

Omar Iskandarani
Vinkenstraat 86A,
9713TK Groningen,
The Netherlands

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Editors
Foundations of Physics

Dear Editor,

I am pleased to submit the manuscript *The Hydrodynamic Triad: Unifying Gravity, Electromagnetism, and Quantum Mass via a Circulation-Based Vacuum Canon* for consideration in *Foundations of Physics*.

Standard Model parameters and gravitational constants are typically treated as arbitrary empirical inputs. In this work, we present a rigorous derivation of these constants from a fundamental hydrodynamic substrate defined by a single topological invariant: the Circulation Quantum Γ . By establishing a "Circulation-First" canon based on the triad of vacuum density ρ_f , wave speed c , and circulation Γ , we demonstrate that the electron mass m_e , the fine structure constant α , and Newton's gravitational constant G emerge as geometric consequences of knotted vorticity in an inviscid, incompressible fluid.

Key foundational advances presented in this work include:

- **The Topological Origin of Mass:** We show that particle rest masses are not intrinsic but solitonic, derived from the energy density of knotted vortex filaments (specifically the 3_1 , 5_2 , and 6_1 topologies) scaled by the hyperbolic volume of their knot complements.
- **Resolution of the Hierarchy Problem:** We derive the gravitational coupling G directly from the strong-force scale of the vortex core, identifying the geometric suppression factor ($\lambda_G \approx 10^{-60}$) that naturally separates quantum and cosmological scales without fine-tuning.
- **Hydrodynamic Origin of Quantum Numbers:** We provide a geometric map where electric charge, spin, and color correspond to specific topological linking numbers and chirality states of the vortex strings.

Why *Foundations of Physics*? This manuscript addresses the deep ontological questions central to your journal's mission. It proposes a realist, geometric unification that bridges the conceptual gap between fluid mechanics, knot theory, and gauge theory. Beyond theoretical synthesis, the framework offers a concrete experimental discriminator: the **Vacuum Verdet Constant**, which predicts a unique linear-in- B magneto-optic effect in the vacuum, distinct from standard QED predictions.

Compliance. The manuscript is original, not under consideration elsewhere, and all authorship/affiliation information is complete. Conflicts of interest: none. Data, code, and the formal derivation canon are available via the cited Zenodo record(s).

Thank you for your consideration.

Sincerely,

Omar Iskandarani
Independent Researcher, Groningen,
The Netherlands
ORCID: 0009-0006-1686-3961
Email: info@omariskandarani.com