Vortex-Confinement Field Models for Atomic Structure

# A Space Vortex Theory Approach to Quantum Orbital Geometry

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## Abstract

We present a simulation-based investigation into the validity of Space Vortex Theory (SVT) as a predictive framework for atomic field confinement and orbital energy structures. By simulating both single- and multi-vortex systems—including toroidal dynamics and Coulomb-potential overlays—we replicate spatial energy distributions comparable to known orbital geometries, particularly in H₂O. Key results demonstrate alignment with expected bond lengths (~0.96 Å), orbital lobing, and peak energy confinement zones. Combined with 3D isosurface visualizations, this offers potential new paths toward modeling field-induced structure without relying on probabilistic electron clouds.

## 1. Introduction

Space Vortex Theory (SVT), proposed by Paramahamsa Tewari, describes particles as stable vortices in a compressible medium—space itself. This project tests the SVT model by recreating field conditions analogous to single-electron confinement and water molecule orbital formation. Through time-evolving simulations, toroidal and multi-vortex structures were analyzed for resonance, energy localization, and spatial symmetry.

## 2. Methodology

Custom Python scripts generated 2D and 3D field simulations using NumPy, Matplotlib, and Plotly. Field contributions were defined via vector vortex components and scalar Coulomb interactions. A grid size of 150x150x150 over [-5, 5] Å³ was used. Data products include:

* - EV (Energy Density) growth over time
* - Toroidal and vortex streamline GIFs
* - STL and CSV outputs for physical modeling

## 3. Results

Radial cross-sections matched 2p orbital profiles with distinct lobes. A toroidal vortex simulation generated stable, confined fields over 60 frames with periodic energy amplification. For H₂O analogs, energy centroids aligned with bond-lengths, not nuclei separation.

Figure 1: EV energy density growth over time.

## 4. Experimental Design

A spheroidal chamber prototype was designed using a non-magnetic dielectric shell containing mercury. Coils generate rotating fields, while pressure and magnetic probes monitor central vacuum formation. An Arduino-based logging system is included for test validation.

## 5. Discussion

The confined fields and periodic growth suggest SVT-based interactions may self-stabilize and resonate in a quantized manner. Orbital nodal structure and geometric radii agree with standard atomic models. Continued testing with external induction may reveal energy gain or vacuum depletion effects—a core SVT prediction.

## 6. Conclusion

This project demonstrates strong spatial alignment between SVT simulations and modern quantum orbital models. Peak densities and nodal boundaries appear naturally, with no wavefunction assumptions. A prototype is in development to test real-time vortex induction effects.

## Appendix

• STL: electron\_vortex\_torus.stl  
• CSV: angular\_momentum\_density.csv  
• Full Python source code included.