Swirl-Resonant Nuclear Phenomena in the Vortex Æther Model

Compiled Insights from LENR and High-Field Laser Experiments

Abstract

This document summarizes key findings from a series of experimental and theoretical works on low-energy nuclear reactions (LENR), laser-induced fusion, and high-power photon-ion interactions. Each paper is analyzed through the lens of the Vortex Æther Model (VAM), confirming its core predictions and offering new directions for development. The results support a topological, swirl-resonant mechanism behind fusion and nuclear activation, distinct from classical thermal models.

1. Core Confirmations of VAM

- **Swirl-Induced Tunneling:** LENR occurs via localized vortex-knot pressure collapse, allowing barrier penetration without thermal energy. Confirmed by low-threshold fusion in palladium lattices and boron-based reactions [**?**, **?**].
- **Dual-Mode Excitation:** Fusion is triggered when both rotational (neutron) and irrotational (gamma) perturbations reach the vortex core, as observed in ^{11}B(d,nγ)^{12}C and laser-ion experiments [**?**, **?**].
- **Helicity Injection:** Circularly polarized light couples directly with vortex knot chirality, enabling helicity transfer and resonant excitation [**?**].
- **Swirl Pressure Acceleration:** Laser-ion acceleration mimics Ætheric pressure collapse, matching VAM's prediction that acceleration derives from $\nabla(\rho_{æ C_{\tilde{e}}^2/2})$ [**?**, **?**].

2. New Theoretical Developments

2.1 Swirl Spectral Coupling

The yield of vortex-mediated nuclear activation is:

$$Y_{\text{VAM}} = \int_0^\infty \rho_{\text{beam}}(\omega) \cdot \sigma_{\text{knot}}(\omega)\, d\omega$$

with the knot spectrum modeled as:

$$\sigma_{\text{knot}}(\omega) = \sum_n \frac{B_n \Gamma_n^2}{(\omega - \omega_n)^2 + \Gamma_n^2}$$

2.2 VAM Tunneling Probability

The Ætheric tunneling probability through a vortex knot pressure barrier is:

$$P_{\text{VAM}} = \exp\left(-\frac{\frac{4}{3}\pi r_c^3 \rho_{æ}}{M_d}\right)$$

yielding $P \sim 10^{-6}$ for canonical VAM values.

2.3 Knot Collapse as Delayed Neutron Emission

Beta-delayed neutron profiles are modeled by:

$$\omega(t) = \sum_{i=1}^{n} \omega_{0i} e^{-t/\tau_i}, \quad \tau_i = \frac{r_i}{C_e}$$

representing vortex layer unwinding [**?**].

2.4 Swirl-Induced Acceleration and RPA

Relativistic acceleration under radiation pressure is modeled by:

$$a_{\text{swirl}} = \frac{1}{M} \nabla \left(\frac{1}{2} \rho_{æ} C_e^2 \right)$$

3. Practical Insights

- Ultra-thin foil targets act as optimal swirl-coupling membranes [**?**].
- Circular polarization ensures angular momentum alignment with knot modes [**?**].
- Energy yield and spectral distribution can be tuned by matching beam coherence to knot eigenfrequencies.
- High Æther density ($\rho_{æ \sim 10^{18}}$ kg/m^3) ensures finite tunneling and supports LENR at low external temperatures [**?**].

4. Conclusion

Experimental results from LENR, laser-induced nuclear reactions, and delayed neutron studies converge on VAM's prediction: nuclear processes are driven not by stochastic collisions, but by topological swirl resonance and vorticity dynamics. The Vortex Æther Model thus provides a coherent, experimentally consistent framework unifying gravitational, quantum, and nuclear domains via conserved vorticity fields.