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Research Article

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The Machinery of the Universe
A New Look At What Causes, Fields, Mass, Forces, Gravity, and What Is Energy

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Abstract
The start of the universe comprises two spheres brought together with the velocity of light c. One sphere is filled with negative basic particles having a charge of ⅓ of that of an electron, and the other with particles with a charge ⅓ of that of a positron. The first dumbbell shaped particles formed upon collision are very high-energy spinning photons essential for the formation of fields. A small part of the photons reacts with additional basic particles to form proto quarks and leptons. The proto particles will surround themselves with photons until the formation of u and d quarks, electrons and positrons. The polarisation of the photons embodies energy and therefor mass. Photons transmit forces and gravity. Observations do not give an Euclidean view of the universe.

Keywords: Forces, Fields, Mass, Energy, Structure of the Universe

Introduction

Dirac [1] and Feynman [2] both mentioned the lack of knowledge about the machinery of the universe. What follows is an attempt to fill this lack. In literature one can find that the universe started with a 17 cm diameter ball [3] with a mass of 1.5E53 kg for the observable part [4]. The crystal ball will explode for unknown reasons and then there is a Big Bang. But for an explosion you need two ingredients and an igniter. Therefore, it is proposed to split the ball into two 0.135 m diameter spheres, one containing densely packed basic particles with a charge with a charge ⅓ of that of an electron, and the other with particles with a charge ⅓ of that of a positron [5]. The ignition comprises that the two spheres are brought together with the velocity of light c

(Fig. 1). The result is the Big Bang the first dumbbell shaped particles formed upon collision are very high-energy spinning photons essential for the formation of fields.

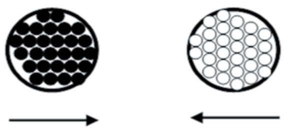

Figure 1: Colliding spheres of positive and negative particles at the start of the universe

The non-observable part of the universe is estimated as 250 times the observable part [6]. Hence the total mass of the universe becomes 3.75E55 kg, corresponding to an energy of 3.38E72 Joule. The volume of a sphere is 1.29E-3 m^3 of which 9.55E-4 m^3 basic particles [7]. The number of the particles within each sphere is dependent on the radius of the basic particles (Table 1). An energy of 3.38E72 Joule corresponds to radius 3.82E-26 m for the basic particles. This is the maximum radius for the basic particles required for the energy/mass in the universe. Fields are present everywhere in the universe. Hence, to generate all photons for the fields many more basic particles are required with a corresponding lower radius.

Table 1: Energy versus radius for basic particles

Basic particles				pair		universe
Radius	**Volume**	**Number**	**Circum-ference**	**Frequency**	**Energy**	**Energy**
m	m^3	In each sphere	m	1/s	J	J
10E-20	4.2-60	2.3E+56	6.3E-20	4.8E+27	3.2E-6	7.2E+50
10E-30	4.2E-90	2.3E+86	6.3E-30	4.8E+37	3.2E+4	7.2E+90
10E-40	4.2E-120	2.3E+116	6.3E-40	4.8E+47	3.2E+14	7.2E+130
10E-50	4.2E-150	2.3E+146	6.3E-50	4.8E+57	3.2E+24	7.2E+170

10E-60	4.2E-180	2.3E+176	6.3E-60	4.8E+67	3.2E+34	7.2E+210

Photons

The first particles formed after the collision are static photons having circumferential velocity equal to the velocity of light c. The frequency and energy of the photons can be calculated assuming the circumference is 2π times the radius of the basic particles. From the radius the volume of basic particles can be calculated and subsequently, knowing the volume of the sphere, the number of particles per sphere and the total energy per sphere.

The rule that nowhere the velocity of c can be exceeded must also apply to photons. The question that immediately arises is why the visible light and gamma ray photons we are familiar with move with velocity c. The explanation is that these photons have a relatively low energy compared with photons forming a field. Because the vector sum of the translational and the rotational velocity of a photon cannot be higher than c, this implies that such a field photon has hardly any translational velocity.

Planck's constant and the Formation of Proto – Quarks and Leptons

During the collision between the two spheres not only the velocity *c* will be established but also Planck's constant *h*. The static photons are the building blocks for all fields. A very small portion of these photons react with additional basic particles (Fig.2). One additional particle added results in a proto quark with a charge of ⅓ of that of an electron or of a positron. Adding an additional particle results in a proto quark with a charge of ⅔ of that of an electron or of a positron [5]. Yet another additional particle will result in a proto lepton. These proto particles are not stable. They must accommodate static photons to get the flavour of *u* and *d* quarks, electrons and positrons.

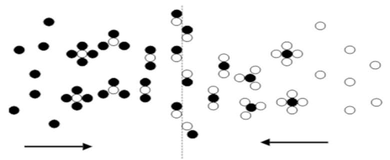

Figure 2: Initial formation of photons, proto-quarks and proto leptons from positive and negative basic particles

Fields

Almost all basic particles are used for the formation of fields. As the structure of the universe is determined by fields they must be present everywhere. Implicitly, there are no virgin static photons. They are all more or less polarised by celestial bodies. But as the universe is expanding the density of these static photons is diminishing over time. As yet it is not known how this will affect the behaviour of the universe.

Structure of the Universe

A problem with all attempts to get a good picture of the universe is that everything is based on optical observations. Gravitation lenses prove that there must be an infinite amount of gravitational prisming, which distort all optical data. Hence, it is very difficult to get an Euclidian picture of the universe at a a certain time moment. Nowhere space and time are so clearly intertwined as in the universe. For a good map of the universe a model is required that can then be gauged with observations. In this model the option of a symmetric universe with matter and antimatter must be taken into account [8].

Mass, Forces and Energy

Mass, forces and gravitation make themselves manifest by polarisation of the (almost) static photons around bodies. The polarization caused by mass comprises energy and therefor their relation. Acceleration of a bodies results in more polarisation. Polarisation can be considered as an embodiment for information as proposed by Eric Verlinde [9]. Last but not least polarisation is required to understand the machinery of the universe.

Inertial mass and gravitational mass lead to the same amount of polarization and underpin the Equivalence Principle. This also holds for antimatter when this has a negative gravitational mass [8]. A negative mass for antimatter is a requirement for its presence in the universe and proves the untenability of the Weak Equivalence Principle [10].

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