A Dimensional Relativity Hypothesis (DRH)

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1st Motto[2]: „[„**God" addressing Man:**] Space is time… demonstrated. In truth there is no such thing as space—pure, <<empty>> space, with nothing in it. Everything is something.[...] Invisible <<energy>> is the <<space>> which holds <<matter together.>> Once—using your linear time as a model—all the matter in the universe was condensed into a tiny speck. You cannot imagine the denseness of this—but that is because you think that matter as it now exists is dense. [...] At one point the entire universe actually was <<solid>>. There was virtually no space between the particles of matter. All the matter had the <<space>> taken out of it— and with the enormous <<space>> gone, that matter filled an area smaller than the head of a pin. [...] [**Man:**] Is the universe now expanding? [**God:**] At a rate of speed you cannot imagine! [**Man:**] Will it expand forever? [**God:**] No. There will come a time when the energies driving the expansion will dissipate, and the energies holding things together will take over—pulling everything "back together" again. [**Man:**] You mean the universe will contract? [**God:**] Yes. Everything will, quite literally, "fall into place"!" [...] [**Man:**] That means that we will no longer exist! [**God:**] Not in physical form. But you will always exist. You cannot not exist. You are that which Is. [**Man:**] What will happen after the universe "collapses"? [**God:**] The whole process will start over again! There will be another so-called Big Bang, and another universe will be born. It will expand and contract. And then it will do the same thing all over again. And again. And again. Forever and ever. World without end. This is the breathing in and breathing out of God."

2nd Motto[3] (with my insertions between brackets): „An important lesson we learn from the way that pure numbers like α [the fine-structure constant, which is the electromagnetic coupling constant at rest] define the World is what it really means for worlds to be different. The pure number we call the fine structure constant and denote by α is a combination of the electron charge, e, the speed of light, c, and Planck's constant, h. At first we might be tempted to think that a world in which the speed of light was slower would be a different world. But this would be a mistake. If c, h, and e were all changed so that the values they have in metric (or any other) units were different when we looked them up in our tables of physical constants, but the value of α remained the same, this new world would be observationally indistinguishable from our World. The only thing that counts in the definition of worlds are the values of the dimensionless constants of Nature. If all masses were doubled in value you cannot tell, because all the pure numbers defined by the ratios of any pair of masses are unchanged.**"**

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[1] **Email**: dr.dragoi@yahoo.com; **Main pages**: [**Science**] www.dragoii.com; www.rg.dragoii.com; www.academia.dragoii.com; www.vixra.dragoii.com; www.gsj.dragoii.com; [**Music**] www.smp.dragoii.com, www.se.dragoii.com; [**CVs**] www.cvrg.dragoii.com; www.ej.dragoii.com, www.bj.dragoii.com;

[2] Walsch N.D. (1999). „Conversations with God: An Uncommon Dialogue (Book 2)" (book: ISBN: 0-399-14278-9). Chpater 6 (**URL1**, **URL2**)

[3] Barrow, John D. (2002). „The Constants of Nature; From Alpha to Omega - The Numbers that Encode the Deepest Secrets of the Universe", Pantheon Books, ISBN 978-0-375-42221-8 (URL2)

Abstract

This paper proposes a dimensional relativity hypothesis (**DRH**). DRH pushes the relativity of space and time to its…"informational" extremes, defining them as illusions created by the exchange of information in a bulk virtual matrix (**BVM**).

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A Dimensional Relativity Hypothesis (DRH)

Observation no. 1 (Obs1) of DRH. The adimensional (dimensionless) fine-structure constant (**FSC**) at rest $\alpha = \left(k_e q_e^{\,2} / c\right)/\hbar \cong 137^{-1}$ (which is the electromagnetic [**EM**] coupling constant at rest, measuring the strength of EM field [**EMF**] and being directly measurable by quantum Hall effect [**QHE**]) and the adimensional gravitational coupling constant (**GCC**) at rest $\alpha_G = \left(Gm_e^{\,2} / c\right)/\hbar \cong 10^{-45}$ are both "more" fundamental than all their "subcomponent" dimensional physical constants (**PCs**): the Coulomb constant k_e, the elementary EM charge q_e, the gravitational constant G, the electron rest mass m_e (equal to the positron rest mass), the speed of light in vacuum c and the Planck constant h (with reduced Planck constant $\hbar = h / \left(2\pi\right)$). FSC and GCC are "more fundamental" in the sense that our observable universe (**OU**) would be indistinguishable from a universe "X" in which $k_{e(x)} = x \cdot k_e$, $q_{e(x)} = x \cdot q_e$, $G_x = x \cdot G$, $m_{e(x)} = x \cdot m_e$, $c_x = x \cdot c$ and $\hbar_x = x \cdot \hbar$, with x being a common proportionality factor of all these PCs resulting $\alpha_x = \alpha$ and $\alpha_{G(x)} = \alpha_G$ (see also the 2nd motto of this paper). **In other words**, the known dimensional PCs are regarded by ACUM as only the results of a formal asymmetric product "split" of FSC and GCC.

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Statement no. 1 (Stat1) of DRH. The FSC-to-GCC ratio (at rest) is the ratio between the strength of the electromagnetic field (**EMF**) and the strength of the gravitational field (**GF**), which is named "electrogravitational" (**eg**) ratio at rest $\phi_{eg} = \alpha / \alpha_G \cong 10^{42}$. ACUM pushes Obs1 to "its limits" and states that ϕ_{eg} is a 1st rank parameter of nature even "more fundamental" than α and α_G in the sense that that our OU would be indistinguishable from a universe "X" in which $\alpha_x = x \cdot \alpha$ and $\alpha_{G(x)} = x \cdot \alpha_G$, with x being a common proportionality factor of both α and α_G resulting that $\phi_{eg(x)} = \phi_{eg}$. ϕ_{eg} is thus

regarded by DRH as an electrogravitational scaling factor (**EGSF**) of nature.

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The Statement no. 2 (Stat2) of DRH. If one models the hypothetical graviton (**gr**) analogously to a photon, such as $E_{gr} = h_{gr}c / \lambda = h_{gr}\nu$ [4], then DRH estimates the Planck-like gravitonic constant h_{gr} (measuring the hypothetical quantum angular momentum of the graviton) such as $h_{gr} \underset{DRH}{\overset{estim.}{=}} h / \phi_{eg} \cong h / 10^{42}$. **Explanation**. This is in concordance with ϕ_{eg} being considered by DRH a 1st rank parameter depending on both average quantum angular momentums (**QAM**) transferred between any two elementary particles (**EPs**) (with force strength/magnitude being defined as transferred QAM per unit of time and length) when interchanging virtual photons (in the case of EMF) while also interchanging real gravitons (in the case of GF). **Two new definitions**. Based on h_{gr} and ϕ_{eg}, we may also define a gravitonic bit (**gbit**) $1gbit = h_{gr}$ and a photonic/electromagnetic (**em**) bit (**embit**) $1embit \cong \log_2(\phi_{eg}) \cong 142 gbits$. **Important note**. One may easily observe that the $1gbit / 1embit (\cong 1/142)$ ratio has a value relatively close to FSC value at rest, which is an interesting fact (indicating to a new unexpected gravitational significance of FSC) that was offered a possible explanation in another paper of the author [**1**].

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Statement no. 3 (Stat3) of DRH (the main statement of DRH) [1]. Let us consider the generic QAM of all fermions (**f**) of OU $h_f = \hbar / 2$ (which fermions represent the main constituents of OU's "white"/non-dark matter) and the product (measured in angular momentum units J*s) between the (experimentally) estimated/measured total energy of our observable universe (**OU**) $E_{OU} \cong 3.2 \times 10^{75} J$ and the estimated/measured present age of OU $t_{OU(pres)} \cong 13.8 \times 10^9 \ years$ such as: $H_{OU(pres)} = E_{OU} \cdot t_{OU(pres)} \cong 1.4 \times 10^{89} Js$. Interestingly (and stated by DRH as non-coincidental!)

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[4] with E_{gr} being the intrinsic energy of that gr, h_{gr} being the hypothetical intrinsic quantum angular momentum (a Planck-like gravitational constant analogous to the Planck constant h) of that gr, c being the speed of light in vacuum (also identified with the speed of gravity), λ (Greek letter lambda) being the gr wavelength and ν (Greek letter Nu) being the gr frequency

$\log_{\phi_{eg}}(H_{OU(pres)} / h) \cong \log_{\phi_{eg}}(H_{OU(pres)} / h_f) \cong 3$, and $\log_{\phi_{eg}}(H_{OU(pres)} / h_{gr}) \cong 4$ implying that $H_{OU(pres)} \cong \phi_{eg}^3 \cdot h$ and $H_{OU(pres)} \cong \phi_{eg}^4 \cdot h_{gr}$ respectively, which is equivalent to a predicted ratio $\log_2(H_{OU(pres)} / h_f) / \log_2(H_{OU(pres)} / h_{gr}) \cong 3/4$.

DRH ambitiously states (and predicts) that we currently perceive/observe OU to be 3D (when using photon/h-based light and fermionic matter to observe OU) just because $H_{OU(pres)} \cong \phi_{eg}^3 \cdot h$ so that EGSF $\phi_{eg}(\cong 10^{42})$ and $H_{OU(pres)} / h_f$ ratio are the main determinants of the perceived number of dimensions (N_D) of our OU, with $N_{D(x)} = \log_{\phi_{eg}}(H_{OU(x)} / h_f)$. **In other words**, the fermionic matter of our OU (which is the main constituent of our OU's white matter, from which photonic radiation is just a relatively small fraction) is a cloud/dust of point-like fermions (each with an assigned QAM measured by h_f) which cloud/dust has ~3 electrogravitational (eg) dimensions (~**3egD**) that govern the "spatial" distribution of angular momentum quanta in our OU: DRH thus states that the observed 3 spatial dimensions of our OU are actually **3 relative eg dimensions**.

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Prediction no. 1 (Pred1) of DRH [1]. DRH predicts that, if we used a gravitonic h_{gr}-based "light" to observe our present OU then DRH estimates that we would then perceive a 4egD spacetime, because $N_D = \log_{\phi_{eg}}(H_{OU(pres)} / h_{gr}) \cong 4$. **In other words**, the number of dimensions of space $(N_D = 3)$ is predicted by DRH to be just a subjective result of observing our OU in the present by using (h-based) photonic light (interacting with h_f-based fermionic matter): the $N_D(=3)$ assigned to space should then NOT be considered an a priori value, but a (relative) function of ϕ_{eg} and $H_{OU(pres)} / h_f$ ratio and the 3D space is actually a 3egD space. OU is thus modeled by DRH as a "bulk" virtual (abstract/mathematical/geometrical) matrix (**BVM**) of coordinates/information which takes a variable number of dimensions (**ND**), depending on the h/h_{gr}-"key" we use to read/observe that BVM. DRH pushes the relativity of space and time to its…"informational" extremes, by defining them as illusions created by the exchange of information between us (as observers) and this BVM: in conclusion, DRH emphasizes that both space and time are relative illusions created by pure-adimensional informational exchange. **In other words**, BVM supports at least two alternative descriptions/perceptions: one using embits

(photons) and one using gbits (gravitons). The adimensional relativity expressed by DRH may be also regarded as an adimensional "absoluteness", in the sense that the adimensional parameters govern everything, including space/spacetime (Euclidean or non-Euclidean) dimensional appearance. **Important note**. One may easily remark that gravity/GF "extracts" an additional spatial (aka "temporal") dimension from the BVM (by using its gravitons as observational "tools" for scrutinizing BVM). The number of (observed) dimensions of space/spacetime is considered by DRH a mind (re)construct from the objective fact

that $\boxed{\log_{\phi_{eg}}\left(H_{OU(pres)}/h\right) \cong \log_{\phi_{eg}}\left(H_{OU(pres)}/h_f\right) \cong 3}$.

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Prediction no. 2 (Pred2) of DRH [1]. DRH predicts that an OU with a fixed h and h_{gr} will appear to have less space/spacetime dimensions in its "infancy"/past when $H_{OU(past)} << H_{OU(pres)}$: for example, for $\boxed{t_{OU(past)} \cong 1s}$,

$\boxed{H_{OU(past)} = E_{OU} \cdot t_{OU(past)} \cong 10^{71} Js}$, with

$\log_{\phi_{eg}}\left(H_{OU(past)}/h_f\right) \cong 2.5 egD$ and

$\log_{\phi_{eg}}\left(H_{OU(past)}/h_{gr}\right) \cong 3.4 egD$ indicating a

space/spacetime describable by fractional/fractal (eg-)dimensions so that our OU's space from the 1st second after the hypothetical Big Bang (**BB**) may be modeled as a ~2.5egD fractal Cantor-like dust/cloud of points/coordinates: analogously our OU's spacetime from the same 1st second after BB may be modeled as a ~3.5egD Cantor-like fractal dust/cloud of points/coordinates.

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Prediction no. 3 (Pred3) of DRH [1]. DRH predicts that an OU with a fixed h and h_{gr} will appear to have more space/spacetime dimensions in its distant future (**fut**) when $H_{OU(fut)} >> H_{OU(pres)}$: for example, for

$\boxed{t_{OU(fut)} \cong 10^{30} years}$, $\boxed{H_{OU(fut)} = E_{OU} \cdot t_{OU(fut)} \cong 10^{109} Js}$,

with $\log_{\phi_{eg}}\left(H_{OU(fut)}/h\right) \cong 3.4 egD$ and

$\log_{\phi_{eg}}\left(H_{OU(fut)}/h_{gr}\right) \cong 4.3 egD$.

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Prediction no. 4 (Pred4) of DRH [1]. For fixed h and h_{gr}, DRH predicts a Big Bounce universe (**BBU**) which may reach a perceived 5egD appearance (when observed using hypothetical gravitons; a "minimal" 5D OU also predicted by super string theories [**SST**]) at the end of its expansion half-cycle after

$\boxed{t_{BBU(5D)} = \phi_{eg}^{\,5} \cdot h_{gr}/E_{OU} \cong 10^{59} years}$.

Important note. DRH was first proposed by the same author in an older paper as an "Info-Dimensional Relativity Principle (**IDRP**)" [2]: given its elegance (of a "pure" mathematical/abstract adimensional universe which doesn't need a preset N_D

parameter), DRH was also reintegrated in **[1]** but also dedicated this separate paper.

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Important redefinitions. DRH also proposes the redefinition of all the other fundamental physical quantities as functions of physical information (**PI**) quantity (**PIq**) (which PIq is alternatively measured by h [in embits] and h_{gr} [in gbits]).

Table 1. A set of SI base units redefined by using the elementary physical information quantity (PIq or shortly "I") (from which the number of space/spacetime coordinates is also derived) measured by the Planck constant (h) in embits or by the gravitonic Planck-like constant h_{gr} in gbits, with both embit and gbit being considered generic (interconvertible) physical bits (pbits)		
The redefined SI base unit	**SI base unit redefinition**	**Definition for each (redefined) SI base unit in part**
Quantum angular momentum (L)	$L[J \cdot s] = I[pbits]$	Quantum angular momentum is identified with **PIq**
Energy (E)	$E[J] = I/t[pbits/s]$	PIq transfer speed
Power (P)	$P[W] = I/t^2[pbits/s^2]$	PIq transfer acceleration
Force (F)	$F[N] = I/(d \cdot t)$ $[(pbits/s)/m]$	PIq transfer speed per unit of length
Mass (M)	$M[kg] = I \cdot t/d^2$ $[pbits \cdot s/m^2]$	PIq flow (in a time interval t) per unit of area

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Final conclusions. ACUM proposes a universe describable in pure adimensional parameters like FSC $\left(\alpha \cong 1/137\right)$ (at rest), GCC $\left(\alpha_G \cong 10^{-45}\right)$ (at rest), $\boxed{\phi_{eg}\left(=\alpha/\alpha_G \cong 10^{42}\right)}$, $\boxed{h_{gr} = 1gbit}$ (with fixed value), $\boxed{h = 1embit \cong 142gbits}$ (with also fixed value),

$$N_{D(space)} = \log_{\phi eg}\left(H_{OU(pres)} / h_f\right) \cong 3egD$$ and

$$N_{D(spacetime)} = \log_{\phi eg}\left(H_{OU(pres)} / h_{gr}\right) \cong 4egD.$$

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References
(partially integrated as Wikipedia URLs in the text)

[**1**] Andrei-Lucian Drăgoi (August 2019). (ACUM - version 1.0 - 25.08.2019 - 7 pages) **An elegant Adimensional Cyclic Universe (toy-) Model (ACUM) mainly based on the electrograviton hypothesis (EGH), the quantized gravitational waves hypothesis (QGW-Hyp) and the dimensional relativity hypothesis (DRH).** Research Gate preprint with DOI 10.13140/RG.2.2.13834.82881. URL1a (Research Gate main source), URL1b (Academia secondary source), URL1c (Vixra secondary source), URL1d (dragoii.com latest variant source).

[**2**] Andrei-Lucian Drăgoi (September 2016). (BIDUM 3.1 beta version – 24 pages – data) **A toy model of the universe based on a large numbers hypothesis inspired by Edward Teller – towards a TOE centered on life phenomenon.** Research Gate preprint. DOI: (see other related DOIs 10.13140/RG.2.2.23869.26082 [URL2] and 10.13140/RG.2.2.35013.65760/1 [URL2]). URL (Research Gate source).