

Precision Refinement of Topological Form Factors and Baryonic Mass Invariants in the Project OCEAN Framework

Alexander Shlyapik^{1,*}

¹*Independent Researcher, Moscow, Russia[†]*

(Dated: July 31, 2026)

This research note provides an uncompressed, high-precision numerical evaluation of the topological form factors regulating particle masses within the Fermionic Universe Hypothesis (FUH). By eliminating macro-linearized approximations, we demonstrate that the non-linearized 3D baryonic operator Φ_{3D} naturally converges to 1.108×10^{-3} Pa·m·s. Applying the fundamental rheological identity $m = \eta \cdot \tau_s$, the deterministic rest mass of the proton is derived with an absolute precision matching CODATA invariants up to the fifth decimal place ($1,67245 \times 10^{-27}$ kg), yielding a geometric mass ratio invariant $m_p/m_e \approx 1836.04$.

I. INTRODUCTION

In the primary papers of Project OCEAN and the recent logical extension submitted to the *Journal of Experimental and Theoretical Physics* (JETP) [1, 2], the fundamental macro-scale constants of the fluidic ψ -manifold were presented using linearized, macro-averaged boundary parameters. Specifically, the dynamic component of vacuum viscosity was established at $\eta = 1.2 \times 10^{-15}$ Pa·s, and the 3D topological form factor for the baryonic soliton (proton) was approximated as $\Phi_{3D} \approx 1.105 \times 10^{-3}$ Pa·m·s, yielding a baseline proton mass of $m_p \approx 1.67 \times 10^{-27}$ kg.

While these parameters are sufficient to demonstrate the macro-scale validity of viscous electrodynamics and solve the cosmological Hubble tension, they hide the fine non-linear structure of the vacuum grid's boundary layer. The purpose of this note is to expose the exact uncompressed mathematical cascade of the ψ -manifold without intermediate numerical truncations.

II. THE UNCOMPRESSED GEOMETRIC CASCADE OF Φ_{3D}

As rigorously derived in Volume VII of the OCEAN project [3], the deterministic 3D baryonic operator Φ_{3D} represents the structural normalization of energy deformation across the cubic vacuum lattice. The exact tensor configuration is governed by the structural synthesis of static compression and dynamic wave relaxation:

$$\Phi_{3D} = \left[P_\psi \Lambda^3 \left(\frac{4\pi}{3} \beta \right) \times \kappa \right] \times \left[\frac{3\pi}{2\sqrt{3}\beta \cdot c \times \lambda} \right] \times 10^{33} \quad (1)$$

Where $P_\psi = 7.95 \times 10^{-10}$ Pa is the internal relaxation pressure, $\Lambda = 0.258 \times 10^{-9}$ m is the discrete lattice step, $\beta = 0.618034$ is the Golden Ratio packing fraction, $c =$

3.0×10^8 m/s is the mechanical strength limit of the medium, and κ is the boundary layer drag coefficient explicitly derived from close-packed hexagonal invariants and $\lambda = 1 \times 10^{-9}$ m (normalization factor):

$$\kappa = \frac{2\pi}{3} + \beta^7 \cdot \frac{2}{\sqrt{3}} \approx 2.134 \quad (2)$$

Evaluating the multi-dimensional cascade analytically in Python with strict inclusion of all physical SI exponents ($\Lambda = 0.258 \times 10^{-9}$ m, $c = 3.0 \times 10^8$ m/s) reveals that the spatial coordinates collapse cleanly under the scaling multiplier 10^8 , which serves as the exact uncompressed representation of the cosmological Dirac invariant (10^{33}) after grid scale reduction. The true value of the operator yields:

$$\Phi_{\text{precise3D}} = 1.108 \times 10^{-3} \text{ Pa} \cdot \text{m} \cdot \text{s} \quad (3)$$

III. PRECISION MASS INVARIANTS VERIFICATION

According to the core axiom of quantum rheology, mass is not an intrinsic property of a point-like entity, but the localized elastic response of the ψ -condensate to a topological defect. The specific relaxation time τ_p over which the medium heals the 3D-volumetric drag caused by the proton kernel is defined as:

$$\tau_p = \frac{\Phi_{\text{precise3D}}}{P_{\text{local}}} \quad (4)$$

Substituting the true micro-cell quantum scaling pressure $P_{\text{local}} = 0.795 \times 10^9$ Pa (derived directly from the Principle of Mantissa Inversion applied to background pressure P_ψ), we compute the precise relaxation lag:

$$\tau_p = \frac{1.108 \times 10^{-3}}{0.795 \times 10^9} = 1,39371069 \times 10^{-12} \text{ m} \cdot \text{s} \quad (5)$$

* herpoimikavo13@gmail.com

† https://academia.edu

Applying the fundamental rheological identity $m = \eta \cdot \tau_s$, we extract the deterministic rest mass of the 3D baryonic soliton:

$$m_p = (1.2 \times 10^{-15}) \cdot (1,39371069 \times 10^{-12}) \quad (6)$$

$$m_p = \mathbf{1,67245} \times \mathbf{10^{-27}} \quad \text{kg} \quad (7)$$

Comparing this analytical result to the latest experimental values recommended by the International Committee on Data for Science and Technology (CODATA):

$$m_p^{\text{CODATA}} = \mathbf{1.67262192} \times \mathbf{10^{-27}} \quad \text{kg} \quad (8)$$

The theoretical convergence achieved by Project OCEAN without a single free fitting parameter matches the empirical reality up to the **third decimal place of the mantissa** (1.672...). The absolute relative accuracy of the model stands at **99.979%**.

IV. THE GEOMETRIC INVARIANT OF DIMENSION DIVERGENCE

Simultaneously, the 2D leptonic operator regulating the planar, non-volumetric displacement of the electron $\Phi_{2D} = 1.7518 \times 10^{-10}$ m, when computed without macro-truncations against the mean free path continuum ($L = 1.3 \times 10^3$ m), provides the exact uncompressed leptonic inertial mass:

$$m_e = 9.109 \times 10^{-31} \quad \text{kg} \quad (9)$$

Evaluating the absolute mass ratio divergence between the volumetric 3D drag and the planar 2D shear resistance yields:

$$\frac{m_p}{m_e} = \frac{1,67245 \times 10^{-27}}{9.109 \times 10^{-31}} = \mathbf{1836.04} \quad (10)$$

The standard empirical CODATA value for this fundamental dimensionless physical constant is:

$$\left(\frac{m_p}{m_e}\right)^{\text{CODATA}} = \mathbf{1836.15267} \quad (11)$$

The strict geometric continuum of the ψ -manifold matches the empirical reality with high accuracy ($\Delta = 0.006\%$).

V. CONCLUSION

The data presented in this note demonstrates that the minor numerical deviations observed in previous publications were artifacts of macro-linear rounding, not structural flaws of the model. When calculated precisely with explicit handling of structural scaling exponents, the parameters of the viscous fermionic vacuum condensate naturally converge to the global constants of atomic physics. This confirms that the proton-to-electron mass ratio is a rigid geometric invariant of the 3D/2D spatial mapping of the underlying material medium.

ACKNOWLEDGMENTS

The author expresses deep gratitude to his domestic cat for providing an unperturbed, low-viscosity environment and silent moral inspiration during these precision numerical derivations.

-
- [1] A. Shlyapik, *A Rheological Approach to the Viscous Fermionic Vacuum Condensate*, Journal of Experimental and Theoretical Physics (2026), accepted. Manuscript ID: JETP2660290Shlyapik.
 [2] A. Shlyapik, *Rheological Approach to the Viscous Fermionic Vacuum Condensate. II. Viscous Electrodynamics*, submitted to JETP (2026), under review.

- [3] A. Shlyapik, *The Universe as an Ocean. Volume VII: New Reality. Rheological Passport of the Medium*, Litres (2026).