionally conceivable physics conjectures surmised out from researching literature physics (Tong, 2007; Nakas and Rigatos, 2020; Levin and Wen, 2023; Bagger *et al*., 1987; Lu *et al*., 2014). Similarly, phonons are conceivable to occupy geometric space like forming inside out toroidal or topological fields morphology. It is well known in physics literature (Schwabl, 2008; Girvin and Yang, 2019; You *et al*., 2021; Faílde and Baldomir, 2021; Hossenfelder, 2006; Li *et al*., 2020) that a phonon is a collective excitation in a periodic, elastic arrangement of atoms or molecules in condensed matter, specifically in solids and some liquids. A type of quasiparticle a phonon is an excited state in the quantum mechanical quantization of the modes of vibrations for elastic structures of interacting particles; phonons can be thought of as quantized sound waves, like photons as quantized light waves (Schwabl, 2008; Girvin and Yang, 2019; You *et al*., 2021; Faílde and Baldomir, 2021; Hossenfelder, 2006; Li *et al*., 2020). These structures may have an in-between topological, and metric fields like bundling, switching, and/or fibrational having open and closed strings that will have open strings and loops fluctuating with time. These aspects are currently speculative, however, verifiable with physics transforms.

The shifting paradigm of dimensional conjectural physics

To a gist manner, we can extend physics conjectures proposed above to make sense physics that will justify dimensions of various entities that may make up the universe (Table 2).

Table 2. Enumerating possible dimensional range affecting entity type with its expected property. Geometry of Space: dimensionless {point, Superluminal, Plenum, magnetic, quagmire} to dimensional {Hod, dipole, magnetic, planar field} to {PDP, clockwork, assembly, discontinuum, mechanism} to {particle, photon, quark, gluonical, matter}.

Expected properties and entities	Dimension
Superluminal Plenum that may be noisy, thereby unobservable dark matter	0 to 1
Open strings, typically 1D; closed strings or loops, typically 1 to 2D extent	1 to 2
Hod that will not have thickness, hence transparent unobservable thin discs	2
Quasi particles, particles like fermions, bosons - potentially observables	2 to 3
Matter universe general Euclidean observable in geometry of space	3
Space-time manifold, for example, blackholes as observable Astro-effects	3 to 4
Hod-PDP assembly dynamics, effects quantum physically interpretable	4 to 5

Each monopole may act like a functor (categorically related) to every other monopole linked further by their Dirac strings to form modon strings originating weak gravity. Dynamic oscillatory Superluminal Plenum with Hod-PDP mechanism culminates with dipolar strong gravity. Strong gravity with micro-blackhole and the weak gravity with the zero point mathematically gages to the (2 × 2) matrix of the original Iyer-Markoulakis formalism (Iyer *et al*., 2020; Iyer, 2021a, 2021b, 2021c;

Iyer and Markoulakis, 2021) modeling quantified theory of a universal physics characterizing superluminal vacuum quanta with diagonal elements corresponding to strong gravity and the cross-diagonal elements corresponding to the weak gravity.

Extending to those conditions satisfying quantum symmetry per literature of Noether's theorem is applicable with having consideration of a zero-matrix undergoing primordial prime factorization magic square symmetries (Iyer *et al*., 2020, 2022, 2023; Iyer, 2021a, b, c; Iyer and Markoulakis, 2021). One can thus argue the case of absolute vacuum genesis spontaneously originating superluminal vacuum quanta having energetic monopolar fields culminating with subquantum Hod-PDP mechanism, like a perpetual motion machine to form stable particles towards a real matter universe; really these are modified by the vacuum friction, however, tired light as well as "Super photon" possibilities arise further with real natural processes (Zhang, 2021a, b).

The effect of gravity is measurable as weight of an object. Also, measurable are those observables revealing typical event causality in terms of parity and sense, for example, observable measurable magnetic polarity with compass sensing needle varying with (latitude, longitude) coordinates specifically exposed to earthen global/local environment. It will give point information to complement gravitational waves and cosmic microwave background radiation measurement values translatable with analysis of interactive worldline-timeline-event.

Discontinuum physics paradigm of dissipative point matrix gravity transforms

The author quantified discontinuum physics (DCP) shifting paradigm by having algorithm identifying weight parametrically as an experimentally testable physically observable measurable quantity (Iyer *et al*., 2022, 2023). This algorithm given as discontinuum energy field (DEF) to be: **(DEF) = (gravity_bundle_transform)(weight) = Σ{(fiber_transforms)*(gage_velocity)},** which allows us to write the DCP algorithm in terms of real observables measurable parameters of gage velocity and the weight equationally. Instrumentation designs measuring **ρ** {the gravity density matrix equivalent to concentrated huge gravitational mass, **M** having its gravitational influence spreading over r which is the spatial distance between **m** and **M**}, **(Gρ/g)** {constituting **bundle gravity transform**, with **G**, the universal gravitational constant so that **mg** will be like normal measurable weight due to gravity like action of earthern gravity, **g** on an object mass, **m**}, and the gage velocity will make it possible to estimate bundle gravity transforms, by application of trial-and-error techniques on experimental observations with measurements using typical computer programming simulations (Iyer *et al*., 2023), graphically determining **(DEF)** versus **(gage_velocity)** for varying **matter_weights**. This enables the discontinuum physics giving a grand unifying paradigm shifting physics.

Strong energy gravity condition arises from fields originating per schemes outlined above, Hamiltonian-Helmholtz-Coulomb gaging (2 × 2) matrix of the original IM Iyer-Markoulakis formalism of theory of a universal physics superluminal vacuum quanta (Iyer *et al*., 2020; Iyer, 2021b, c) to having the diagonal elements corresponding to strong gravity and the cross-diagonal elements corresponding to the weak gravity. Astrophysical explanations have already been advanced by various stellar mathematical mechanics verifiable with telescopic radiometric techniques (Malaver *et al*., 2022). Based on these, we can surmise that strong gravity energy conditions on the diagonal micro black hole elements of IM (2 × 2) tensor will cause the diagonal shrinking. Weak gravity energy conditions on the cross-diagonal zero-point tensor will cause cross-diagonal expansion. Thus the "stringmetrics" bundle of the electron-positron graviton mass tensor metrics (Iyer *et al*., 2020; Iyer, 2021b, 2021c) pointing quantum astrophysical galactical stellar objects' discs accretion that are observed at the blackhole, wormhole, supernova, and emissions might be used to provably verify observables. Presently, ongoing grand unifying physics efforts are underway to put all first principles' formalisms altogether!! We have many projects publications with collaborative international scientists' forum platform to enable it within a few years. The weak gravity cross-diagonal term will stretch like bow as per "stringmetrics" (Iyer *et al*., 2020; Iyer, b, c), while the strong gravity diagonal term will be like arrow of time.

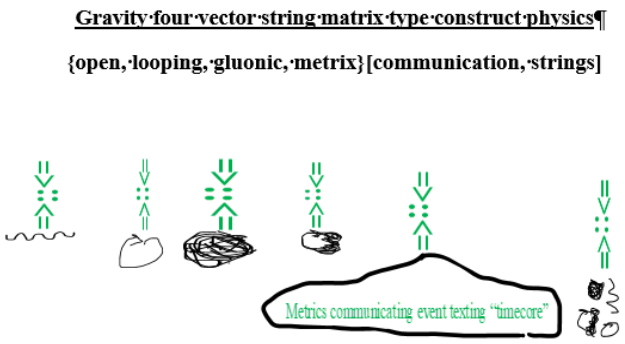

Fig. 3. The strong gravity and the weak gravity quantifiability physics constructs of a four-vector string matrix model linking time-event sequencing.

Gaging allows time to be in string matrix format, i.e., four vector string matrix like {open, loop, gluon, metrix} strings. Weak gravity may be like gluonic oscillatory metrix string, for instance, see in Figure 3. Strong gravity may be gluonic loop metrix strings. These are analyzed more in detail at subsequent publications. However, initiating paradigm sets constructs to model way to stitch

String theory with Propositions advanced here expounding process of grand unifying physics natural processes will be explored thoroughly as part of preliminary results.

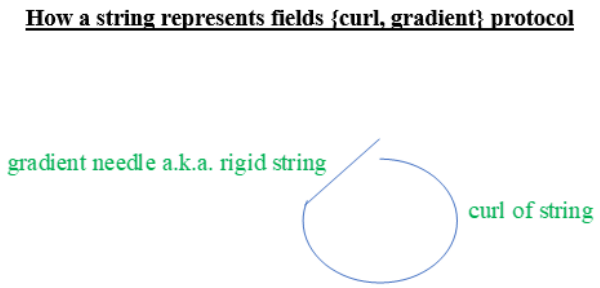

Fig. 4. The string-gravity-fields relating by analogy to stitching elements - needle threading strings. Gradient field analogy representation models needle acting like rigid string gradient, while curvature of string acting to analogically represent the curl of fields rotational aspects of the (2 × 2) point matrix tensor fields.

Gradient needle also known as rigid string part with the curl of string composite inverse gages to (2 × 2) Helmholtz decomposition gradient rotational field matrix, with gradient needle a.k.a. rigid string gradient (Fig. 4) and the curl of string rotational aspects of the (2 × 2) point matrix fields (Iyer and Markoulakis, 2021). Thus, we may convolute involute point tensor $[\hat{\mathbf{i}}, \hat{\mathbf{j}}, \hat{\mathbf{k}}]$ space having value of i or j, forming quaternions. Gradient needle may be working like a switch key that when it closes onto curl of string produces {open, looping, gluonic, metrix} [communication, strings] shown above.

CONCLUSION

The author starts by continuing earlier peer published papers' results to come up with propositions that are hypothesized laying knowhow characterizing gravity in terms of the weak and strong aspects of a unified field of physics.

Schematics show how the concepts of matter mass generating spheres of influence via forming distributed spatial density matrix may be modeled. Then interacting objects having attractive versus repulsive forces trying to occupy space generate the action-reaction sequence of collisions, like thermodynamics of ideal gas particles, creating center of gravity (COG) while motion vectors equilibrate balancing at intersecting regions. Types of force pulling on one another towards COG can create strong gravity versus weak gravity, explained by mesoscopic observable examples. Strong gravity works analogous to closed strings that are joined at the ends and hard to break or stretch out. Weak gravity works analogous to open strings that are loose at the ends and easier to break or stretch out.

String Theory analogy will interpret open string geometry like a metric field, metric rank2 tensor to quantify curve length of an open string. While closed string (loop) geometry may be interpreted like a topological field. Fermions, Bosons, and Phonons have been shown to fit into open and closed string regime as well as fibrational combinatorial of topological, and metric fields, although they are speculative currently. Geometry of space in relation to possible dimensions of various entities making up the universe are listed to introduce dimensional range, entities, and their expected properties. Graphically Hod-PDP mechanism operating in the phase Superluminal Magnetic Plenum having monopoles are depicted by sketches of Feynman-like diagram enabling graphing wave particle by incorporating wavefunction, and the gage field function with phase angle generalizing Feynman diagram to gage field calibration, and the wavefunction evaluations.

The effect of gravity measurable as weight of an object is extended by the author to quantify discontinuum physics (DCP) parameter of discontinuum energy field (DEF) shifting paradigm by having algorithm identifying weight parametrically as an experimentally testable physically observable measurable. Real observables measurable parameters of gage velocity and the weight equationally to estimate bundle gravity transforms computable programming simulations enable the discontinuum physics giving grand unifying paradigm shifting physics.

Strong gravity and the weak gravity conditions are gage equivalent to "stringmetrics" bundle of the electron-positron graviton mass tensor metrics formalisms that the author has published already. Gaging allows time to be in the string matrix format, i.e., four vector string matrix like {open, loop, gluon, metrix} strings. Weak gravity may be like gluonic oscillatory metrix string, for example. Strong gravity may be gluonic loop metrix strings. String-gravity-fields are related by analogy to stitching elements like needle acting like rigid string gradient helping to thread strings the curvature of which represents the curl of fields rotational aspects of the (2 × 2) point matrix tensor fields. Propositions advanced here expounding process of grand unifying physics natural processes will be explored further to progress beyond the preliminary results.

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