Is the universe spinning?

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Abstract

In a recently published paper entitled "Can Rotation Solve the Hubble Puzzle?", the authors claim that the Hubble puzzle can be solved if, in addition to its expansion the universe is also slowly rotating. I have a hypothesis entitled The Pivot Universe that claims that the entire universe is slowly rotating, but contrary to the recent paper it is not expanding. My hypothesis differs in several points from the paper mentioned above.

Highlights of the recent paper

In a paper, dated 19 March 2025, which was published by Balazs Endre Szigeti, et al. the authors claim that if the universe is slowly rotating in addition to the verified expanding universe - this can solve the Hubble puzzle. See: https://arxiv.org/abs/2503.13525

1) Proposed Model: The paper suggests a "Gödel inspired slowly rotating dark-fluid variant of the concordance model".
2) Purpose: This rotation is proposed as a novel solution to the "Hubble puzzle" or "Hubble tension", or "Hubble crisis", which is the discrepancy between measurements of the universe's expansion rate at different times. The Hubble puzzle is that Hubble's constant, according to present-day observations, is not a constant but has two values, depending on the method it is measured. It is to be noted that the Hubble constant is a pillar of the current model of the universe.
3) Calculated Rotation: The authors calculate a present-day angular velocity for the universe ($\omega_o \simeq 2 \times 10^{-3}$ Gyr^{-1}). They note this value is close to the maximal possible rotation that avoids theoretical issues like closed time-like loops. They note that the rotation is superimposed on the value of the expanding universe.
4) The calculations in this paper are done in the classical framework of fluid dynamics and are sufficient for an initial estimation of rotational effects on the Hubble constant. They leave general relativistic considerations for future work.

The Pivot Universe hypothesis

The Pivot universe hypothesis describes a spinning universe. In a nutshell, our matter universe contains a central massive celestial body and a visible matter universe in the shape of a flat disk that includes galaxies, stars, planets, and dust, that orbit this central celestial body. Without elaborating here, this central celestial body is a Kerr rotating black hole. The structure of the Pivot Universe is described in **[1]**

The Pivot hypothesis differs from the recent paper on the following points:

1) The Godel universe rotates but has no specific axis of rotation. The Pivot universe has a defined axis of rotation. The universe axis is the axis of the spinning central black hole. The Pivot model is based on the Kerr solution of GR equations.
2) The current paper assumes that the universe is expanding according to Hubble's law and at the same time slowly rotates. I claim that Hubble's law is not correct. The reason for the observed velocities measured between galaxies is because they are orbiting the Pivot at different radiuses. This resembles the differences in velocities of planets in the solar system. If you want to delve into Hubble's crisis, see **[2]** and **[3].**
3) I rely on a measurement done by Paul Birch in 1982. He measured and calculated the angular velocity of the universe to be $\omega_o \simeq 1\times 10^{-13}\ yr^{-1} = 1\times 10^{-4}\ Gyr^{-1}$ **[4].** Compare Birch's number to the angular velocity of the recent paper, $\omega_o \simeq 2 \times 10^{-3}\ Gyr^{-1}$.
4) In the recent paper, the authors use the classical framework of Euler-Poisson in fluid dynamics. In the Pivot universe, I use the equations of GR to calculate the shape and dimensions of our matter universe. One of the most important predictions of GR is the frame-dragging of space by any rotating celestial body. Note: Frame-dragging by Earth was verified by the Gravity Probe B experiment – the results were found miniscule. But around black holes, the frame-dragging is substantially high. The approach of GR's frame-dragging enables the solution.
   I argue that the shape and dimensions of the universe can also be described and calculated by Navier-Stokes-Poisson fluid dynamics. **[5].**
   Note: The difference between the Euler-Poisson system and Navier- Stokes-Poisson system is that the first describes an **ideal compressible self-gravitating fluid** whereas the Navier- Stokes-Poisson system describes a **real, viscous, self-gravitating fluid**.

References

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