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A New Hypothesis Concerning the Big Bang

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ABSTRACT

Using the fact that the power P^g is a tangent function, this paper develops a hypothesis concerning the beginning of the Universe and the Big Bang. Everything starts from an initial singularity which contains infinite power. Further the mass and the diameter of the whole Universe is also calculated.

INTRODUCTION

A Vector-Hyper-Complex Number, representing an ideal particle, can be written as[1]:

$$p = t^g + iz + j\bar{y} + k\bar{x} \tag{1.1}$$

Where, $t^g + iz$ is the scalar part of this number, and $j\bar{y} + k\bar{x}$ represents the vector part. The symbols 1, i, j and k are fundamental units of H-numbers as defined in the reference paper[2]. The Table 1 shows the multiplication rules of the fundamental units.

Table1: Units' Multiplication Table

x	**1**	**i**	**j**	**k**
1	1	i	j	k
i	i	-1	-k	j
j	j	-k	-1	i
k	k	j	i	1

The four parameters of the particle's representation are time (t^g), mass (z), the momentum ($\bar{y}$) and the space ($\bar{x}$). The space and momentum are vectors in the 3d Euclidean space. The geometrized system of units[3] (GU) enables to express all these parameters using a common unit, meter, as shown below in the Table 2.

Table 2: The conversion of international system of units (SI) to geometrized system of units (GU); c is the velocity of light and G gravitational constant, as seen in reference[4].

z	GU		SI		Conversion
	symbol	unit	symbol	unit	SI↔GU
Length	x	m	l	m	1↔1
Time	t^g	m	t	s	$c \leftrightarrow c^{-1}$ $2.998x10^{8} \leftrightarrow 3.335x10^{-9}$
Velocity	v^g	none	v	ms^{-1}	$c^{-1} \leftrightarrow c$ $3.335x10^{-9} \leftrightarrow 2.998x10^{8}$
Mass	z	m	m	Kg	$Gc^{-2} \leftrightarrow G^{-1}c^{2}$ $7.424x10^{-28} \leftrightarrow 1.347x10^{27}$
Momentum	y	m	p	$Kgms^{-1}$	$Gc^{-3} \leftrightarrow G^{-1}c^{3}$ $2.477x10^{-36} \leftrightarrow 4.037x10^{35}$
Force	F^g	none	F	N	$Gc^{-4} \leftrightarrow G^{-1}c^{4}$ $8.257x10^{-45} \leftrightarrow 1.211x10^{44}$

Power	P^g	none	P	W	$Gc^{-5} \leftrightarrow G^{-1}c^5$ $2.755x10^{-53} \leftrightarrow 3.629x10^{52}$

As can be easily seen the velocity (v^g), force (F^g) and power (P^g) are dimensionless.

The Power, as defined in GU, is in fact the mass flow. The mass flow (μ), is expressed in SI in Kgs^{-1}, when refers only to displacement of masses. Simultaneously any mass flow is representing power in the classical sense, because the mass is equivalent to energy. If we consider a mass flow $\mu=1\ kgs^{-1}$, then this represents also a power $P= 8.988x10^{16}$ W. Both values correspond to a unique P^g of $2.477x10^{-36}$. The conversion coefficients to GU for mass flow and power are $K_\mu = 2.477x10^{-36}$and $K_p = 2.755x10^{-53}$.

THE POWER OF PARTICLES

The Coordinate Transformations

A particle in the **"space-rest frame"** has an evolution line which remains in the complex plane[1], C. The time measured by an observer attached to this frame, is called the proper time. The mass of the particle represents evidently the rest mass. The corresponding H-number has the following expression:

$$p_0 = t_0^g + iz_0 \tag{2.1}$$

The coordinate transformations of this H-numbers occur by multiplication with unit multipliers[5] as it follows:

a. The rotor with imaginary argument is, by definition, a pure scalar

$$e^{i\alpha} = cos\,\alpha + i\,sin\,\alpha$$

b. The rotor with co-imaginary argument contains a vector part:

$$e^{j\bar{\beta}} = cos\,\beta + j\bar{u}\,sin\,\beta$$

c. The pseudo-rotor with co-real argument contains a vector part, too:

$$e^{k\bar{\chi}} = cosh\,\chi + k\bar{u}\,sinh\,\chi$$

Where $\bar{u}$ is an arbitrary unit vector in the tridimensional Euclidean space. For particle with the constant rest mass, it obtains[5]:

$$P^g = tan\alpha;\ \bar{F}^g = \bar{u}tan\beta;\ \bar{v}^g = \bar{u}tanh\gamma \tag{2.2}$$

Addition of Powers

As it shown in the equations (2.2) the mass flow, or the power of a particle, may be written as

$$P^g = tan\alpha \tag{2.3}$$

Let us consider a set of different powers:

$$P_1^g = tan\alpha_1 ; P_2^g = tan\alpha_2 ; \dots\dots\dots\dots\dots\dots P_n^g = tan\alpha_n \quad (2.4)$$

The superposition of the powers above, means the addition of the imaginary arguments:

$$\alpha = \sum_{i=1}^{n} \alpha_i \quad (2.5)$$

Consequently, the resulting power can be written as it follows:

$$P_{total}^g = tan\alpha = \tan(\sum_{i=1}^{n} arctanP_i^g) \quad (2.6)$$

Because the value of P^g is usually verry small, the expression (2.6) reduces to an algebraical addition, in most of the cases, i.e.

$$P_{total}^g \approx \sum_{i=1}^{n} P_i^g \quad (2.7)$$

In order to have an idea about how awfully small is the power expressed in GU, even for cosmic objects, let's calculate the power (P^g) of a quasar. The quasar represents the ultimate sources of power in the universe. This power[6] is in the range of 10^{37} W to 10^{39} W.

The corresponding quasar's power expressed in GU is obtained multiplying by the factor K_P, mentioned above in the chapter Introduction, and lies within the range of 10^{-16} to 10^{-14}.

In the particular case involving the superposition of only two powers, the equation (2.6) becoms[5]

$$P_{total}^g = \frac{P_1^g + P_2^g}{1 - P_1^g P_2^g} \quad (2.8)$$

If the denominator of the expression shown above is zero, then the resulting power P^g becomes an infinite number. Reciprocally, the infinite power could split, for example, in two finite powers $P_1^g = P_2^g = 1$.

In general, there is possible that a superposition of a set of finite powers result in an infinite total power. This happens when the resulting α, shown in the equation (2.5), becomes: $\frac{\pi}{2} = 1.571\ Rad$.

It is also possible that an infinite power transforms in a set of finite powers.

Hypothetically, the infinite power is contained in a kernel which has no proper time flow:

$$\frac{dz}{dt} = tan\frac{\pi}{2} = \pm\infty \text{ i.e. } dt = 0 .$$

BIRTH OF THE UNIVERSE, ITS MASS AND SIZE

At the Beginning

Abbe Lemaitre has published, in 1931 in the Journal Nature, a short paper called, "The beginning of the world from the point of view of quantum theory." (see reference[8]). He has developed, for the first time in Cosmology, the hypothesis that the Universe originated from an initial quantum which existed before there was Space and Time. He said that all the energy of the future Universe was packed in it. This theory was called latter "the Big Bang", and is actually largely accepted in Physics and Cosmology. However, a mystery remains. What initiated the primordial explosion?

Is interesting to mention that fifty years earlier[9] a similar birth of the Universe was described by the genial Romanian poet, Mihai Eminescu:

When the things were not enshrouded, even though they were concealed...

……

But, behold! A point is moving, the first, solitary crumb

And the chaos will be mother, while He Father will become.

And that point, always in motion, smaller than the drop of foam,

Is the just and mighty ruler of the huge heavenly dome...

Since then, the eternal darkness has been splitting every day,

(Letter 1, Mihai Eminescu in translation of Octavian Cocoș)

The Initial Point Containing an Infinite Power; An Alternate Big Bang Hypothesis

Our hypothesis[5] presumes that at the beginning there was an initial kernel containing an infinite power, $P^g = +\infty$.

We make the following assumptions:

a. The Big Bang began 13.8 billons years ago[7], so the age of the universe, t_U, is 4.32×10^{17} seconds.
b. The source was a singularity which contained an infinite power and consequently it had no proper time flow.
c. At the initial moment the singularity's power split into n finite powers $P_n^g = tan\frac{\pi}{2n}$, and consequently the limit of total emerging power is $P_{emerging}^g = \frac{\pi}{2} = 1.571$.
d. Since then, the power flows uniformly in all directions, creating the web of Space and Time, i: e. the Universe.

The Mass of The Whole Universe

Knowing the total emerging mass flow and the age of the Universe, the total mass of the Universe (M_U) can be calculated, as it follows:

$$M_U = \mu_{emerging} x\ t_U \tag{3.1}$$

Where $\mu_{emerging}$ is the mass flow emerging from the singularity, and t_U is the age of the Universe. The value of the emerging mass flow expressed in Kgs^{-1} is:

$$\mu_{emerging=P^{g}_{emerging}} X\frac{1}{k_{\mu}} = 1.571\ x4.037x10^{35} = 6.341x10^{35}Kgs^{-1} \quad (3.2)$$

Replacing in the equation (3.1) it obtains the actual mass of the entire Universe:

$$M_U = 2.74x10^{53}Kg \quad (3.3)$$

The Density, Content and Diameter of The Whole Universe

The actually accepted Big Bang model requires that the density of the mass (energy) in Universe should be equal to critical density: $\rho_{critical} = 9.9x10^{-27}Kgm^{-3}$.

In according to reference[7], the matter is composed of: ordinary or baryonic matter (4.9%), dark matter (26.8%) and dark energy (68.3%).

If the actual density of the Universe is the critical density, mentioned above, then the volume results from the following calculation:

$$V_U = \frac{M_U}{\rho_{critical}} = 2.77x10^{79}\ m^3 \quad (3.4)$$

But the volume[7] of the observable Universe, as measured by astronomists, appears to be more than ten times bigger, $V_{obs} = 3.566x10^{80}$.

The conclusion is that our hypothesis of "the infinite power singularity" and the critical density of the Universe (required by actually accepted Big Bang model) are incompatible.

We must add to assumptions made in the paragraph 3.2, the following one:

e. The mass spread in the expanding Universe is the regular or the baryonic matter. We may presume that is the only type of existent mass.

In order to measure the density of the Universe, cosmologists sample a region where the Universe becomes approximately homogeneous. By measuring the volume of this region and evaluating the mass of the matter it contains, they can calculate the density. As it is shown above, the Big Bang model predicts a density of the regular matter of about $5x10^{-28}Kgm^{-3}$.

But the measured density lies within the range of $2x10^{-28}$ and $3x10^{-28}$ Kgm^{-3}. This discrepancy[10] is known as "the missing baryon problem". The new introduced assumption solves this problem by default, and so the Gordian knot is cut.

The present paper just takes the measured values of the density for further calculation. It is widely estimated[7,11,13,14] that the total mass of ordinary matter (M_{obs}) in the observable

universe is on the order of 10^{53} Kg. Considering the value of the volume (V_{obs}), we arrive to a baryonic mass density of:

$$\rho_{baryonic} \approx 3x10^{-28} Kgm^{-3} \tag{3.5}$$

The following relationships are further valid:

$$\frac{M_U}{M_{obs}} = \frac{V_U}{V_{obs}} = \frac{D_U^3}{D_{o3bs}^3} = 2.74 \tag{3.6}$$

Where M, V and D signify the mass, the volume and the diameter.

Processing it obtains:

$$\frac{D_U}{D_{obs}} = \sqrt[3]{2.74} = 1.4 \tag{3.7}$$

This enables the calculation of the diameter of the whole Universe, knowing that the diameter of the observable universe[7] amounts to $8.8x10^{26}$ m.

$$D_U = 12{,}32x10^{26} \text{ m}$$

Conclusion

The author agrees that the hypothesis of the "infinite power initial singularity" is well off the beaten path, but is only one of quite a few. Actual cosmological theories and measurements have no clear ideas about the dimension of the whole Universe. Its size is unknown and may be infinite or, why not, finite as our hypothesis has just shown.

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