Two Significant Cosmological Masses

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Abstract: From a logical starting point that a whole and parts are immanently depandant on each other, I have calculated two masses significant for cosmology. The question of significance of these masses can be answered by astrophysicists.

Keywords: hypothetical mass quantum, number of Planck oscillations, star

Introduction

The Universe, as I see it, is Machian and to describe it all we need are mathematical constants, primarily number ***2***, π and ***e***. The same reasoning can be applied in nature, on both micro and macro physical quantities. My articles, largely focused on micro relations and on the relations between micro and macro proportions are freely available at *GSJ* and *viXra*. Here I will use practically the same formulas for cosmic proportions.

Let's define any mass $\mathbf{m_x}$ as the product of hypothetical mass quantum $\mathbf{m_q}$ with formula:

$$m_x = m_q * N^{1-1/x\pi} \qquad \textbf{(1)}$$

where from [1] and [2] we get:

π=3.14159...;

m_q=2.7233883E-69 kg - hypothetical mass quantum

N=6.3871E+121 - number of Planck oscillations

We can also define a mass of a structure by formula (2), where it is assumed that **k** is the coefficient for structure's shape (e.g. for **k=4π/3** we have a sphere).

$$m = k * m_q * N^{1-1/k} \qquad \textbf{(2)}$$

Let's suppose the possibility of existence of a special structure in the Universe for which the following is true:

$$\mathbf{m_x = m} \qquad \textbf{(3)}$$

By shortening (1), (2) and (3) we get:

$$N^{-1/x\pi} = k * N^{-1/k} \qquad \textbf{(4)}$$

Let's also assume the following simple relation between **x** and **k**:

$$k = 16/[3\log_2(16/x)] \qquad \textbf{(5)}$$

By inserting (5) in (4) and editing, we get the formula (6):

$$16\pi * \mathrm{N}^{1/\,x\pi - 3\log_2(16/x)/16\pi} / [3\log_2(16/x)] = 1 \qquad \textbf{(6)}$$

Thanks to the Wolfram alpha software, we get two solutions for **(6):**

X_1=1.70107412535636

X_2=9.55018137453392

If we insert these values **X_1, X_2** in (1) we get the corresponding masses:

$$m_1 = m_q * N^{1-1/(x1*\pi)} = 2.804484\mathrm{E}+30\ \mathrm{kg} \qquad \textbf{(7)}$$

$$m_2 = m_q * N^{1-1/(x2*\pi)} = 1.515693\mathrm{E}+49\ \mathrm{kg} \qquad \textbf{(8)}$$

Which leads us to:

Hypothesis I: Masses $\mathbf{m_1}$ and $\mathbf{m_2}$ have special importance in cosmology.

It is evident that the first mass, $\mathbf{m_1}$, is in the domain of stellar masses, while the second mass, $\mathbf{m_2}$, is possibly the biggest structure in the Universe. The question weather masses in (7) and (8) have significance in cosmology I am leaving to astrophysicists. Here I will discuss just the possibility that formula (5) is not mere speculation and that it has a rational ground:

- Formula (5) contains all the basic mathematical constants mentioned in the beginning, i.e. ***2***, π and ***e*. Two "2"** is contained in **$16=2^4$** and in the logarithm for base **2**, π is within the formula (1), while ***e*** is contained in **N**.

- By inserting **X_1** in (5) we get **K_1=5.18165488**, which is a spheroid shape. By inserting **X_2** in (5) we get **K_2=22.5061034**, which is the shape of a highly stretched sphere. Weather these are expected structures for masses from (7) and (8) is again a questions I am leaving to astrophysicists.

- Transition from formula (1) to formula (2) is in fact the transition from expressing the mass without shape, as the product of hypothetical mass quantum, to the mass whose structure adopts a shape (expressed through **k**). That transition has to have its logic, while the formula (5) is a very likely candidate for mathematical description of that transition.

I should emphasize that this is just the first step in the accretion process. The next step could for example be the division of constant **k** in the formula (2) into **k1** and **k2** in the product, i.e. in the exponent. It is imporant to retain the rational approach and to use the mathematical constants ***2***, π and ***e*** from the idealized mass towards real masses and structures.

This stance is true for all the levels of organization of matter, that's how the importance of number **2** is evident in relations regarding the average density of planets [3] and in relations among characteristic volumes of matter in article [4].

Conclusion

Expressed exclusively in relational terms, this theory is Machian. The assumption is that in cosmological proportions there are significant masses just like in micro proportions there are significant masses, such as for example Planck's mass. Two such masses have been obtained.

This article contains no physical explanations, as I believe that relations between the whole and its parts are more general than physical laws and phenomena. Everything in the Universe is the product of immanent relations governing it. Actually, physical constants are the product of the unity of the whole and are evident and can be explained through relations in which they appear and through physical laws arising from them.

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References:

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