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# The GeometroDynamic Model (GDM) of Reality in 80 THESES

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# BARAK PAPERS: Order of Reading

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This short introduction to the Barak collection of papers recommends the order of reading of the individual papers.

## THE CURRENT PARADIGM

The current paradigm, despite the successes of the excellent theories that construct it, quantum mechanics included, faces many obstacles. Many principles remain unproven, attributes of elementary particles cannot be derived and calculated, and mysteries are unresolved. This situation results from the lack of a deeper theoretical layer.

## THE GDM

To cope with the long-standing issues, and provide this missing theoretical layer, we have constructed a new theory - foundation - The GeometroDynamic Model of Reality (GDM). The GDM provides answers as to what are: **charge, an elementary particle, inertia, gravitation**, and relates to additional fundamental subjects. The GDM does not, at large, contradict the paradigm; it simply serves as a realistic and tangible New Foundation.

## GDM RESULTS

**Some results**, out of many published in the Barak papers, are presented here. The current foundations of physics, including the Standard Model and String Theory **fail** to provide such results.

### MASSES OF THE ELEMENTARY PARTICLES (See [2], cgs units)

#### Electron/Positron Mass

$$M_e = \frac{s^2 \sqrt{2}}{\pi(1 + \pi \alpha)} \cdot \sqrt{G^{-1} \alpha \hbar c^{-3}}$$

For the electron/positron charge, which is a white/black hole,  $s = 1$  ( $[s^2] = L^2 T^{-2}$ ) is light velocity at the event horizon, as the far-away observer measures.

$$M_e (\text{calculated}) = 0.91036 \cdot 10^{-27} \text{ gr}$$

$$M_e (\text{measured}) = 0.910938356(11) \cdot 10^{-27} \text{ gr}$$

A dimensionality check:  $[G^{-1}] = ML^{-3}T^2$   $[\alpha] = 1$   $[\hbar] = ML^2T^{-1}$   $[c^{-3}] = L^{-3}T^3$  Thus:

$$M = [s^2 \sqrt{G^{-1} \alpha \hbar c^{-3}}] = L^2 T^{-2} (ML^{-3} T^2 \cdot ML^2 T^{-1} \cdot L^{-3} T^3)^{1/2} = L^2 T^{-2} (M^2 L^{-4} T^4)^{1/2} = L^2 T^{-2} M L^{-2} T^2 = M$$

#### Muon/Anti-Muon Mass

$$M_\mu (\text{calculated}) = 112.5 \text{ Mev}/c^2$$

$$M_\mu (\text{experimental}) = 105.8 \text{ Mev}/c^2$$

#### Quarks/Anti- quarks Masses

$$M_d (\text{calculated}) = 9M_e = 4.5 M_e V/c^2$$

$$M_d (\text{measured}) = 4.8 \pm 0.5 M_e V/c^2$$

$$M_{\bar{u}} (\text{calculated}) = 4.5M_e = 2.25 M_e V/c^2$$

$$M_{\bar{u}} (\text{measured}) = 2.3 \pm 0.8 M_e V/c^2$$

## PROTON/ANTI-PROTON CHARGE RADIUS

$$r_p \text{ (calculated)} = 0.8774 \cdot 10^{-13} \text{ cm}$$

$$r_p \text{ (measured)} = 0.8768(69) \cdot 10^{-13} \text{ cm}$$

## THE EXTENDED GR EQUATION (See [4], cgs units)

Exploring the essence of electric charge, we found that by defining charge as nothing but curved space we are able to derive the entire Maxwellian Electromagnetic theory, without any phenomenology. This result enables us to extend Einstein's equation of General Relativity (GR) to become an equation that incorporates not only the energy/momentum tensor ( $T_m^{\mu\nu}$ ), but also the charge/current tensor ( $T_q^{\mu\nu}$ ).

$$R^{\mu\nu} - 1/2 R g^{\mu\nu} = 8\pi G/c^4 \cdot T_m^{\mu\nu} + 4\pi G^{1/2}/s^2 \cdot T_q^{\mu\nu}$$

where  $S = 1$  and  $[S] = LT^{-1}$

This equation becomes a macroscopic/microscopic equation of the entire physical reality. Charge and angular momentum are quantized and thus we predict that the curvature of spacetime is also quantized.

## THE GDM METHOD OF UNIFICATION (See [10])

The GDM **approach** to the issue of unification is as follows: **Instead** of adding spatial dimensions, which we consider a formal, even artificial, way of unification, we have explored the possibility that **all phenomena** have a common denominator. This common denominator turns out to be the **geometrodynamics of space**, since in the GDM **space is all there is**. Thus Riemannian geometry, applied to deformed spaces rather than to bent manifolds [6], becomes our mathematical tool to explore the reality.

## **BARAK PAPERS ON PHYSICS**

The papers can be found by inserting Shlomo Barak in the HAL Search:

HAL (<https://hal.archives-ouvertes.fr/>)

### **RECOMMENDED ORDER OF READING**

#### **The starting point:**

- [1] S. Barak: On the Essence of Electric Charge, Part 1: Charge as Deformed Space  
hal-01401332 (2016) <https://hal.archives-ouvertes.fr/hal-01401332>

A derivation and calculation of the elementary particles masses:

- [2] S. Barak: On the Essence of Electric Charge, Part 2: How Charge Curves Space  
hal-01402667v2 (2016) <https://hal.archives-ouvertes.fr/hal-01402667>

The nature of inertia – mass is merely a practicality:

- [3] S. Barak: On the Essence of Gravitation and Inertia, Part 1: Inertia and Free Fall  
of an Elementary Particle hal-01404143v5 (2016)  
<https://hal.archives-ouvertes.fr/hal-01404143v5>

The unification of gravitation and electromagnetism:

- [4] S. Barak: On the Essence of Gravitation and Inertia, Part 2: The Curving of Space  
by an Elementary Particle hal-01405460 (2016)  
<https://hal.archives-ouvertes.fr/hal-01405460>

Our new foundation – the GDM:

- [5] S. Barak: The Geometrodynamics of Space. hal-01435685 (2017)  
<https://hal.archives-ouvertes.fr/hal-01435685>

The GDM mathematics:

- [6] S. Barak: On Curved Manifolds and Deformed Spaces hal-01498435  
(2017) <https://hal.archives-ouvertes.fr/hal-01498435> to be revised

The strong force is electromagnetic:

- [7] S. Barak: Where is Anti-Matter? hal-01423547 (2016)  
<https://hal.archives-ouvertes.fr/hal-01423547>

The photon and quantum mechanics:

- [8] S. Barak: The Photon and the Quantum Enigma hal-01423548 (2016)  
<https://hal.archives-ouvertes.fr/hal-01423548>

Quantization of Gravitation:

- [9] S. Barak: The Graviton

On methods of unification:

- [10] S. Barak: The GeometroDynamic Model (GDM) Versus String Theory (ST)

On time:

- [11] S. Barak: Time is not Fundamental - unlike Distance and Velocity. hal-01502214  
(2017) <https://hal.archives-ouvertes.fr/hal-01502214>

Space as a special frame:

- [12] S. Barak: Space as a Special Frame and Starlight Aberration hal-01498454  
(2017) <https://hal.archives-ouvertes.fr/hal-01498454>

Dark Matter as a misconception:

- [13] S. Barak: An Overlooked Central Acceleration as an Alternative to Dark Matter  
hal-01471151v3 (2017) <<https://hal.archives-ouvertes.fr/hal-01471151v3>>

A continuation of [1]:

- [14] S. Barak: Electromagnetism as the Geometrodynamics of Space  
hal-01498448 (2017) <https://hal.archives-ouvertes.fr/hal-01498448>

## THE AUTHOR OF THESE PAPERS

Dr. Barak was born and lives in Israel.

He holds a Ph.D. in Physics from the Hebrew University of Jerusalem.

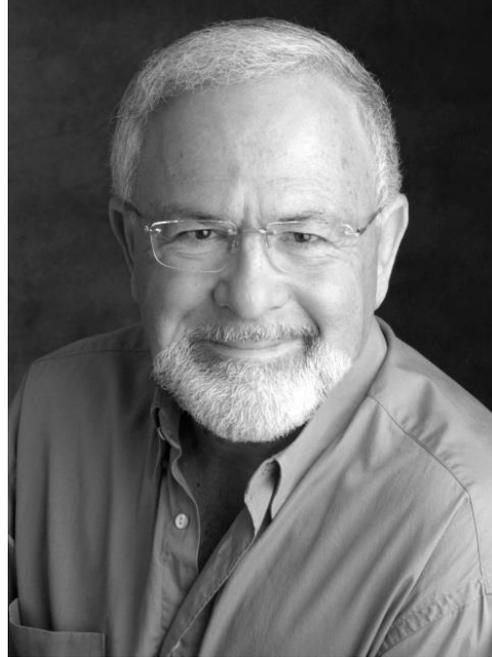
He contributed to the defense of his country.

He contributed to technology and to the economy of his country.

His contribution to science is this collection of papers.

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