Cover Letter

April 18, 2025

Dr. Holden Thorp Editor-in-Chief Science Magazine American Association for the Advancement of Science 1200 New York Avenue NW Washington, DC 20005

Dear Dr. Thorp,

I am pleased to submit our manuscript titled "Information Ontology: Rewriting the Foundations of Physics" for consideration as a Research Article in Science. This paper presents a comprehensive framework that reinterprets the foundations of physics by establishing information as the fundamental substrate of reality.

Our work proposes that the most elegant and powerful resolution to multiple outstanding problems in modern physics—including the quantum measurement problem, quantum gravity incompatibility, and black hole information paradox—comes from recognizing information operations as physically primitive. Using two basic operations (XOR and SHIFT), we derive quantum phenomena, relativistic effects, and thermodynamic principles from a common foundation.

We believe this manuscript is appropriate for Science for several reasons:

1. **Interdisciplinary significance:** The information ontology framework bridges quantum mechanics, relativity, thermodynamics, and information theory, providing insights relevant to a broad scientific audience.
2. **Paradigm-shifting perspective:** By positioning information as ontologically fundamental, our approach represents a significant conceptual advancement in how we understand physical reality.
3. **Experimental testability:** We provide specific, quantitative predictions that differ from conventional theories, particularly in quantum mechanics and gravitational physics, offering clear pathways for empirical validation.
4. **Practical applications:** Our framework suggests novel approaches to quantum computing, information processing, and complex systems modeling with potential technological implications.

The manuscript includes both theoretical development and experimental predictions. We have begun testing key predictions and have included preliminary data supporting the framework's validity.

All authors have approved the manuscript and its submission to Science. This manuscript is not under consideration elsewhere, and its contents have not been previously published in any form.

We suggest the following individuals as potential reviewers who have appropriate expertise without conflicts of interest:

1. Dr. Sarah Chen, University of California, Berkeley (quantum information science)
2. Dr. Michael Levin, Perimeter Institute (quantum foundations, topological physics)
3. Dr. Elena Rodriguez, Max Planck Institute for Gravitational Physics (quantum gravity)
4. Dr. Jonathan Kim, Massachusetts Institute of Technology (foundations of quantum mechanics)
5. Dr. Sophia Wang, Oxford University (information theory, complex systems)

We would prefer to exclude reviewers from the following institutions due to competing approaches: Stanford Quantum Research Group and the Institute for Advanced Theoretical Studies.

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

Sincerely,

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