PWARI-G Fusion: A Deterministic Field Model for Clean Nuclear Energy

PWARI-G Framework

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Abstract

We present a deterministic field-theoretic model of nuclear fusion based on the PWARI-G framework, in which nuclei are modeled as breathing -solitons with internal twist fields . Fusion occurs when two such solitons phase-align and merge, releasing stored twist energy. We derive the energy conditions for fusion, map these to real-world nuclear reactions, and propose experimental strategies to realize clean energy using twist-driven fusion.

1 Mathematical Derivation of PWARI-G Fusion

1.1 Initial Fields

Let two solitons be defined by:

$$\phi_1(x) = Ae^{-(x+a/2)^2},\ \phi_2(x) \quad = Ae^{-(x-a/2)^2},\ \theta_1(x) = Be^{-(x+a/2)^2},\ \theta_2(x) \quad = Be^{-(x-a/2)^2} \tag{1}$$

with synchronized breathing and twist field phase.

1.2 Pre-Fusion Energy

Total energy before fusion:

$$E_{\text{pre}} = E_{\phi_1} + E_{\phi_2} + E_{\theta_1} + E_{\theta_2} \approx 2E_0 + 2E_\theta \tag{2}$$

1.3 Bonding Energy During Overlap

Twist-mediated bonding energy:

$$E_{\text{bond}} = -\lambda \int \phi_1\phi_2\theta_1\theta_2, dx \qquad\qquad = -\lambda A^2B^2e^{-a^2}\sqrt{\pi/4} \tag{3}$$

This term represents the net gain from constructive interference.

1.4 Post-Fusion Energy and Net Release

Assuming coherent fusion:

$$E_{\text{post}} = 2E_0 + 2E_\theta + E_{\text{bond}}\ \Delta E \qquad\qquad = E_{\text{post}} - E_{\text{pre}} = E_{\text{bond}} < 0 \tag{4}$$

Fusion is thus energetically favored when is negative and significant.

2 Mapping to Real-World Fusion

2.1 Standard D–T Fusion

$$^2\mathrm{H} +^3 \mathrm{H} \rightarrow^4 \mathrm{He} + n + 17.6, \mathrm{MeV} \tag{5}$$

This process releases energy through a mass defect . In PWARI-G, the same energy arises from twist snap and soliton binding.

2.2 PWARI-G Analog

- : Nucleon core mass-energy field
- : Internal twist phase or spin orientation
- **Fusion condition**: Twist phase alignment and soliton merge trigger a release of stored field energy

3 Requirements for Real-World Fusion Implementation

- Light nuclei (e.g. D + T or D + D) to minimize inertia
- Coherent twist excitation (e.g. circularly polarized lasers, spin waves)
- Spatial confinement to enforce low
- Synchronization of breathing and twist phase

4 Proposed Experiments and Observables

1. **Twist-Triggered Fusion Chamber**:
   - Pulse deuterium with twist-aligned EM fields
   - Measure neutron/photon emission vs. twist phase control
2. **Spin-Polarized Gas Fusion**:
   - Prepare deuterium in spin-aligned states
   - Compare fusion rate to unpolarized baseline
3. **Lattice-Confined Fusion Test**:
   - Trap nuclei in metal hydride or optical lattice
   - Apply twist-frequency laser pulses

Observables:

- Sudden twist wave emission
- Enhanced neutron yield at twist phase maxima
- Shifted emission spectra (from twist-field decay)

Conclusion

We have derived a full twist-driven fusion mechanism using PWARI-G principles. This model predicts nuclear fusion from soliton merging and twist field alignment, offering a deterministic route to clean energy. The framework yields testable experiments and proposes concrete engineering strategies.