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Information, Singularity, and the Structure of Reality: A Comprehensive Analysis

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Abstract: ***Information is often discussed in physics, but this article takes a step further and treats information as a basic part of reality, much like energy or space. It reviews how information shows up in quantum mechanics, digital physics, and even old philosophical ideas. The article connects singularity, light, electromagnetism, and the structure of matter with information, suggesting that physical laws come from how information is arranged and moves. While some thoughts are speculative, they aim to stay within known science. The article draws on past work and suggests that thinking of the universe as informational could help us understand everything from the smallest particles to the biggest mysteries.***

Keywords: Information, Quantum Physics, Singularity, Digital Data, Massless Particles

1. Introduction

Information plays an increasingly central role in contemporary physics, appearing in quantum state descriptions, entropy measures, black hole thermodynamics, and quantum computation. These developments motivate the examination of information not merely as a descriptive tool, but as a potentially fundamental quantity underlying physical law.

Within the domain of digital physics, reality is modeled as fundamentally informational or computational, with physical entities and interactions emerging from discrete informational processes rather than existing as primary ontological constituents (Wheeler, 1990; Landauer, 1991). From this perspective, mass–energy relations, spacetime geometry, and force interactions are interpreted as emergent phenomena arising from deeper informational structure.

Building upon the unified framework introduced by Perinjelil (2025), where a unified framework for measuring the universe is established, this article advances the hypothesis that information functions as a pre-physical organizing principle, governing the emergence and behavior of observable physical systems. Notably, conceptually similar ideas appear in early philosophical literature. In the Johannine formulation of the Logos ("Word"), all physical reality is described as arising through an abstract, preexistent principle (John 1:1–3). If not taken as theology, this idea can be seen as an early version of an informational base beneath matter. While not a scientific claim, this historical perspective illustrates the persistence of information-centric intuitions that are now formalized within digital physics and quantum information theory.

Singularity and Informational Compression

A singularity may be characterized as a limit of physical differentiation, in which conventional descriptions of spacetime and energy density become insufficient. Rather than treating singularity solely as a geometric divergence, this framework interprets it as a state of maximal informational compression and minimal degrees of freedom. This view matches approaches in quantum gravity that see spacetime as emergent. It also fits with the unification idea suggested by Perinjelil (2025). In informational terms, singularity represents a boundary condition in which physical observables collapse into a highly compressed informational state.

Information, Light, and Propagation Constraints

Photons propagate at the invariant speed of light and serve as primary carriers of information in physical systems. Information itself, however, is distinct from its physical carriers and is encoded within particles, fields, or quantum states. As discussed in Perinjelil (2025), informational structure may precede observable radiation, with electromagnetic emission emerging as a manifestation of organized informational release. Quantum correlations, including entanglement, further indicate that informational relationships may exist independently of classical signal propagation, without violating relativistic causality. These observations support the digital-physics view that information constrains physical behavior at a more fundamental level than energy transfer alone.

Electrical Systems as Informational Transmission Media

Electricity is commonly modeled as the flow of electric charge through a conductor. Empirical evidence shows energy transfer in electrical systems depends on electromagnetic field movement; charge carriers move much slower. From an informational perspective, electric power may be interpreted as the rate of structured energy and information transmission. Voltage represents potential energy per unit charge and determines a system's capacity for work and signal encoding. This interpretation is consistent with the energy–information relationship outlined in Perinjelil (2025) and with the digital-physics view that physical processes function as information-processing systems.

Information Conservation and Subatomic Encoding

Information conservation is a principle supported by quantum mechanics and black hole information theory, which hold that

information is neither created nor destroyed but transformed or redistributed across physical interactions. Within the proposed framework, subatomic particles such as quarks function as informational encoders, with quantum numbers, symmetry properties, and interaction dynamics representing structured informational states. Although information does not stay in one place, its pattern allows matter to stay together and complex forms to appear. This interpretation aligns with digital physics models in which particles are viewed as discrete informational configurations rather than fundamental material objects.

Noise, Decoherence, and Structural Stability

Physical systems are subject to noise, decoherence, and loss of informational fidelity, which degrade coherence and limit predictability. Stability depends on mechanisms that preserve or restore informational structure. Error correction in physical systems- through conservation laws, symmetry restoration, or feedback processes- serves an analogous role to syntactical correction in formal information systems, maintaining internal consistency and functional order. Such mechanisms reinforce the interpretation of physical law as informational constraint rather than purely dynamical behavior.

2. Discussion

Interpreting physical phenomena through an informational framework provides a unifying perspective across gravity, electromagnetism, and quantum theory. Energy transfer, force interactions, and structural stability may be viewed as emergent consequences of organized information. The digital-physics interpretation presented here suggests that physical reality operates as a rule-governed informational system, with observable phenomena arising from underlying informational processes. While elements of this framework remain speculative, they remain compatible with the unification principles presented in the author's IJSR publication and with broader research directions in quantum information science and computational models of the universe.

3. Conclusion

This article proposes that information may be regarded as a foundational constituent of physical reality. By extending the unified framework introduced by Perinjelil (2025), information is presented as a conserved and organizing principle capable of linking singularity, electromagnetism, and subatomic structure within a coherent conceptual model. From the perspective of digital physics, this approach positions physical law and material structure as emergent expressions of deeper informational order. In this sense, modern theoretical developments echo longstanding philosophical intuitions that identified an abstract "Word" or ordering principle as antecedent to material existence (John 1:1–3), suggesting a convergence between early metaphysical reasoning and contemporary informational models of the universe.

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