

A conjectured identity/equivalence between matter (including radiation) and spacetime curvature (STC) based on subquantum movement (SQM) explaining both inertial and gravitational masses and their equivalence/equality

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Abstract

(with main abbreviations further used in this paper)

This short paper proposes a conjectured identity between matter (both fermionic and bosonic matter/radiation) and spacetime curvature (STC) based on subquantum movement (SQM) explaining both inertial and gravitational masses and their equivalence/equality.

This paper continues (from alternative angles of view) the work of other past articles/preprints of the same author [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26].

I. The main observation and conjecture proposed in this paper

Observation no. 1 (Obs1) [6]. It is well known/demonstrated that ~99% of a nucleon (proton [p] or neutron [n]) rest mass ($m_{p/n}$) (which $m_{p/n}$ is actually the inertial mass of a nucleon measured by an observer which is “at rest” in respect to that nucleon) IS IN FACT produced by BOTH, primarily, the kinetic energy of their subcomponent gluons (the quanta of the strong nuclear field [SNF], which gluons bind “nucleonic” up and down quarks together, by the so called quantum chromodynamics binding energy which is actually the SNF energy) and, secondarily, the kinetic energy of quarks: tertiarily, only the rest of ~1% of $m_{p/n}$ is due to the rest masses of all its subcomponent quarks, HOWEVER all rest mass-energy ($99\% + 1\%$) $m_{p/n}$ couples gravitationally (because the gravitational mass [URL2] and inertial mass of a nucleon were experimentally proved to be equal, at least in the error limit of the experiments).

Conjecture no. 1 (Conj1) (based on Obs1) [3]. Starting from Obs1, Conj1 “inductively” pushes Obs1 to its extreme possibilities by stating that: a non-zero rest mass (nzrm) of any known elementary particle (nzrmEP) indicates subquantum movement (SQM) of “something” inside that nzrmEP, which SQM “sine-qua-non”-ly needs a non-zero volume (to ...logically take place!), which implies that all nzrmEPs have non-zero (finite and non-infinitesimal) volumes (nzvs) (which nzvs are a fable solution to avoid the infinite self-energy paradox of any nzrmEP); Conj1 additionally (and ambitiously!) states that all nzrms of all known and unknown EPs can ONLY be FULLY explained by the kinetic energy of other bosonic “ultimately” fundamental (uf) EPs (ufEPs) moving inside those nzvs of those nzrmEPs: these ufEPs are stated to be “fundamental” bosons (of possibly one or more types) with zero-rest masses and ONLY relativistic masses limited by the speed of light in vacuum $c (= v_{\max})$ (like the photons and the gluons for example), which c is considered equal to the maximum speed allowed in our universe (OU) (v_{\max}) for any movement of any EP from OU (including ufEPs): this $v_{\max} (= c)$ -rule/law/principle is stated by both Einstein’s Special relativity (ESR) and General relativity (EGR) SO THAT Conj1 assumes both ESR and EGR to be at least partially true, at least in this essential aspect (the existence of a finite $v_{\max} = c$) and also in the aspect of “spacetime curvature” (describing both length and time distortions produced by matter possessing sufficiently large mass and/or energy). ufEPs are essentially defined by Conj1 to be actually subquantum oscillations/vibrations (SQM) of spacetime (ST) vacuum itself, SO THAT any group of adjacent ufEPs from any local ST represents the dynamical ST curvature (dynSTC) of that local ST. Not only the fermionic and bosonic nzrmEPs, but also the known “standard” zero-rest mass bosons (like photon and gluon) are also conjectured to not to be actually “elementary”, but also composed from these elementary ufEPs.

Explanation no. 1 (Expln1). If any nzrmEP is present in any local ST, then the same ufEPs (which generate the nzrm of that EP) simultaneously generate both dynSTC and that nzrm of that EP (present in that arbitrarily chosen local ST) SO THAT mass(nzrm) is essentially STC/dynSTC (which is a distinct approach from EGR which treats mass and STC as distinct entities/phenomena which influence each other according to Einstein’s field equations). Because both inertial mass (im) and gravitational mass (gm) are identified (by Conj1) with the same dynSTC (identified in turn with the same group of ufEPs generating nzrm), that is how Conj1 explains the equality between im and gm (which equality is the equivalence principle of EGR, on which EGR strongly rely on).

Explanation no. 2 (Expln2). The mass and gravitational field (GF) of any EP are both identified by Conj1 with the same dynSTC/ufEPs group (which may extent to infinity) and that is why mass/nzrm and gravity/GF are stated/conjectured to be essentially the same thing, indissolubly related up to reciprocal identity (an identity governed by ufEPs). In other words, any EP is actually SQM (thus kinetic) and any SQM is actually dynSTC (group of ufEPs) of our 4D spacetime (4DST): various EPs may be identified with various types of SQM/dynSTC allowed by our 4DST; all fundamental physical fields (FPFs) produced by all known/unknown (real) EPs are thus stated to be actually various forms of dynSTC and thus various “allotropic” forms of this same universal ufEP-based GF (identified with both mass and STC).

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Conclusions of this paper. (1) In conclusion, nature has only one “director” who “plays” both the “actor” (matter) and the “scene” (spacetime): spacetime (ST) and its topologically allowed oscillation modes (identified with dynSTC, including closed STC or tunnel-like STCs identified with wormholes) with all types of EPs and FPFs being identified (by Conj1) with these oscillation modes. (2) Conj1 essentially states that “Matter IS spacetime curvature (STC)” so that Conj1 is actually a *matter-STC equivalence principle (MSTC-EP)*.

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