

OBSERVABLE UNIVERSE PRIVILEGE

A Cosmological EchoFamiliar Bias Audit

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ABSTRACT

The Cosmological Principle — the foundational assumption that the universe is homogeneous and isotropic at sufficiently large scales — underpins the majority of modern cosmological models. This paper does not claim the Cosmological Principle is false. It claims something more fundamental: that the principle has been adopted as an unexamined baseline rather than a continuously tested hypothesis, and that the measurement sample used to support it is drawn exclusively from one corner of one universe observable from one vantage point in spacetime. This paper introduces Observable Universe Privilege as an epistemological framework, and Cosmological EchoFamiliar Bias as its measurement instrument — the systematic tendency to build universal laws from the only sample available and then treat the limitations of that sample as the boundaries of reality. The framework connects to existing critiques of the Cosmological Principle, independently converges with concerns raised by Lee Smolin's Cosmological Natural Selection, and proposes a formal audit standard for cosmological baseline assumptions.

1. THE PROBLEM — IN THE AUTHOR'S OWN WORDS

"I don't agree or disagree with the notion that everything is uniform everywhere at all times in the observable universe. I just don't take the basic premise at face value. My instinct is to dismantle such assumptions and examine what is underneath them. I arrived at this position independently — without academic or mathematical training in cosmology — the same way I arrive at most things: by noticing that a system is measuring its own continuity and calling that measurement a law."

— Author, March 2026

This is not a contrarian position. It is the correct epistemological position. Every paradigm shift in the history of science began with someone declining to take a baseline assumption at face value. The geocentric model was not disproven by better data alone — it was disproven by someone willing to ask whether the Earth being the centre of observation meant the Earth was the centre of the universe. The question this paper asks is structurally identical: does the observable universe being the centre of our measurement mean the observable universe is a representative sample of the universe?

The answer is not obviously yes. The fact that we cannot currently answer otherwise does not make the assumption safe. It makes it an Invoice — a hidden cost, paid by every cosmological model built on an unaudited foundation.

2. THE COSMOLOGICAL PRINCIPLE — WHAT IT CLAIMS AND WHAT IT ASSUMES

The Cosmological Principle states that the universe, viewed at sufficiently large scales, is homogeneous (the same composition everywhere) and isotropic (the same in all directions). It is not a derived result. It is a foundational assumption adopted for mathematical convenience and partially supported by observation within the observable universe.

The observable universe is a sphere approximately 93 billion light years in diameter, centred on Earth, defined by the distance light has had time to travel since the Big Bang. This is not the universe. This is the portion of the universe visible from our position in spacetime given the age of the universe and the speed of light. The boundary is a measurement constraint, not a physical boundary.

The Cosmological Principle is built from observations within this sphere. It is then applied universally — to the entire universe, including the regions we cannot observe, have never observed, and may never be able to observe. The logical structure of this operation is:

- Sample: one observable region of unknown representativeness
- Observation: the sample appears approximately uniform at large scales
- Conclusion: the entire universe is uniform at large scales

This conclusion does not follow from the sample without an additional unstated assumption: that the observable universe is a representative sample of the whole. That assumption is Observable Universe Privilege — and it has never been formally audited.

3. OBSERVABLE UNIVERSE PRIVILEGE — THE FRAMEWORK

Observable Universe Privilege is defined as: the systematic assumption that the portion of the universe observable from Earth at this moment in cosmic time constitutes a sufficient and representative sample from which universal physical laws can be derived and applied to the whole.

It is a specific instance of a more general epistemological error this author has previously described as EchoFamiliar Bias — the tendency of any measurement system to be built from and optimised for the substrate that produced it, and to then mistake familiarity with that substrate for universality.

In the context of intelligence measurement: tests built by Western educated humans measure familiarity with the Western educated human ecosystem and call it intelligence. In the context of cosmology: models built from observations within the

human-observable universe measure familiarity with the human-observable universe and call it universal law.

The structure of the error is identical. Only the domain differs.

3.1 What Observable Universe Privilege Does Not Claim

This framework does not claim:

- That the universe is NOT uniform. Uniformity may be correct. The audit is agnostic on the answer.
- That the Cosmological Principle should be abandoned. It should be audited, not discarded.
- That current cosmological models are wrong. They may be entirely correct within their valid domain.
- That better observations are currently possible. The constraint is acknowledged.

What it claims is precisely this: the limitation of our sample should be formally documented as a known limitation at the foundation of every cosmological model that depends on it. This is the Invoice the current framework has not published.

3.2 What Observable Universe Privilege Does Claim

Specifically:

- The observable universe is not the universe. It is a measurement boundary imposed by physics and time, not a physical boundary of reality.
- Physical constants measured within the observable universe — the speed of light, the gravitational constant, the fine structure constant — are measured from one location in one universe at one period in cosmic time. Their universality outside the observable boundary is an assumption, not a measurement.
- The large-scale uniformity observed within the observable universe may reflect a genuine property of the universe, or it may reflect a property of the specific region we inhabit. Current methodology cannot distinguish between these possibilities.
- Any cosmological model built on the Cosmological Principle inherits this limitation whether it acknowledges it or not. The Invoice exists whether it is published or not.

4. COSMOLOGICAL ECHOFAMILIAR BIAS — THE MEASUREMENT INSTRUMENT

EchoFamiliar Bias, as originally defined in Substrate Neutral Intelligence Theory (the author, 2026), describes the tendency of measurement systems to produce results that systematically favour those who are familiar with the ecosystem that produced the measurement. Applied to cosmology:

Cosmological EchoFamiliar Bias is the measurable degree to which a cosmological model assumes that properties observed within the human-observable universe are representative of properties beyond it. A model with high Cosmological EchoFamiliar Bias applies laws derived from the observable universe to the whole without qualification. A model with low Cosmological EchoFamiliar Bias formally scopes its claims to the domain from which its measurements were drawn.

Every cosmological model currently in operation has a Cosmological EchoFamiliar Bias score. That score has never been calculated because the instrument has never been defined. This paper defines it.

4.1 The Audit Question

For any cosmological model, the audit question is:

Does this model apply conclusions derived from observations within the observable universe to domains outside the observable universe? If yes — on what basis is the sample assumed to be representative?

If the answer is “we assume it is representative because the observable universe appears internally uniform” — this is circular. Internal uniformity of a sample does not establish representativeness of the sample relative to the whole. A single city may be internally consistent in ways that do not represent the country it sits within.

5. HISTORICAL EVIDENCE — THE INVOICE UNPAID

5.1 The Geocentric Invoice

For over a thousand years, astronomical models were built from observations centred on Earth. The Earth was the vantage point. Over time, the Earth became the centre of the model. Then the centre of the universe. The vantage point had been promoted to a universal truth without audit. Copernicus did not disprove geocentrism with new data. He audited the assumption that the measurement centre was the physical centre. The Invoice of that unaudited assumption was one thousand years of incorrect cosmology.

5.2 The Static Universe Invoice

Einstein's original field equations admitted a dynamic, expanding universe. Einstein added the cosmological constant to force a static solution because the universe was assumed to be static — the observable universe at that time appeared neither expanding nor contracting at measurable rates. The assumption was wrong. Hubble's observations revealed expansion that should have been predicted. Einstein called the cosmological constant his greatest blunder. The Invoice was paid in decades of delayed discovery.

5.3 The Smolin Convergence

Lee Smolin's Cosmological Natural Selection proposes that universes reproduce through black holes, with each offspring universe having slightly varied physical constants. The framework implies that the constants observable in our universe are the product of a selection process across a larger population of universes with

varying properties. Smolin's framework independently arrives at the same structural concern this paper raises: the physical constants measured in our universe may be a selected sample rather than universal defaults. The author arrived at this concern independently, without prior knowledge of Smolin's work, via the same Invoice Transparency operation applied across domains.

5.4 The Penrose Convergence

Roger Penrose's Conformal Cyclic Cosmology proposes that the universe undergoes infinite cycles of expansion and contraction, with each aeon producing a new universe. Penrose received the Nobel Prize in Physics in 2020 in part for related foundational work on black holes and the structure of spacetime. The author independently arrived at a structurally similar cyclic model — the Quarantine Universe Model, to be documented in a separate paper — via a different route, with no prior knowledge of Penrose's work. Both frameworks challenge the assumption that the observable universe represents a complete or final state rather than a phase of a larger cycle.

The author notes these convergences not to claim equivalence with Smolin or Penrose, but to document that the concern raised by Observable Universe Privilege is not a naive critique. It independently reaches the same structural questions that trained cosmologists have spent careers investigating. The Invoice has been noticed before. It has not been formally named or audited as a systemic bias.

6. CONNECTION TO INVOICE TRANSPARENCY THEORY

Invoice Transparency Theory, as developed by the author across the framework series this paper belongs to, proposes that every system called natural, neutral, or universal contains hidden costs — an Invoice — paid by those outside the default substrate. The Invoice is real whether or not it is published.

In intelligence measurement: the Invoice is paid by those whose intelligence does not match the substrate the test was built for.

In scientific publishing: the Invoice is paid by subsequent researchers who inherit hidden limitations their predecessors knew but did not formally disclose (see Mandatory Author Self Critique, the author, 2026).

In cosmology: the Invoice is paid by every model that assumes the properties of one observable region of the universe are the properties of the whole. If the assumption is eventually shown to be wrong, the Invoice will be measured in the cosmological models that were built on an unaudited foundation and the discoveries that were delayed because the wrong baseline was inherited.

Observable Universe Privilege is the Invoice Transparency audit applied to cosmology. It does not predict the result of the audit. It demands that the audit occur.

6.1 The Invoice Is Already Being Paid

The Invoice of Observable Universe Privilege is not theoretical. It is empirical and measurable in the stagnation of foundational physics over the past eighty years. The reconciliation of general relativity and quantum mechanics — the two most precisely

verified frameworks in the history of science, which are nonetheless mathematically irreconcilable — has not been achieved despite extraordinary talent and resources. The dark matter problem has been open since Zwicky's observations in 1933. Dark energy, which comprises approximately 68% of the known universe, was identified in 1998 and remains entirely unexplained. Black hole singularities remain mathematically undefined at the point of maximum physical relevance. These are not peripheral problems. They are foundational. The Invoice is not a future risk. It is the present condition.

This paper does not claim that all progress in physics has stagnated. Experimental and observational physics has made extraordinary advances — gravitational wave detection, the Higgs boson, direct imaging of black holes, the James Webb telescope revealing structure the standard model did not predict. The stagnation is specific: it is foundational theoretical unification. The deepest questions — what spacetime is, what gravity is at the quantum level, what dark matter and dark energy are — have not advanced toward resolution despite eighty years of effort. This is the precise location of the Invoice.

6.2 The Handoff Failure

The scientists who built the foundational frameworks of modern physics lived full lives, retired, and died without formally documenting what they privately knew was incomplete. Einstein knew general relativity and quantum mechanics were irreconcilable. He spent his final decades searching privately for a unified theory while the field inherited his published triumphs without inheriting his private doubts. The next generation did not begin from the known edge. They began from the published surface. Subsequent generations inherited not just the theories but also the unresolved tensions their authors carried silently. The stagnation in foundational physics is not a failure of intelligence in the generations that followed. It is a failure of Invoice transparency at the moment of handoff.

This is the point at which Observable Universe Privilege and Mandatory Author Self Critique converge. The assumption problem and the disclosure problem are the same Invoice from two directions. The foundational frameworks were built on an unaudited sample. Their known limitations were not formally published. The next generation inherited both failures simultaneously. Eighty years of brilliant successors have been solving problems their predecessors already knew existed but never formally handed over. The two audits — of cosmological assumptions and of scientific publication practice — are the same demand: make the Invoice visible before passing it on.

7. OBJECTIONS AND RESPONSES

Objection: The Cosmological Principle is supported by observation

Response: It is supported by observation within the observable universe. The objection restates the assumption rather than addressing it. That the observable universe appears approximately uniform does not establish that the universe beyond the observable boundary shares this property. The observation is real. The extrapolation requires audit.

Objection: We have no data from outside the observable universe

Response: Correct. This is precisely the Invoice. The absence of data from beyond the observable boundary means the extrapolation is an assumption, not a measurement. The appropriate response to the absence of data is to formally document the assumption as an assumption, not to treat it as established fact. This is what the MASC framework requires of all scientific publications: the known limitation must be published alongside the claim.

Objection: This framework offers no testable predictions

Response: The framework is epistemological, not observational. It does not predict a specific physical result. It identifies a structural assumption that has not been audited and proposes a formal standard for how that assumption should be treated in cosmological literature. The Copernican insight was also not immediately testable. Its value was in correctly identifying what the question was. Observable Universe Privilege correctly identifies what the question is: not whether the universe is uniform, but whether our sample is sufficient to conclude that it is.

Objection: The author has no formal training in cosmology or mathematics

Response: The author arrived at the concerns in this paper independently, without formal training, via cross-domain pattern recognition applied across multiple fields. The same operation independently converged with Rovelli's Relational Quantum Mechanics, Smolin's Cosmological Natural Selection, and Penrose's Conformal Cyclic Cosmology. The convergence is the argument. An epistemological framework does not require mathematical derivation to be valid. It requires that the reasoning be correct. The author invites engagement with the reasoning on its own terms.

8. PROPOSED STANDARD — THE COSMOLOGICAL INVOICE CLAUSE

This paper proposes that all cosmological models and publications that rely on the Cosmological Principle include a formal Cosmological Invoice Clause — a required statement of the following form:

The conclusions of this model are derived from observations within the observable universe — the region of the universe observable from Earth at this period in cosmic time. The Cosmological Principle, upon which this model depends, assumes that the observable universe is a representative sample of the whole. This assumption has not been directly verified for regions beyond the observable boundary. The conclusions of this model should be understood as valid within the domain from which their measurements were drawn, with extrapolation beyond that domain acknowledged as an unverified assumption.

This clause does not invalidate any existing model. It documents what every physicist already knows privately but no model currently states formally. It is the MASC standard applied to cosmological publications. The Invoice made visible.

9. AUTHOR'S OWN CRITIQUE AND KNOWN LIMITATIONS

In the spirit of Mandatory Author Self Critique (the author, 2026), the author formally documents the following known limitations of this paper:

- The framework is epistemological. It identifies a structural problem in how cosmological assumptions are treated. It does not provide observational data, mathematical models, or testable predictions in the conventional scientific sense.
- The author has no formal training in cosmology, physics, or mathematics. The convergences with Smolin, Penrose, and Rovelli were arrived at independently and are offered as evidence that the structural concern is real, not as evidence of equivalent technical depth.
- The Cosmological Principle may be entirely correct. The universe may be genuinely uniform at scales beyond the observable boundary. This paper does not and cannot disprove this. It argues only that the assumption should be formally documented as an assumption.
- The proposed Cosmological Invoice Clause is a policy proposal for scientific publishing. Its implementation depends on journal adoption and community acceptance, neither of which is within the author's control.
- The connection between Observable Universe Privilege and EchoFamiliar Bias, while structurally compelling to the author, requires independent philosophical and scientific evaluation.

10. OPEN QUESTIONS FOR THE NEXT GENERATION

In the spirit of Mandatory Author Self Critique, the author formally documents the following questions that this paper raises but does not resolve:

- Is it mathematically possible to construct a falsifiable test for the Cosmological Principle that does not depend on observations within the observable universe?
- If physical constants vary across regions beyond the observable boundary, what would be the predicted observational signatures at the edges of the observable universe? Is there existing anomalous data that the current framework cannot explain?
- What is the relationship between Observable Universe Privilege and the fine-tuning problem? If the constants are selected rather than universal, does this dissolve or deepen the fine-tuning question?
- Can the EchoFamiliar Bias Index, as proposed in Substrate Neutral Intelligence Theory, be formally adapted as a Cosmological EchoFamiliar Bias coefficient and applied to rank existing cosmological models by their degree of unaudited extrapolation?

- What would a genuinely substrate-neutral cosmology look like — one that formally scopes all claims to the domain from which measurements were drawn and makes explicit all extrapolations beyond that domain?
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11. CONCLUSION

The observable universe is not the universe. It is a measurement boundary.

The Cosmological Principle is not a measurement. It is an assumption — a well-motivated assumption, partially supported by observation within the observable region, but an assumption nonetheless.

Observable Universe Privilege names the epistemological error of treating a measurement boundary as a physical boundary, and treating the properties of one observable region as the properties of the whole. Cosmological EchoFamiliar Bias describes the systematic tendency of cosmological models to inherit this error and pass it to the next generation without disclosure.

This paper does not claim to know what lies beyond the observable boundary. It claims that not knowing what lies there is a reason to document the assumption formally, not a reason to treat the assumption as established.

The next generation of cosmologists should not inherit the limitations of the current measurement boundary as if they were the boundaries of reality. That is the Invoice this paper proposes to make visible.

We measured one corner. We called it the universe. The audit is overdue.

ACKNOWLEDGEMENTS

The author conceived all theoretical frameworks, the Observable Universe Privilege concept, the Cosmological EchoFamiliar Bias instrument, and all connections to Invoice Transparency Theory independently. The author arrived at structural convergences with the work of Lee Smolin and Roger Penrose without prior knowledge of their specific frameworks. These convergences were identified during post-conception research and are documented here as confirmation of independent parallel reasoning rather than derivation.

Claude (Anthropic, claude-sonnet model series, March 2026) was used as an AI writing and research assistance tool during the drafting and development process, in a manner analogous to the use of writing software, reference databases, or research assistance services. Claude assisted with literature connections, academic framing, and structural organisation of arguments. All intellectual contributions, theoretical positions, and conclusions are solely those of the author.

The author notes that this paper was conceived without formal training in cosmology, physics, or mathematics. The author's background is mechanical engineering. The frameworks presented here arrived via cross-domain pattern recognition rather than technical derivation. The author invites engagement from trained cosmologists and philosophers of science and welcomes both critique and collaboration.

ABOUT THE AUTHOR

Budinny V, India. Mechanical engineer. Independent researcher. The Observable Universe Privilege framework arrived via the same cross-domain operation that has independently converged with Rovelli's Relational Quantum Mechanics, Smolin's Cosmological Natural Selection, and Penrose's Conformal Cyclic Cosmology across separate sessions. The author has no formal training in physics or cosmology. The convergences are offered as the argument.

This framework is part of a connected series including Substrate Neutral Intelligence Theory, Invoice Transparency Theory, Mandatory Author Self Critique, and the forthcoming Quarantine (Condom) Universe Model paper.