

The 95% missing mass of the universe.

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Abstract

The Big Bang theory is the prevailing theory in cosmology. But it is facing an awkward situation. It can account for only 5% of the mass in the universe. This is the mass of the visible universe. The other 95% of the mass in the universe is unknown or “dark”.

In this paper, I suggest a modification to the BB that can solve this conundrum.

Current status of cosmology

Dark matter (DM) and dark energy (DE) are two hypotheses suggested by scientists to explain observations of the universe. The hypothesis of DM solves mathematically the observations. The calculated mass of DM comprises ~25% of the total mass in the universe. However, a near-century search for DM has not produced any results.

DE is an unknown form of energy that affects the universe at its largest scales. It has been hypothesized by cosmologists to account for the observations which show the universe going through an accelerated period of expansion. DE, like DM, has not been observed in the universe for more than two decades. The calculated mass of DE comprises ~70% of the total mass in the universe.

Current cosmologists that are proponents of the Big Bang theory (BB) are facing an awkward situation. Despite the huge advancement in science, excellent scientists, techniques, and instrumentations they can explain only ~5% of the mass in the universe. This is the mass of the visible matter. The other 95% of the mass in the universe is unknown.

It seems that although the BB is flawed scientists still cling to this theory. There is one important verified observation, which is cosmic microwave radiation (CMBR). CMBR supports the main hypothesis of the BB, namely that the universe started 13.7 billion years ago with an explosion of a singularity point.

Current status dark matter:

The dark matter hypothesis was suggested by scientists to explain cosmological observations. The first that coined this term was Fritz Zwicky, in 1933, to explain observed galaxies velocities of the Coma cluster. He estimated that the mass of the cluster is much more than the total mass of galaxies that were visually observed. He hypothesized that there is an additional mass hidden from view in the universe which he called dark matter.

The same conclusion of DM existence was given by Vera Rubin and coworkers in 1978, based on measurements of star velocities in galaxies. She found that the velocity curves of stars orbiting the

center of the galaxy are flat, no matter the distance of the star from the center. This finding contradicts Kepler's observation in the solar system where the farther a planet is from the Sun its velocity gets smaller. If Kepler's law is used in a galaxy the outer stars should have been ejected from the galaxy. However, this is not the case as galaxies seem to be stable. Also, in this case, the existence of additional DM can explain the flattening curve of stars in galaxies. The DM hypothesis claims that DM reacts with ordinary matter only by gravity and it has been calculated that 85% of matter in the universe is DM whereas 15% is ordinary matter i.e., 5 times more dark matter than ordinary matter.

For nearly a century, many experiments to detect DM have been done, some by satellites observing space in and around galaxies and some located deep below the surface of Earth. However, so far, all of them failed. This raises serious doubt about the validity of the BB theory.

Current status dark energy:

Dark energy is an unknown form of energy that affects the universe at its largest scales. It has been hypothesized by cosmologists to account for the observations which show the universe is going through an accelerated period of expansion. The accelerated expansion of the universe came as a surprise to the scientific community. This happened in 1998 when two separate research teams measured High-Z shift Supernovas. The aim was to measure cosmic deceleration and global curvature. In their calculation, they used Hubble's constant. They found that the universe is expanding not in a linear ratio, but rather accelerating. For this discovery, the two teams received the Nobel prize in 2011.

To explain the accelerated expansion of the universe an energy source is needed. This energy is called dark energy (DE). A suggestion was that the vacuum space energy, which has been confirmed in quantum physics, is DE. However, calculated DE Vs. measured vacuum space energy results in an unreasonable discrepancy: 10^{120} . So, the nature of DE is unknown.

I claim that the accelerated expansion of the universe is doubtful because it is based on Hubble's law i.e., that the universe is expanding. For more than a decade Hubble's constant measurements show that there are two distinct values of this constant. This has risen a crisis in cosmology, that as of today, has not been resolved.

The structure of the Pivot universe

The Pivot structure explains DM, DE, and CMBR.

I concur with the claim of the BB theory that our visible universe started with an explosion. However, this explosion was not of a singularity point that had a very high temperature and infinite density, but rather of a huge spinning primeval neutron star. I object to the BB claim that before the explosion there was nothing and that space, time, and matter originated simultaneously from the BB explosion. On the other hand, I concur with Newton's hypothesis that stated: 1. Space is eternal, absolute, infinite, and permeates everywhere in the universe. It exists without relating to the matter. 2. Time is eternal, absolute, and passes without relating to anything. 3. The matter universe is an isolated island in space.

I modify Newton's description to include theories that were not known at his time. For example, the density of neutrons, all celestial bodies are spinning on their axis, and space near a celestial is framed-dragged.

This primeval neutron star was built gradually in space from the accumulation of neutrons that originated from the infinite vacuum energy. My conjecture of how it was done is described in [The origin of matter](#).

Although the vacuum energy is infinite the primeval neutron star did not grow without limits. Its growth was limited by physical parameters. I use two parameters: 1) Maximum density observed in the universe - this is the density of the neutron $\sim 7.8 \cdot 10^{17} \text{ kg/m}^3$. 2) Maximum acceleration possible in the universe $\sim 1.6 \cdot 10^{20} \text{ m/sec}^2$. From these two parameters, the mass and size of the primeval neutron star can be calculated. The mass of the primeval was $1.24 \cdot 10^{54} \text{ kg}$ and its radius $7.24 \cdot 10^8 \text{ km}$. The calculation is detailed in paragraph 3 – "The Primeval Universe" of [The structure of the Pivot Universe](#).

When the primeval neutron star reached the maximum acceleration possible in the universe it exploded into two distinct parts. The major part of the spinning neutron star stayed in its place, I designate it as the Pivot, and the other part, the visible universe, flung off tangentially and started to orbit the Pivot on the equatorial plane of the Pivot in the shape of a flat disk. This description is contrary to the BB theory that claims that after the explosion all matter moved radially in all directions.

The mass of the Pivot and the mass of the visible universe are calculated based on mass conservation law and angular momentum conservation law. The Pivot mass is $7.82 \cdot 10^{53} \text{ kg}$ and the mass of the visible universe is $4.3 \cdot 10^{53} \text{ kg}$. The ratio between the Pivot mass and the mass of the visible universe is ~ 1.8 . The calculations are detailed in paragraph 4. "The structure of the Pivot Universe" of [The structure of the Pivot Universe](#).

The structure of the Pivot Universe is simple and resembles other structures observed in the universe, i.e., a central massive celestial body and other smaller celestial bodies orbiting it. For example, this is the structure of the solar system and the structure of galaxies. However, the structure of the Pivot universe is not so simple. It was mentioned above that from GR's point of view the Pivot is a spinning black hole. In this case, according to GR space is frame dragged by the Pivot. GR's conclusions must be included in the structure of the universe. The description of the Pivot as a black hole also explains why no radiation can escape from the Pivot. On the other hand, the gravity of the neutron star, inside the black hole, can cross the event horizon and influence celestial bodies around it. From the description above one may wonder if the Pivot is a neutron star or a black hole. I claim that a black hole and a neutron star are the same. What makes the difference between them is the event horizon. The event horizon of the black hole is bigger than its physical radius, whereas the neutron star has a physical radius that is bigger than its event horizon. See: [Is a black hole a neutron star?](#)

Note: The calculated physical radius of the Pivot is $6.2 \cdot 10^8 \text{ km}$, whereas its event horizon is 122.8 billion light years. For comparison purposes only, the distance of Jupiter from the Sun is $7.8 \cdot 10^8 \text{ km}$.

This size of the Pivot is impressive, but it is dwarfed when compared to its event horizon. The ratio is $6.2 \cdot 10^8 \text{ km} / 122.8 \text{ billion light years} = \sim 5 \cdot 10^{-16}$.

The Pivot structure and dark energy:

I claim that the accelerated expansion of the universe is not valid because it is based on the flawed Hubble's constant. For more than a decade accurate Hubble's constant measurements have risen a crisis in cosmology. I relate in detail to Hubble's law and its constant crisis: [Is there an explanation for Hubble's constant crisis?](#)

I claim that there is no expansion of the universe as Hubble predicted, nor accelerated universe's expansion, therefore dark energy does not exist.

The Pivot structure Verification

A scientific theory must explain all observations and measurements. A great part of my hypothesis relates to the verification of cosmological observations. For example:

1. [Spiral galaxies - explanation for their shape and the velocity curve flattening](#)
2. [Does the JWST disprove the Big Bang?](#)
3. [The conundrum of handedness direction of rotation of galaxies](#)

Summary

In this paper, I suggest a structure of the universe I designate the Pivot universe. This structure relates to the above-mentioned issues:

- 1) **The CMBR is the remnant of the BB explosion.** I agree with BB's claim that the universe started with an explosion. However, contrary to BB which hypothesizes that the explosion was of a singularity point with infinite density, I claim that the explosion was of a massive primeval spinning neutron star.
- 2) **The DM resides in the Pivot.** According to GR, the Pivot is a spinning black hole, therefore, an observer located in the visible universe outside the event horizon, cannot see the Pivot. That explains why DM is not observable.
- 3) **There is no DE** because rotating the Pivot does not need additional energy. It resembles the situation in which planets orbit the sun without additional energy and stars orbit the center of a galaxy.