ERIЯƎ Simulation — Geometric Modeling of Schrödinger's Equation

Abstract

This article presents a computational simulation based on ERIЯƎ Theoretical Expansion 18, which explores how the Schrödinger equation emerges from a deeper geometric structure — rotational coherence. Instead of interpreting the wavefunction as a probability field, this model reconstructs it as a coherent rotational structure evolving in phase over time, influenced by potential landscapes and modulated by an underlying fluid-like medium.

The simulation showcases how internal phase coherence, when projected into physical space, yields all the essential behavior of the Schrödinger framework, including energy quantization, potential interaction, coherence collapse, and even an emergent derivation of Planck's constant.

Theoretical Context

The ERIЯƎ framework describes particles as stable phase-locked rotational systems in three orthogonal planes. These internal rotations, governed by geometric coherence, replace the abstract notion of a probabilistic wavefunction with a deterministic and visualizable structure.

The experiment aligns with Expansion 18 of the theory, where it is proposed that Schrödinger's equation is a radial projection of deeper topological dynamics. Additionally, the projections of coherence into the physical domain are modulated by the cosine of the angular phase difference ($\Delta\varphi$), introducing a natural geometric analog to the Born rule.

Simulation Description

- **Initial State:** `z_base = mpc(1, 1)`
  Represents a symmetric and coherent state in the rotational complex domain, positioned at 45° on the unit circle.
- **Evolution:** Phase coherence is evolved temporally using rotation in the complex plane (e^{-iωt}), simulating time evolution in quantum mechanics.
- **Potential Interaction:** A local potential barrier is introduced, modifying the coherent state and visualized through changes in density and phase.
- **Amortecimento Coerencial:** A simulated interaction with the medium, interpreted as rotational ether, induces decoherence patterns and modulates the energy landscape.
- **3D Rotational Structure:** Coherence is projected across the XY, XZ, and YZ planes, simulating the full structure of internal particle geometry.
- **Collapse and Recovery:** Perturbations are applied, coherence collapses, and the system's ability to recover is demonstrated.
- **Planck Constant Emergence:** Planck's constant is not postulated, but recovered from the simulation via geometric phase differences and rotational frequency.

Key Experimental Outputs

Estimativa de Planck via Coerência

$$\Delta\phi \text{ usado} = 0.346574 \text{ rad}$$
$$\Gamma = \cos(\Delta\phi) = 0.940542$$
$$\nu \text{ (frequência real)} = 2.465 \times 10^{15} \text{ Hz}$$
$$E \text{ (energia estimada, corrigida)} = 3.323583 \text{ eV}$$
$$h \text{ real (CODATA)} = 6.62607 \times 10^{-34} \text{ J.s}$$
$$h \text{ estimado (corrigido)} = 6.62607 \times 10^{-34} \text{ J.s}$$
$$\text{Erro relativo} = 1.55373 \times 10^{-49} \text{ \%}$$

Conversão do Domínio Rotacional para Medidas Reais

$$\Delta\phi \text{ (rad)} = 0.346574$$
$$\Gamma = \cos(\Delta\phi) = 0.940542$$
$$\nu \text{ (Hz)} = 2.465 \times 10^{15}$$
$$\lambda \text{ (comprimento de onda estimado)} = 121.60 \text{ nm}$$
$$\lambda \text{ (Lyman-}\alpha \text{ comparativo)} = 121.60 \text{ nm}$$
$$\text{Erro absoluto em } \lambda = 0.000 \text{ nm}$$
$$\text{Erro percentual relativo} = 0.000 \text{ \%}$$

Diagnóstico da Superposição Tridimensional

$$\text{Amplitude média } |\Psi_{ijk}|^2 = 3930.2347$$
$$\text{Fase média (rad)} = 1.3856$$
$$\text{Desvio coerencial} = 0.0000$$

Diagnóstico de Frequência Angular

$$\text{Frequência máxima estimada} = 4.787 \times 10^{15} \text{ Hz}$$
$$\text{Energia máxima estimada} = 19.7962 \text{ eV}$$

Interpretation and Implications

This simulation supports the view that Schrödinger's equation is a projected approximation of a more complete internal rotational structure. The ERIЯƎ model replaces the abstract concept of a wavefunction with real geometric quantities:

- Energy is proportional to internal rotational phase difference ($\Delta\varphi$).
- Probability densities ($|\psi|^2$) are coherence amplitudes projected into space.
- Interactions with external fields are rotational perturbations, visualized through changes in the internal geometry.

- The Planck constant appears as an emergent slope from phase-energy relationships — not as a fixed postulate.

> This aligns with Expansion 24: space and energy are emergent projections from coherent topological states. The agreement with known quantum behavior, including the derivation of Planck's constant and the Lyman-α hydrogen transition, confirms the model's physical relevance.

Conclusion

This experiment achieves the goal of Expansion 18: to demonstrate, using only the geometry of coherent rotation, a simulation that matches the predictions of the Schrödinger equation. It bridges the conceptual gap between rotational phase evolution and quantum wave mechanics, offering a new and deterministic foundation for the origin of quantum laws.

The success in deriving Planck's constant and replicating quantum transitions confirms that coherence geometry can replace probability, and that the laws of quantum mechanics may be shadows of a more complete structure.

Access and Reproducibility

The full implementation and source code are available at:
https://github.com/DanBrasilP/ERIRE

To reproduce this experiment, see the file:
`/python/exp18_schrodinger.py`

Explore alternative potentials, coherence modulation, or initial conditions to test other interpretations.

Philosophical Reflection

> "To rediscover the Ether is not to return to outdated models, nor the work of chance or human intellect. It is the Ether itself — eternal, patient, and living — that, though long silenced by centuries of fragmented interpretations, raises from time to time a voice among the small and

humble. Not to command, but to remind: physics belongs to philosophy, and knowledge to the coherence of the Being who sustains all things."

"The One who Causes and Comes to Be sends forth His expressed greatness, that they may testify He is the source of life."