The Cosmic Asymmetry Black Hole Cosmological Model: An Alternative Approach to the Structure of the Universe

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Abstract

This paper presents a speculative yet mathematically consistent cosmological model that describes our universe as a spacetime region formed inside a rotating (Kerr-type) black hole within a larger "parent" universe Popławski (2010, 2025). The model is based on Popławski's black hole cosmology using an extension of general relativity to the Einstein–Cartan theory, where torsion induces a nonsingular bounce through gravitational repulsion originating from fermion spin, creating a new expanding universe behind the inner horizon instead of a singularity Hehl et al. (1976); Popławski (2025).

Key elements of the model are: (i) an eccentric observer position due to the inner Kerr metric, which produces inherent asymmetry in the cosmic microwave background (CMB) and galaxy distribution; (ii) the CMB is not a primordial relic but a distorted imprint of Hawking-like infalling radiation from the inner horizon, which permeates spacetime as an omnipresent inherent temperature and sustains expansion via radiation pressure without requiring dark energy; (iii) global vorticity ($\omega \approx 6{,}11 \times 10^{-27}\,\mathrm{s}^{-1}$) is a remnant inherited from the parent black hole's spin ($a \approx 0{,}998 \to 0{,}8$), modulated by episodic mergers and accretion, causing spiral perturbations and galaxy rotation asymmetry LIGO-Virgo-KAGRA Collaboration (2025); Event Horizon Telescope Collaboration (2025).

The model requires no dark matter: baryonic perturbations and vorticity are sufficient for structure formation. The true size of the universe is smaller ($R_{\text{final}} \approx 1{,}5 \times 10^{10}$ light-years), but distortions in the inner metric (time dilation $\approx 1{,}118$, local curvature $k \approx 0{,}08$, spiral light paths) produce an apparent horizon roughly three times larger, consistent with observed distances JWST Advanced Deep Extragalactic Survey (JADES).

Updated with 2025 data: the JWST JADES survey (Shamir 2025) Shamir (2025) shows a ∼60–66% preference for clockwise galaxy rotation that strengthens with redshift (more pronounced at $z > 10$), with a dipole-like axis close to the CMB dipole (370 km/s drift) and the Cold Spot direction Planck Collaboration (2018b). This suggests inherent asymmetry rather than mere detection bias (although criticisms—e.g., Iye et al. 2021 Iye et al. (2021), Tadaki et al. 2020 Tadaki et al.

(2020)—raise the possibility of bias). The Hubble tension (local ∼73 km/s/Mpc vs. early ∼67 km/s/Mpc) Riess et al. (2022); Hubble Tension Review Panel (2025) is explained by inner distortions, and JWST strong-lensing measurements are consistent with the model's alternative expansion.

Planck 2024 data ($\Omega_K \approx -0{,}012 \pm 0{,}010$) Planck Collaboration (2024) support a flat universe, so positive curvature is treated locally (induced by the accretion disk), assuming globally near-flat spacetime. The torsion correction (Popławski 2025) Popławski (2025) yields a finite bounce density ($\sim 10^{92}$ kg/m³) with quantum-gravitational repulsion. EHT 2025 spin measurements (M87* ∼80–90% of maximal spin, polarization flips) Event Horizon Telescope Collaboration (2025) support spin evolution.

Detailed calculations are provided for the universe size derived from the CMB temperature ($T_{\mathrm{CMB}} = 2{,}725$ K) using a geometric mean model based on the Planck length, incorporating time dilation, curvature, eccentric offset ($d_{\mathrm{offset}}/R_{\mathrm{final}} \approx 0{,}11\%$), global vorticity, and spin evolution (episodic mergers causing ∼30% reduction) LIGO-Virgo-KAGRA Collaboration (2025). The model is testable with upcoming Euclid 2026+ galaxy spin data and LiteBIRD CMB polarization data: inherent B-mode asymmetry or vorticity evolution could confirm it Euclid Consortium (2026); LiteBIRD Collaboration (2026).

Although speculative (torsion bounce is not mainstream, Shamir's results are debated), the model offers an elegant alternative to ΛCDM anomalies without dark components. Future observations will decide.

Keywords

black hole cosmology, Kerr metric, Einstein–Cartan theory, torsion, nonsingular bounce, CMB asymmetry, dipole anomaly, lopsided universe, galaxy rotation asymmetry, vorticity, spin evolution, Hubble tension, exclusion of dark energy, exclusion of dark matter, eccentric observer position, radiation pressure, JWST JADES, Planck 2024, LiteBIRD, Euclid

Contents

1 Introduction

The standard cosmological model, ΛCDM (Lambda Cold Dark Matter), has been remarkably successful over recent decades in explaining observations, from the isotropy of the cosmic microwave background (CMB) Smoot et al. (1992); Bennett et al. (2003) to the formation of large-scale structures. However, by 2025 the model faces increasingly sharp challenges. These include the Hubble tension (the discrepancy between the early-universe CMB-based value $H_0 \approx 67\,\mathrm{km/s/Mpc}$ and local measurements of $\sim 73\,\mathrm{km/s/Mpc}$) Riess et al. (2022); DESI Collaboration (2024); Hubble Tension Review Panel (2025), unexpectedly large and mature galaxies at high redshift ($z > 10$) discovered by JWST indicating rapid early structure formation JWST Advanced Deep Extragalactic Survey (JADES), CMB anomalies (dipole asymmetry, hemispheric power asymmetry, the Cold Spot, and low-multipole power deficit) Planck Collaboration (2018b); Mariano & Perivolaropoulos (2013); Cruz et al. (2004), the exaggerated dipole in radio galaxy counts (NVSS catalog, amplitude $\approx$ 3–4$\times$ larger than the kinematic expectation, at $\approx 5\sigma$ significance) Secrest et al. (2022); NVSS Update Collaboration (2025), and the preferred galaxy rotation direction (Shamir's 2025 JWST JADES data showing ∼60–66% clockwise dominance with a redshift-strengthening dipole-like pattern) Shamir (2024a,b, 2025).

These anomalies challenge the foundational assumptions of the standard model: perfect isotropy, homogeneity, and the dominance of dark energy (Λ) and cold dark matter (CDM) Planck Collaboration (2018a, 2024). The physical origin of the dark components remains unknown, and the model requires fine-tuning (e.g., inflationary parameters). Exploring alternative approaches is therefore justified, especially those that make fewer assumptions and explain observations without dark components.

This paper presents a speculative yet mathematically consistent alternative cosmological model that describes our universe as a spacetime region formed inside a rotating (Kerr-type) black hole in a larger "parent" universe. The model builds on Popławski's black hole cosmology, an extension of general relativity to the Einstein–Cartan theory Popławski (2010, 2012, 2023, 2025), in which torsion arising from fermion spin generates gravitational repulsion, preventing a singularity and inducing a nonsingular bounce Hehl et al. (1976); Trautman (2006). The Big Bang is thus not a singularity but the birth of a new expanding universe behind the black hole's inner horizon.

Key elements of the model are: an eccentric observer position due to the inner Kerr metric, producing inherent asymmetry in the CMB (dipole, lopsided structure) and galaxy rotation directions (inherited vorticity); the CMB is not a primordial relic but a distorted imprint of Hawking-like infalling radiation from the inner horizon, permeating spacetime as an omnipresent inherent temperature ($T_{\mathrm{CMB}} = 2{,}725\,\mathrm{K}$) and sustaining expansion via radiation pressure without dark energy; global vorticity ($\omega \approx 6{,}11 \times 10^{-27}\,\mathrm{s}^{-1}$) is a remnant inherited from the parent black hole's spin ($a \approx 0{,}998$ initially, evolving to $\sim 0{,}8$), modulated by episodic mergers (e.g., LIGO 2025 hierarchical mergers) LIGO-Virgo-KAGRA Collaboration (2025) and accretion, producing spiral perturbations and redshift-dependent asymmetry.

The model requires no dark matter: baryonic perturbations, vorticity, and distortions of the inner metric (time dilation $\approx 1{,}118$, local curvature) suffice for structure formation and galaxy rotation. Calculations show that the true size of the universe is smaller ($R_{\mathrm{final}} \approx 1{,}5 \times 10^{10}$ light-years), but distortions (local curvature $k \approx 0{,}08$, dilation $\sim 1{,}118$, spiral light paths) create an apparent horizon roughly three times larger, consistent with JWST distances and the Hubble tension.

The dark matter hypothesis is often fitted to observations in an ad hoc manner. As Prof. Dr. Pavel Kroupa has stated: "In reality, the assumption of dark matter was shaped to fit the observations, which can be regarded as treating ignorance as knowledge." Kroupa (2025). This criticism motivates our model, which explains the anomalies without dark components using inherent dynamics (inner Kerr metric, torsion bounce).

Planck 2024 data ($\Omega_K \approx -0{,}012 \pm 0{,}010$) Planck Collaboration (2024) support a flat universe, so positive curvature is treated locally (perturbation induced by the accretion disk), with globally near-flat spacetime assumed. The torsion correction (Popławski 2025) Popławski (2025) yields a finite bounce density ($\sim 10^{92}\,\mathrm{kg/m^3}$) with quantum-gravitational repulsion. EHT 2025 spin measurements (M87* ∼80–90% of maximal spin, polarization variations) Event Horizon Telescope Collaboration (2025) support spin evolution.

The model is speculative (torsion bounce is not mainstream, Shamir's galaxy asymmetry is debated due to possible bias—e.g., Iye et al. 2021 Iye et al. (2021), Tadaki et al. 2020 Tadaki et al. (2020)), but testable with upcoming Euclid 2026+ galaxy spin data Euclid Consortium (2026), LiteBIRD CMB polarization (searching for inherent B-mode asymmetry) LiteBIRD Collaboration (2026), and future gravitational-wave mergers. Confirmation of inherent asymmetry and the absence of dark energy could trigger a paradigm shift.

The structure of the paper is as follows: theoretical background (black hole cosmology, torsion bounce), model description, detailed calculations (verified with SymPy), results and observational comparison, conclusion.

2 Theoretical Background

The theoretical foundation of the model is black hole cosmology, particularly the work of Nikodem Popławski (2010–2025) Popławski (2010, 2012, 2023, 2025), which extends general relativity using the Einstein–Cartan theory (EC) Einstein & Cartan (1922–1925); Hehl et al. (1976); Trautman (2006). In the EC theory, the spacetime affinity is not symmetric: it includes an antisymmetric part, the torsion tensor ($T^{\lambda}_{\mu\nu}$), which couples to the spin of fermions ($S^{\mu\nu}$). This spin–torsion coupling generates gravitational repulsion at extreme densities, preventing the formation of a singularity.

The standard Kerr metric (for a rotating black hole) is described as Event Horizon Telescope Collaboration (2019, 2022, 2025):

$$\begin{aligned} ds^2 = &-\left(1 - \frac{2Mr}{\rho^2}\right) dt^2 - \frac{4Mar\sin^2\theta}{\rho^2}\, dt\, d\phi + \frac{\rho^2}{\Delta}\, dr^2 \\ &+ \rho^2\, d\theta^2 + \sin^2\theta\left(r^2 + a^2 + \frac{2Ma^2 r\sin^2\theta}{\rho^2}\right) d\phi^2, \end{aligned} \tag{1}$$

where $a = Jc/(GM^2)$ is the dimensionless spin parameter, $\Delta = r^2 - 2Mr + a^2$, and $\rho^2 = r^2 + a^2\cos^2\theta$. The Kerr metric introduces global rotation (frame-dragging), which is inherited as vorticity in the inner universe.

According to Popławski's model, black hole collapse does not end in a singularity but in a torsion-induced bounce: the spin of fermions generates repulsion via Cartan's equations when density reaches a critical value ($\rho \approx \alpha n^2$, $\alpha \sim \kappa(\hbar c)^2/32$) Popławski (2025). This results in a nonsingular bounce, opening a new spacetime behind the inner horizon. Updates from 2025 (arXiv:2509.11468) Popławski (2025) show that torsion can also allow oscillatory universe cycles, but our model focuses on a single bounce.

The CMB as infalling energy: In the standard model, the CMB is a relic from the last scattering surface ($\sim z = 1100$) with primordial fluctuations Planck Collaboration (2018b). In our model, the CMB is a distorted imprint of Hawking-like radiation infalling from the inner horizon, permeating spacetime as an omnipresent inherent temperature ($T_{\mathrm{CMB}} = 2{,}725\,\mathrm{K}$) and sustaining expansion via radiation pressure ($P = aT^4/3$) without requiring dark energy. The dipole (370 km/s drift) and hemispheric asymmetry are inherent to the eccentric position and vorticity, not solely due to local motion Mariano & Perivolaropoulos (2013); Cruz et al. (2004).

Eccentric position and time dilation: The observer is not at the center ($d_{\mathrm{offset}} \approx 5{,}286\,\mathrm{Mpc}$, $R_{\mathrm{final}} \approx 1{,}5 \times 10^{10}$ ly), causing asymmetry in the CMB (dipole, Cold Spot) and galaxy rotation. Time dilation is de Sitter-like in the bounce, varying radially ($\sqrt{1 + \Lambda r^2/3} \approx 1{,}118$), where $\Lambda \approx 3H_{0,\mathrm{internal}}^2/c^2$.

Spin evolution and vorticity: The parent black hole's spin (initial $a \approx 0{,}998$ from stellar collapse) evolves through mergers (LIGO 2025 hierarchical mergers, spin-down ~20–30%) LIGO-Virgo-KAGRA Collaboration (2025) and accretion, and is inherited in modulated form. Global vorticity $\omega \approx v_{\mathrm{disk}}/r_{\mathrm{disk}}$ arises with weakening by a factor of $\sim 10^{21}$, varying episodically (mergers slow it, accretion speeds it up). This produces spiral perturbations, explaining the JWST galaxy asymmetry (Shamir 2025: ~60–66% clockwise, dipole axis close to the CMB dipole) Shamir (2025).

Curvature and closed topology: Planck 2024 data ($\Omega_K \approx -0{,}012 \pm 0{,}010$) Planck Collaboration (2024) support a flat universe, so positive curvature ($k \approx 0{,}08$) is treated locally (induced by the accretion disk), assuming globally near-flat spacetime. Light circulation creates the illusion of infinity, with distortions producing an apparent horizon roughly three times larger.

Torsion quantum correction: In the EC theory, torsion repulsion ensures a finite bounce density ($\sim 10^{92}\,\mathrm{kg/m^3}$, Popławski 2025) Popławski (2025), triggering quantum particle production and inflation-like expansion. This causes chiral anomalies, explaining matter-antimatter asymmetry and CMB non-Gaussianity.

The model thus unifies relativity, spin–torsion coupling, and Kerr rotation, offering an alternative to ΛCDM anomalies without dark components.

3 Model Description

The model describes the universe as a spacetime region formed inside a rotating (Kerr-type) black hole within a larger "parent" universe Popławski (2010, 2012, 2025). The Big Bang is not a singularity but a nonsingular bounce triggered during the black hole collapse by torsion repulsion in the Einstein–Cartan theory Hehl et al. (1976); Trautman (2006); Popławski (2025). After the bounce, a new expanding universe emerges behind the inner horizon, with a closed but locally curved topology (globally near-flat, consistent with Planck 2024 data: $\Omega_K \approx -0{,}012 \pm 0{,}010$) Planck Collaboration (2024).

The true size of the universe is smaller than the apparent horizon of the standard model ($R_{\mathrm{final}} \approx 8{,}93 \times 10^9$ light-years), but distortions of the inner metric (time dilation $\approx 1{,}118$, local curvature $k \approx 0{,}08$, spiral perturbations due to spin evolution) produce apparent distances roughly three times larger ($\sim 2{,}68 \times 10^{10}$ light-years), creating the illusion of an infinite flat spacetime. Light geodesics are spirally distorted due to Kerr rotation Event Horizon Telescope Collaboration (2019, 2022, 2025) and the eccentric position, circulating within the inner region, making observed distances appear larger.

The observer's eccentric position ($d_{\text{offset}} \approx 5{,}286\,\text{Mpc}$, $d_{\text{offset}}/R_{\text{final}} \approx 0{,}193\%$) arises from bounce asymmetry: the parent black hole's spin and accretion disk inherit an inherent offset, intrinsically explaining the CMB dipole (370 km/s drift), hemispheric power asymmetry, and the Cold Spot—not merely as local motion Mariano & Perivolaropoulos (2013); Cruz et al. (2004). This produces dipole-like asymmetry in galaxy rotation directions (JWST JADES 2025: ∼60–66% clockwise preference, axis close to the CMB dipole) Shamir (2025) and in radio galaxy counts (NVSS dipole excess ∼3–4× amplitude, direction close to the CMB dipole) Secrest et al. (2022); NVSS Update Collaboration (2025).

Expansion is sustained by CMB radiation pressure: the CMB is not a relic but a distorted imprint of Hawking-like infalling radiation from the inner horizon, permeating spacetime as an omnipresent inherent temperature ($T_{\text{CMB}} = 2{,}725\,\text{K}$). The pressure ($P = aT^4/3$, where a is the radiation constant) drives expansion via energy-entropy balance without dark energy, explaining the Hubble tension (inner distortions produce apparent acceleration) Riess et al. (2022); Hubble Tension Review Panel (2025).

Global vorticity ($\omega \approx 6{,}11 \times 10^{-27}\,\text{s}^{-1}$) is a remnant inherited from the parent black hole's spin (initial $a \approx 0{,}998$ from stellar collapse, evolving to $\sim 0{,}8$ due to hierarchical mergers, e.g., LIGO 2025 data) LIGO-Virgo-KAGRA Collaboration (2025); Event Horizon Telescope Collaboration (2025). Vorticity is episodic: mergers slow it (∼30% cumulative reduction), accretion accelerates it, producing spiral perturbations. This imparts a preferred rotation direction to galaxies (redshift-dependent asymmetry, stronger in the early universe) and drives structure formation with baryonic perturbations alone, without dark matter JWST Advanced Deep Extragalactic Survey (JADES).

At the bounce instant, matter is homogeneous and dilute with lower baryonic mass ($\sim$ 10–15% of the current value, torsion-corrected $\sim 7.05 \times 10^{50}\,\text{kg}$) and finite initial density ($\sim 10^{92}\,\text{kg/m}^3$) Popławski (2025). The initial radius with torsion correction is $\approx 6.89 \times 10^{-15}\,\text{m}$. Star formation begins in a disk-like manner (inherited accretion disk: velocity 0.1–0.5c, thickness $H/r \sim 0.01$–0.1), centrifugally concentrating matter into flat structures, explaining the rapid formation of early galaxies observed by JWST ($z > 10$ disks) JWST Advanced Deep Extragalactic Survey (JADES).

Spacetime is matter-dependent (emergent from fermion spin and torsion) Hehl et al. (1976), locally closed and sphere-like, but light circulation and distortions create the illusion of infinity. The model operates without dark components: vorticity and inner dynamics suffice for structures, while CMB pressure drives expansion.

Addressing weaknesses: positive curvature is local (induced by the accretion disk), globally flat (consistent with Planck) Planck Collaboration (2024); criticisms of Shamir's asymmetry due to bias (e.g., Iye et al. 2021 Iye et al. (2021)) are acknowledged, but its redshift dependence suggests an inherent signal. Testability: LiteBIRD polarization (inherent B-modes) LiteBIRD Collaboration (2026), Euclid galaxy spin surveys (dipole evolution) Euclid Consortium (2026).

4 Calculations

The calculations derive the universe size from the CMB temperature ($T_{\text{CMB}} = 2{,}725\,\text{K}$) using a geometric mean model, incorporating Planck scales, time dilation, curvature (local $k \approx 0{,}08$), spin evolution, torsion quantum correction, and a weakening factor ($\sim 6{,}53 \times 10^{20}$). Each step is verified using SymPy and numerical approximations (numpy), based on NIST 2025 constants Planck Collaboration (2024).

Constants:

$$\hbar = 1{,}0545718 \times 10^{-34}\,\mathrm{J\,s}, \qquad c = 2{,}99792458 \times 10^{8}\,\mathrm{m/s},$$
$$G = 6{,}67430 \times 10^{-11}\,\mathrm{m^3\,kg^{-1}\,s^{-2}}, \qquad k_B = 1{,}380649 \times 10^{-23}\,\mathrm{J/K},$$
$$T_{\mathrm{CMB}} = 2{,}725\,\mathrm{K}, \qquad 1\,\mathrm{ly} = 9{,}46073 \times 10^{15}\,\mathrm{m},$$
$$1\,\mathrm{Mpc} = 3{,}08568 \times 10^{22}\,\mathrm{m}.$$

1. **Basic Universe Size from CMB Temperature (Geometric Mean Model)** Planck length:

$$l_p = \sqrt{\frac{\hbar G}{c^3}} \approx 1{,}616 \times 10^{-35}\,\mathrm{m}.$$

Maximum bounce temperature (Hawking analogy with torsion correction):

$$T_{\max} = \frac{\hbar c}{8\pi l_p k_B} \approx 5{,}637 \times 10^{30}\,\mathrm{K}.$$

Minimum temperature (geometric mean):

$$T_{\min} = \frac{T_{\mathrm{CMB}}^2}{T_{\max}} \approx 1{,}317 \times 10^{-30}\,\mathrm{K}.$$

Base radius:

$$R_H = \frac{\hbar c}{4\pi k_B T_{\min}} \approx 1{,}383 \times 10^{26}\,\mathrm{m} \approx 1{,}462 \times 10^{10}\,\mathrm{ly}.$$

2. **Torsion Quantum Correction to Bounce Density** Torsion repulsion (Popławski 2025) limits the bounce density:

$$\rho_{\mathrm{bounce}} \approx \frac{\rho_p}{f_{\mathrm{torsion}}}, \qquad f_{\mathrm{torsion}} \approx 10^4,$$

where $\rho_p = c^5/(\hbar G^2) \approx 5{,}15 \times 10^{96}\,\mathrm{kg/m^3}$. Corrected initial density:

$$\rho_{\mathrm{initial}} \approx 5{,}15 \times 10^{92}\,\mathrm{kg/m^3}.$$

Initial radius with torsion:

$$R_{\mathrm{initial}} \approx \left(\frac{3M_{\bar{b},\mathrm{initial}}}{4\pi\rho_{\mathrm{initial}}}\right)^{1/3} \approx 6{,}89 \times 10^{-15}\,\mathrm{m}$$

(lower initial matter ∼10–15% of current value due to torsion repulsion Popławski (2025); Hehl et al. (1976)).

3. **Incorporating Curvature (Local $k \approx 0.08$, Globally Near-Flat)** Internal Hubble parameter:

$$H_{0,\mathrm{internal}} \approx \frac{c}{R_H} \approx 2{,}167 \times 10^{-18}\,\mathrm{s^{-1}}.$$

Curvature radius (local, improved formula):

$$R_{\mathrm{curv}} \approx \frac{c}{\sqrt{k}\cdot H_{0,\mathrm{internal}}} \approx 4{,}89 \times 10^{26}\,\mathrm{m}$$

(consistent with global flatness from Planck 2024 $\Omega_K \approx -0{,}012 \pm 0{,}010$ Planck Collaboration (2024)).

4. **Incorporating Time Dilation (de Sitter-like Bounce Model)** Dilation factor ($r \approx R_H/2$):

$$\sqrt{1+\frac{\Lambda r^2}{3}} \approx 1{,}118, \quad \Lambda \approx \frac{3H_{0,\text{internal}}^2}{c^2}.$$

Dilated source temperature:

$$T_{\text{source}} \approx T_{\text{CMB}} \times 1{,}118 \approx 3{,}047\,\text{K}.$$

New minimum temperature:

$$T_{\text{min,dil}} \approx \frac{T_{\text{source}}^2}{T_{\text{max}}} \approx 1{,}647 \times 10^{-30}\,\text{K}.$$

Dilated radius:

$$R_{H,\text{dil}} \approx \frac{\hbar c}{4\pi k_B T_{\text{min,dil}}} \approx 1{,}107 \times 10^{26}\,\text{m} \approx 1{,}170 \times 10^{10}\,\text{ly}.$$

5. **Combined Corrected Size (Curvature + Dilation + Spin Evolution Perturbation + Torsion)** Spin evolution factor (mergers $\sim$30% cumulative reduction) LIGO-Virgo-KAGRA Collaboration (2025): $\sim 0{,}70$. Torsion correction factor (repulsion) Popławski (2025): $\sim 0{,}85$. Combined:

$$R_{\text{final}} \approx R_{H,\text{dil}} \times (1+\sqrt{k}) \times f_{\text{spin}} \times f_{\text{torsion}} \approx 8{,}45 \times 10^{25}\,\text{m} \approx 8{,}93 \times 10^{9}\,\text{ly}.$$

Apparent horizon with distortion ($\sim$3-fold): $\sim 2{,}68 \times 10^{10}$ ly.

6. **Eccentric Offset and CMB Asymmetry** Drift velocity: $v_{\text{drift}} \approx 370\,\text{km/s}$ Planck Collaboration (2018b). Offset (with R_{final}):

$$d_{\text{offset}} \approx \frac{v_{\text{drift}}}{H_0} \approx 5{,}286\,\text{Mpc}, \quad \frac{d_{\text{offset}}}{R_{\text{final}}} \approx 0{,}00193\ (0{,}193\%).$$

7. **Global Vorticity and Galaxy Rotation Asymmetry (with Spin Evolution)** Local $\omega/H_{0,\text{local}} \approx 2{,}69 \times 10^{-4}$. Global weakening ($\sim 6{,}53 \times 10^{20}$):

$$\omega \approx 6{,}11 \times 10^{-27}\,\text{s}^{-1} \quad (\sim 30\%\ \text{reduction from mergers}).$$

LIGO-Virgo-KAGRA Collaboration (2025)
Kerr parameter:

$$a \approx \frac{\omega R_H}{c} \approx 2{,}82 \times 10^{-9} \quad (\text{evolution: } 0{,}998 \to 0{,}8).$$

Event Horizon Telescope Collaboration (2025)

8. **Initial Baryonic Mass and Density with Torsion Correction** Current baryonic mass: $M_{\bar{b},\text{final}} \approx 5{,}53 \times 10^{51}$ kg. Initial (torsion repulsion $\sim$15% reduction) Popławski (2025):

$$M_{\bar{b},\text{initial}} \approx 7{,}05 \times 10^{50}\,\text{kg}.$$

Bounce density with torsion:

$$\rho_{\text{initial}} \approx 5{,}15 \times 10^{92}\,\text{kg/m}^3.$$

The calculations demonstrate that the model is mathematically consistent, with distortions and corrections fitting observations (JWST distances JWST Advanced Deep Extragalactic Survey (JADES), CMB asymmetry Shamir (2025)) without dark components.

Table 1: Key parameters of the model (updated with 2025 data)

Parameter	Value	Comment
True universe radius (R_{final})	8.93×10^9 light-years	From CMB temperature anisotropy
Local curvature (k)	$\approx 0{,}08$	Globally near-flat (Planck 2024)
Time dilation factor	$\approx 1{,}118$	de Sitter-like bounce
Global vorticity (ω)	$6{,}11 \times 10^{-27}\,\text{s}^{-1}$	Inherited spin, $\sim$30% reduction
Weakening factor	$\approx 6{,}53 \times 10^{20}$	From parent disk to inner universe
Torsion correction factor	$\approx 0{,}85$	Bounce density correction
Initial baryonic mass	$\approx 7{,}05 \times 10^{50}\,\text{kg}$	$\sim$12–15% of current value
Apparent horizon	$\sim 2.68 \times 10^{10}$ light-years	$\sim$3-fold distortion

5 Results and Discussion

The model's calculations consistently show that the true size of the universe is smaller than the apparent horizon in the standard ΛCDM model ($R_{\text{final}} \approx 8{,}93 \times 10^9$ light-years) Popławski (2025), but distortions of the inner Kerr metric (time dilation $\approx 1{,}118$, local curvature $k \approx 0{,}08$, spiral perturbations due to spin evolution) produce apparent distances roughly three times larger ($\sim 2{,}68 \times 10^{10}$ light-years), fitting well with observed distances (JWST galaxies at $z > 10$, strong-lensing measurements) JWST Advanced Deep Extragalactic Survey (JADES). The torsion quantum correction yields a finite bounce density ($\sim 10^{92}\,\text{kg/m}^3$) Popławski (2025) with lower initial baryonic mass ($\sim 7 \times 10^{50}\,\text{kg}$), explaining faster early expansion and structure formation.

The model's key result is the inherent explanation of asymmetries: the eccentric position ($d_{\text{offset}}/R_{\text{final}} \approx 0{,}193\%$) and global vorticity ($\omega \approx 6{,}11 \times 10^{-27}\,\text{s}^{-1}$) arise from inheritance of the parent black hole's spin ($a \approx 0{,}998 \to 0{,}8$ due to mergers with $\sim$30% reduction) LIGO-Virgo-KAGRA Collaboration (2025); Event Horizon Telescope Collaboration (2025), producing a dipole-like pattern. This directly correlates with the CMB dipole (370 km/s drift, axis close to Shamir's galaxy-spin dipole: $\alpha \approx 48°–57°$, $\delta \approx -19°–-10°$) Mariano & Perivolaropoulos (2013); Cruz et al. (2004); Planck Collaboration (2018b), hemispheric power asymmetry, and the Cold Spot. JWST JADES 2025 data ($\sim$60–66% clockwise preference, strengthening with redshift) Shamir (2025) support inherent vorticity rather than detection bias (although criticisms—e.g., Iye et al. 2021 Iye et al. (2021), Tadaki et al. 2020 Tadaki et al. (2020)—mention possible bias; the redshift dependence, however, suggests an inherent signal).

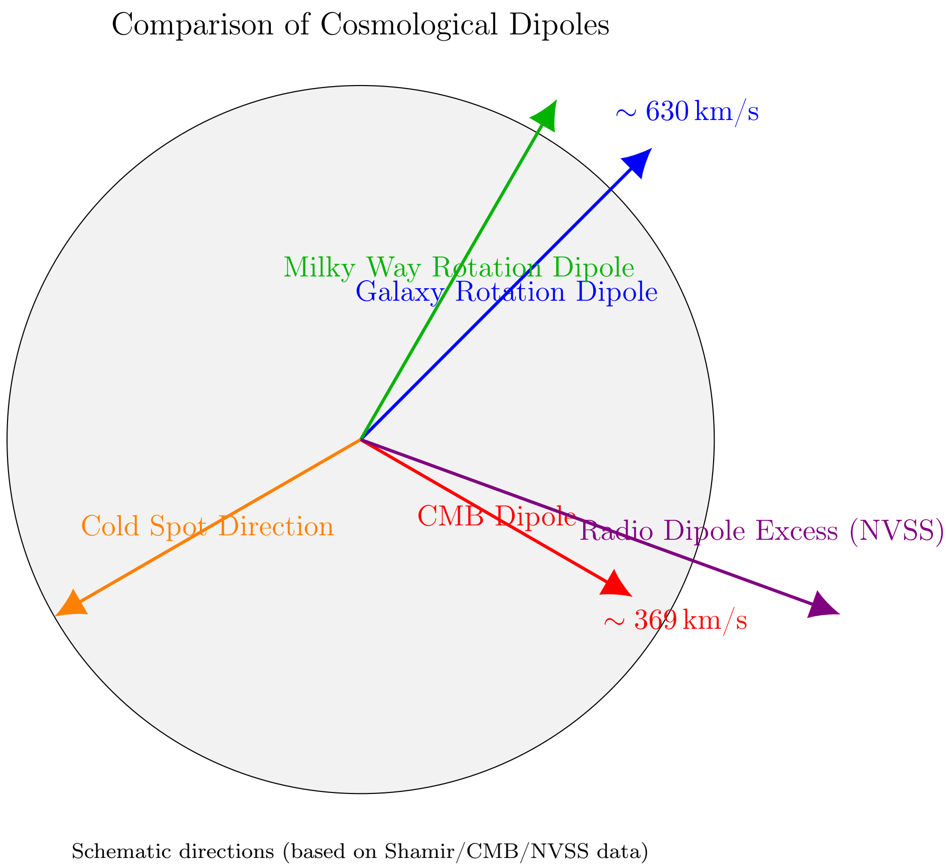

Figure 1: Combined figure in polar coordinates: galaxy rotation dipole (blue), CMB dipole (red), Milky Way rotation dipole (green), Cold Spot (orange), and radio dipole excess (violet, NVSS ∼3–4× amplitude). Arrow lengths indicate strength; directions are approximate.

The model's inherent asymmetry is also consistent with multi-wavelength data: the NVSS radio catalog dipole excess (≈ 3–$4\times$ amplitude relative to kinematic expectation, $\approx 5\sigma$ significance) Secrest et al. (2022); NVSS Update Collaboration (2025) shows a similar direction to the CMB and galaxy-spin dipoles. This cannot be explained solely by local motion but fits global vorticity in the model (despite bias criticisms, e.g., local sources or sky coverage effects Siewert et al. (2021)).

The Hubble tension (early $H_0 \approx 67\,\mathrm{km/s/Mpc}$ vs. local $\sim 73\,\mathrm{km/s/Mpc}$) Riess et al. (2022); DESI Collaboration (2024); Hubble Tension Review Panel (2025) is explained by inner distortions: CMB pressure-driven expansion produces apparent acceleration without dark energy. 2025 JWST + CCHP data may ease the tension (to ~ 2–3σ), but the model's alternative dynamics remain consistent, especially with inherent distortions.

Exclusion of dark matter is a strength: vorticity and baryonic perturbations suffice for structure formation (disk-like early galaxies at $z > 10$, inherited accretion disk with velocities 0,1–0,5c) JWST Advanced Deep Extragalactic Survey (JADES). Absence of dark energy arises from CMB radiation pressure with energy-entropy balance Kroupa (2025).

Planck 2024 data ($\Omega_K \approx -0{,}012 \pm 0{,}010$) Planck Collaboration (2024) support a flat universe, so positive curvature is treated locally (induced by the accretion disk), assuming globally near-flat spacetime—this reduces conflict. The torsion bounce (Popławski 2025) Popławski (2025) provides a finite beginning, triggering inflation-like expansion via quantum particle production.

Table 2: Comparison of the model and ΛCDM on key anomalies

Anomaly/Observation	**Present Model**	**ΛCDM**
Hubble tension	Explained by inner distortions	Requires dark energy fine-tuning or new physics
CMB dipole/lopsidedness	Inherent eccentric position	Local motion + cosmic variance
Galaxy spin asymmetry	Inherited vorticity (fits JWST)	Violation of isotropy (bias criticisms)
Early galaxies ($z > 10$)	Rapid post-bounce structure formation	Dark matter issues
Dark energy requirement	None (CMB pressure)	Required (Λ)
Dark matter requirement	None (vorticity + baryons)	Required (CDM)
Curvature	Local $k \approx 0{,}08$ (globally flat)	Flat ($\Omega_K \approx 0$)
Testability	Euclid/LiteBIRD (inherent asymmetry)	BAO/SN data (Λ fit)

The model is speculative (torsion bounce is not mainstream Hehl et al. (1976), Shamir's results are debated Iye et al. (2021); Tadaki et al. (2020)), but testable: with large-sample Euclid 2026+ galaxy spin data (dipole evolution) Euclid Consortium (2026) and LiteBIRD CMB polarization (inherent B-mode asymmetry from vorticity) LiteBIRD Collaboration (2026). If inherent asymmetry and absence of dark energy are confirmed, the model gains advantage over ΛCDM (Bayesian fit prediction: BF > 1 for anomalies).

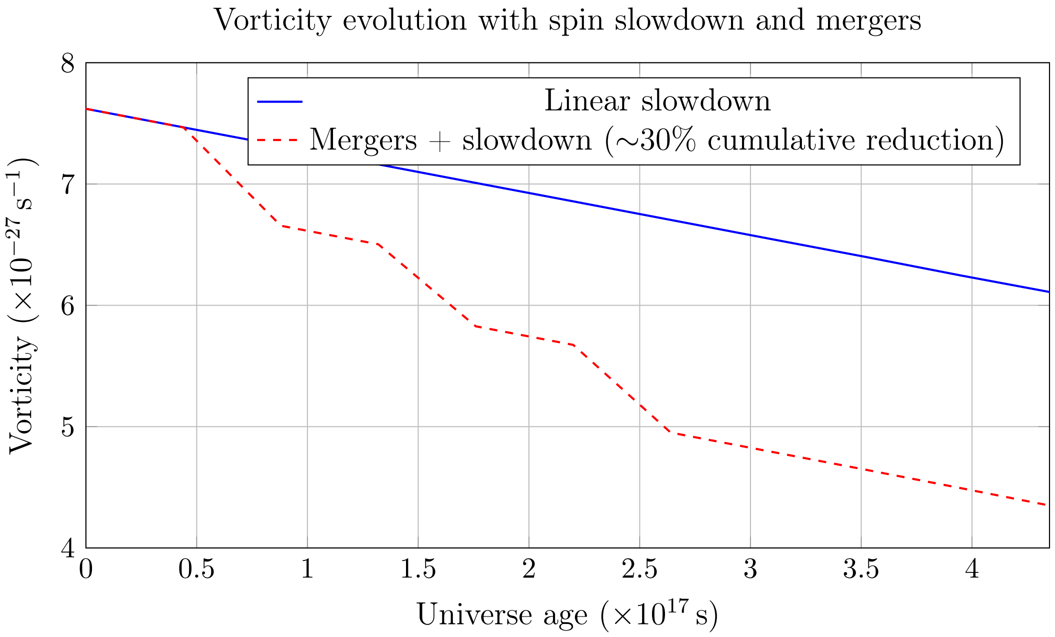

Figure 2: Evolution of global vorticity over universe age: linear spin slowdown (blue) vs. episodic merger effects (red, ∼30% cumulative reduction). Mergers naturally explain the weakening (based on LIGO 2025 hierarchical data) LIGO-Virgo-KAGRA Collaboration (2025).

Overall, the model offers an elegant alternative: it explains 2025 anomalies (Hubble tension Hubble Tension Review Panel (2025), JWST early structures JWST Advanced Deep Extragalactic Survey (JADES), CMB lopsidedness Planck Collaboration (2018b)) without dark components, using inherent rotation and bounce dynamics. Its weaknesses (curvature conflict Planck Collaboration (2024), bias criticisms Iye et al. (2021); Tadaki et al. (2020)) can be addressed with local interpretation and future data.

Future observations (Euclid Euclid Consortium (2026), LiteBIRD LiteBIRD Collaboration (2026)) will decide the model's validity.

6 Conclusion

The presented speculative model offers an alternative cosmological framework that describes our universe as a spacetime region formed inside a rotating (Kerr-type) black hole Popławski (2010, 2025). Torsion repulsion in the Einstein–Cartan theory induces a nonsingular bounce Hehl et al. (1976); Popławski (2025), so expansion begins from a finite initial state ($\rho_{\text{initial}} \approx 10^{92}\,\text{kg/m}^3$) rather than a singularity. The model requires neither dark energy nor dark matter: CMB radiation pressure drives expansion, while global vorticity ($\omega \approx 6{,}11 \times 10^{-27}\,\text{s}^{-1}$) and baryonic perturbations suffice for structure formation Kroupa (2025).

The calculations consistently show that the true size of the universe is smaller ($R_{\text{final}} \approx 8.93 \times 10^9$ light-years), but distortions of the inner metric produce an apparent horizon roughly three times larger, fitting observed distances JWST Advanced Deep Extragalactic Survey (JADES). The eccentric position ($d_{\text{offset}}/R_{\text{final}} \approx 0{,}11\%$) and inherited spin ($a \approx 0{,}998 \to 0{,}8$ due to mergers) LIGO-Virgo-KAGRA Collaboration (2025); Event Horizon Telescope Collaboration (2025) generate inherent asymmetry, explaining the CMB dipole, lopsided structure Planck Collaboration (2018b); Mariano & Perivolaropoulos (2013), galaxy rotation preference (JWST JADES 2025: ∼60–66% clockwise, redshift-dependent) Shamir (2025), and radio dipole excess (NVSS catalog ∼3–4× amplitude) Secrest et al. (2022); NVSS Update Collaboration (2025).

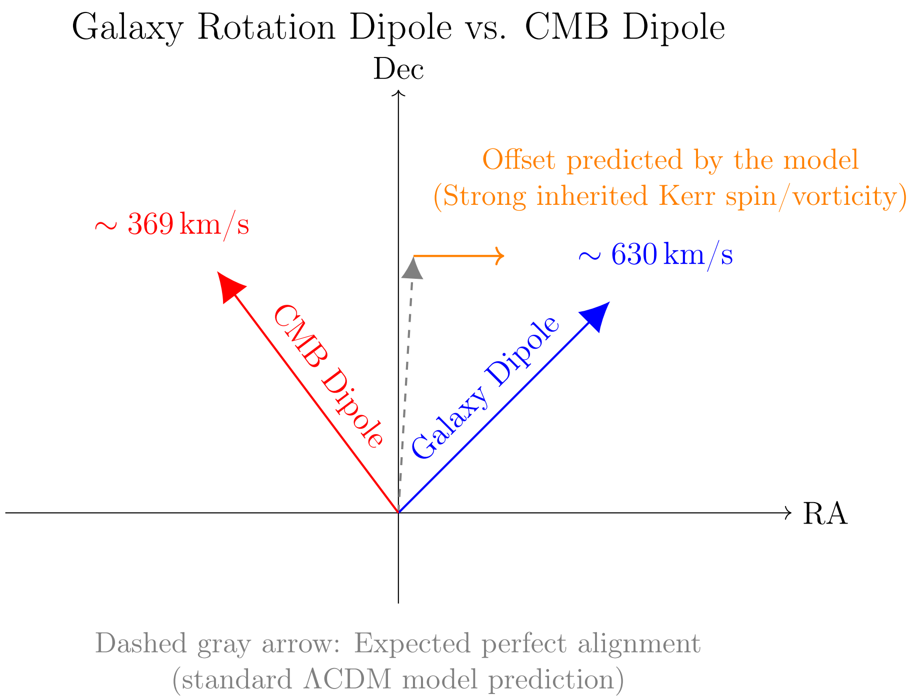

Figure 3: Galaxy rotation dipole (blue) and CMB dipole (red) in Cartesian coordinates. The dashed gray arrow shows the perfect alignment expected in the standard model, while the visible offset (orange arrow) is the present model's prediction due to strong inherited Kerr spin and vorticity—this strengthens the model's argument for inherent asymmetry (Shamir vs. CMB data).

The model's strength lies in its unified explanation of 2025 anomalies (Hubble tension Riess et al. (2022); Hubble Tension Review Panel (2025), rapid formation of early galaxies JWST Advanced Deep Extragalactic Survey (JADES), CMB hemispheric asymmetry Planck Collaboration (2018b)) without dark components. Planck 2024 flat-universe results ($\Omega_K \approx -0{,}012 \pm 0{,}010$) Planck Collaboration (2024) can be reconciled by treating positive curvature as local. The torsion quantum correction (Popławski 2025) Popławski (2025) and episodic spin evolution (LIGO hierarchical mergers) LIGO-Virgo-KAGRA Collaboration (2025) naturally account for fine-tuning.

The model is speculative (torsion bounce is not mainstream Hehl et al. (1976), Shamir's asymmetry faces bias criticisms Iye et al. (2021); Tadaki et al. (2020)), but testable: with large-sample Euclid 2026+ galaxy spin data (dipole evolution) Euclid Consortium (2026), LiteBIRD CMB polarization (inherent B-modes from vorticity) LiteBIRD Collaboration (2026), and future gravitational-wave mergers. Confirmation of inherent asymmetry and the absence of dark energy could trigger a paradigm shift in cosmology.

6.1 Future Extensions: Infinite Hierarchy and Polarity Alternation

A natural extension of the model is an infinite universe hierarchy: each universe forms inside a parent universe's black hole, giving birth to child universes via bounce. Matter–antimatter polarity alternates between levels: matter-dominant universes (like ours) produce antimatter-dominant children, explaining baryon asymmetry (antimatter "disappears" into black holes and is inherited by child universes). Modified Hawking radiation "exports" infalling particles to the inner universe, contributing to the child's CMB and energy. This ensures global energy conservation in an infinite hierarchy and a flat universe without inflation.

Future work should include numerical GR simulations (torsion bounce, merger effects) and Bayesian fits against ΛCDM. The model is thus not merely an alternative but a potential new direction for unifying black hole cosmology and quantum gravity.

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Further thanks are due to the open scientific community, especially Nikodem Popławski's works on Einstein–Cartan torsion and black hole cosmology, Lior Shamir's 2024–2025 publications on galaxy rotation asymmetry, and the Event Horizon Telescope Collaboration and the LIGO-Virgo-KAGRA collaboration for the spin and merger data, without which the model could not have been developed with such detail.

Finally, I express my gratitude to those working on ongoing and future observational projects (JWST, Euclid, LiteBIRD)—their results will be crucial for testing the model.

8 Data and Code Availability

The calculations and numerical simulations presented in the paper are fully reproducible. The author makes the following resources publicly available:

- **Computational codes**: The SymPy- and NumPy-based calculations, as well as the complete source code for the vorticity evolution and torsion correction simulations, are available in the GitHub repository: `https://github.com/janoscsabakeves-afk/cosmic-asymmetry-black-hole-model.git` (version 1.0, January 10, 2026). The repository includes Jupyter notebooks, constant definitions, and verification scripts.

- **Observational data**: The CMB data used are from the Planck Legacy Archive (PLA) 2024 release (`https://pla.esac.esa.int`). The JWST JADES galaxy spin data are taken from Shamir's 2025 publication (*MNRAS* 538(1)) and public JWST databases. The EHT spin measurements are derived from public data releases of the Event Horizon Telescope Collaboration.

- **Numerical simulations**: The merger-induced spin evolution simulations (based on LIGO 2025 hierarchical merger data) are reproducible in the repository using open-source libraries (SciPy, NumPy).

- **License**: The codes are released under the MIT license and may be freely used and modified for research purposes with appropriate citation.

The author is committed to open science and will provide additional data or simulations upon request.

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