

Universe Ontology Research Group
Institute for Advanced Studies
123 Science Avenue
City, State 12345

April 19, 2025

The Editor
Physical Review Letters
American Physical Society

Dear Editor,

We are pleased to submit our manuscript entitled “Experimental Verification Predictions of the Universe Ontology Theory: Quantum XOR Causal Invariance” for consideration for publication in Physical Review Letters.

This manuscript presents four specific, experimentally testable predictions derived from the Universe Ontology theoretical framework, which posits that fundamental information operations—specifically XOR and SHIFT—form the underlying basis for physical phenomena. These predictions focus on quantum causal invariance phenomena and offer concrete opportunities to validate or falsify key aspects of this novel approach to unifying quantum and classical physics.

We believe this manuscript is ideally suited for Physical Review Letters for the following reasons:

1. **Novelty and Significance:** Our work proposes a new theoretical approach to understanding quantum phenomena through information operations, with specific predictions that differentiate it from standard quantum mechanics in experimentally accessible regimes.
2. **Experimental Testability:** All four predictions are accompanied by detailed experimental protocols that can be implemented with current or near-term technology, providing clear pathways for empirical verification or falsification.
3. **Interdisciplinary Impact:** The predictions bridge quantum physics, information theory, and foundational physics, potentially impacting multiple fields of research.
4. **Concise Presentation:** We have presented the core theoretical concepts and predictions in a focused, self-contained format appropriate for PRL’s readership and format requirements.

The key predictions include:

- Quantum causal invariance under XOR-SHIFT transformations
- Non-local XOR correlation preservation in entangled systems
- Quantum phase transitions at critical XOR-SHIFT coupling
- Phase-dependent quantum coherence oscillations during sequential XOR operations

These predictions are not parameter adjustments to existing theories but rather emerge from fundamentally different axioms about the nature of physical reality, making them ideal candidates for rigorous experimental testing.

All authors have approved the manuscript and its submission to Physical Review Letters. This manuscript is not currently under consideration elsewhere, and no part has been previously published.

We suggest the following individuals as potential reviewers who have expertise in quantum foundations, experimental quantum optics, and information theory:

e, Institution, Email - Expertise in quantum foundations and Bell-type experiments

e, Institution, Email - Expertise in quantum phase transitions and many-body systems

e, Institution, Email - Expertise in quantum information theory

e, Institution, Email - Expertise in experimental quantum optics

We would like to request that [Potential Conflicted Reviewer Name] not be considered as a reviewer due to competing research interests.

Thank you for considering our manuscript. We look forward to your response.

Sincerely,

Universe Ontology Research Group
Institute for Advanced Studies