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## EPOLA: A New Approach to the Fine Structure of Matter and Space

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### Article 6

## THE ALLEGED "DEPENDENCE OF MASS ON VELOCITY", ANOTHER MISINTERPRETATION OF MATHEMATICAL RESULTS THAT RUINED OUR PROSPECTS TO UNDERSTAND PHYSICS

**1. Mathematical Ways To Save the Ether By Sacrificing Basic Physical Concepts.** After trials to 'save the ether' by alleged "length contractions" or by "time dilations" in fast moving bodies (G.Fitzgerald, 1893, and H.A. Lorentz, 1895) that undermined the concepts of time and dimensions in natural physics (see [Article 5](#)), H.Poincare suggested (in 1901, and Lorentz in 1904) to give up Newton's concept that "mass is quantity of matter", as well as Lavoisier's Law of Mass Conservation, ("the most elaborately proven law of physics and chemistry"), the two pillars of natural physics, and to replace them by a "velocity-dependent mass" and by a speed of light that is a "universal constant", everywhere in all universes, forever.

Amazingly, all these physically unsound (*physis* means *nature* in ancient greek) but well-working mathematical approaches to save the ether were used by A.Einstein in 1905 to **bury** the ether concept, **revive** Newton's "*absolutely empty space*" and establish the physically wrong but mathematically well-working principles of special relativity. Einstein revived also Newton's **empty-space-based conclusion** that the velocity of light in optically denser materials is higher. Knowing that this was proven wrong for visible light, Einstein made the conclusion work by stating that it is right for the far ultraviolet, for X-rays, and for gamma-rays. When measurements in a certain radiational frequency range proved that the opposite is true, Einstein used (until 1916) to push over the validity of Newton's conclusion upon shorter frequency ranges, for which angles of refraction remained unmeasurable.

**2. The Alleged "Dependence of Mass on Velocity".** Using the Maxwell Equations and the Lorentz Transforms, A.Einstein made in 1905 his multipage very complicated mathematical derivation of the equation

$$m_v = m_e (1 - v^2 / c^2)^{-1/2} ,$$

for the apparent velocity-dependent mass  $m_v$  of an electron moving with velocity  $v$  in an electro-magnetic (EM) field. Einstein announced that this is a universal formula, valid for everything, everybody, forever. And the people said "amen", and textbooks and teachers force students to calculate the increase of masses in various vehicles, and everybody wonders why our wise daughters so seldom go into physics.

One may also wonder how is it that on the physical basis of the epola structure of space, we derived 80 years later the same formula as Einstein, who proclaimed the absolute emptiness of space (See the Book, Chapter 17, or the Paperback, Chapter 8). The answer is that both the Lorentz Transforms and the Maxwell Equations, used by Einstein, were derived for **the ether model of space**, so that anyone using them introduces into his derivation some features of this quasi-material ambient. Moreover, the Maxwell Equations were derived as a mathematical formulation of **Faraday's Dielectric Ether**, a *may well be* **prototype of our epola**.

**3. Faraday's Dielectric Ether and Our Epola.** Faraday's ether consisted of unidentified, discrete, electrically charged ("+" and "-") and magnetically active particles, elastically bound to one another by EM forces. This dielectric ether was established by Faraday as the *material carrier of EM forces, fields, and radiations*, and presented mathematically in the Maxwell Equations. Thus anyone using Maxwell's Equations, *volens nolens* introduces some features of Faraday's Dielectric Ether.

For example, the elastic binding between the discrete particles of Faraday's Dielectric Ether relates the velocity  $c$  of elastic waves in the medium to the elastic energy  $E$  per unit volume and the mass  $m$  per unit volume, by the formula  $c^2 = E / m$ . Choosing a unit volume that contains **one** pair of the "+" and "-" charged

particles, one should take for **E** the binding energy of the pair, and **m** for the mass of the pair. In the epola, the binding energy of an electron-positron (**epo**) pair is  $E=1.02\text{MeV}$  (1.02 million electron volt), and the mass of the pair is two electron masses,  $m=2m_e = 2*9.1*10^{31}$  kg. Substitution of these values to the formula (in SI units) yields  $c=300,000$  km/s.

**4. Einstein's Mass-Energy-Velocity Turnovers.** The  $c^2 = E/m$  formula was known to Faraday and is embedded in the Maxwell Equations. Einstein "fished" it out from there with the help of Lorentz Transforms, turned it over, right to left and left to right, and multiplied both sides by **m**, to obtain  $E=mc^2$ . Then he announced that this formula expresses the incredible "equivalence of mass and energy" (see [Article 3](#)). And the people said "Amen", and textbooks and teachers force students to calculate the full energy contents and equivalents of bodies, and everybody wonders why our wise daughters so seldom go into physics.

Though Einstein derived his formulas for an electron, he generalized them onto "*ponderable masses as well*", i.e., on bodies of atomic matter. He did it, as he did many other bad things, just by stating: "*We remark that these results as to the mass are also valid for ponderable material points, because a ponderable material point can be made into an electron (in our sense of the word) by the addition of an electric charge, no matter how small*".

This naive generalization is physically improper, for it does not consider the tremendous differences between bodies of atomic matter and the electrons, which are particles of nuclear matter, especially the quadrillion times higher density of matter in nuclear particles, and the density of electric charge in an electron that is quadrillions of a quadrillion times higher than in a strongly charged extended body of atomic matter.

It is true that the full extent of these differences could not be known to Einstein in 1905, when atoms were considered to be droplets of a positively charged liquid with tiny discrete electrons floating in them. However, even with this model, Einstein's generalization should not have been considered lawful. Provided that physical thinking was not overwhelmed by mathematical formulations and by the eagerness of people to extrapolate their findings upon everything, everywhere, and forever.

It is also true that these differences were slowly growing to their full extent during Einstein's mature life, thanks to, first of all, the pioneering work of Sir Ernest Rutherford (1871-1931), who invented terrific methods of getting through atomic matter with beams of nuclear particles, of counting the outcome of their scattering to discover the atomic nuclei and measure their femtometer sizes, who discovered the planetary structure of atoms and the incredible emptiness of atoms, which are proportionally a hundred times more empty, more space-like than the Solar System. Hence, already in or right after 1911, Einstein could withdraw at least his statement that "*a ponderable material point can be made into an electron*".

Instead, he and his apparatchiks developed wide attacks on Rutherford and everybody trying to give physical explanations to experimental results. Everything in which physics was not outshadowed by mathematical equilibristics or that contradicted the principles of the dictators of 'modern physics' was rejected outright by the math tutors who became referees and editors of physics journals. In the late 1920's, Rutherford wrote that those so called theoretical physicists "*have risen upon their hind legs, and it is up to us to put them back to where they belong*".

Then came the misuse of the 1932 C.D.Anderson experiments, in which the appearance in space of a free epo pair on absorption of a single 1.02 MeV gamma quantum, and the disappearance of the free pair on emission of this energy amount (in at least two quanta !) was presented as the first direct experimental proof of Einstein's "creation and annihilation" of the particles out of and into empty space, and of his mass-energy "equivalence" (See [Article 3](#)). All this, without a prove that the particles weren't in space before the absorption, and that they aren't there after the emission.

And the people said *Amen* and believed in the postulated statement of the magician that the pair of rabbits did not exist before their hokus-pocus "creation" out of the empty space, and does not exist after their pocus-hocus "annihilation" into the emptiness. Although all such miraculous phenomena can be explained by the

existence of the items in our space, in some compartments where they cannot be detected by our unaided senses. And although all observed miraculous phenomena of relativity and quantum theories are derived and explained by simple physics, based on the existence of the particles in epola bonds, where they cannot be detected by our unaided regular EM and optical means. Do we still wonder why our wise daughters so seldom go into physics?

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If you are interested to find out what the Epola model of space does and can do for the understanding of observed physical phenomena, I may recommend a close encounter with my book [Invitation to the Natural Physics of Matter, Space, and Radiation](#), World Scientific Publishing Co, 1994, (292 pages, ISBN 981-02-1649-1, can be ordered from Amazon.com or Barnes & Noble).

All mathematical derivations can be found in my Paperback, [The Electron-Positron Lattice Space, Cause of Relativity and Quantum Effects](#), Physics Section 5, The Hebrew University, Jerusalem 1990 (158 pages). The Paperback, as well as my popular Booklet, [The Story of Matter and Space](#), 1999 (70 pages,) can be ordered from Robi Guttman - [guttmans@netvision.net.il](mailto:guttmans@netvision.net.il)

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