Psi-Codex Spatial Simulation Report

Simulation Configuration

h_sigma: 0.0625
C (Scaling Constant): 0.0573
Lambda_CDM: 0.3
Spatial Domain (x): min=-5.00, max=5.00, points=500
Num Sim Steps Planned: 100
Num Sim Steps Executed: 1
DM Density (Omega_DM): 0.22
DM Interaction (sigma_DM-Psi): 0.012
lambda_3 Coupling (Resilience): 0.55
eta_E Crit Threshold: 0.1250
Delta_Theta Coherence Limit: 3.60

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Final State Summary & Conceptual Metrics

Final Step: 0
Stability: Unstable
Holonomy H(Psi): 2.6800
eta_E: 0.3178
Delta_Theta: 1225.5973
Mean |Psi(x)|: 0.3130
Mean |a2|: 1.280e+00
Mean Re(a2): -7.945e-01
Std Dev |a2|: 1.210e+00
Re(a2) at x approx 2.56: 9.678e-01
Im(a2) at x approx 2.56: 2.450e+00

Fixed Points and Critical Dynamics

This simulation explores system behavior around critical values and potential fixed points, primarily through the Psi-Codex theoretical lens.

The `a2` coefficient, defined conceptually as `a2 = 3 / (x^5 * psi* . y(i) - 1)`, is theorized as a recursive attractor for the gnostic identity `gnostic(iI)* = a2 * x^5 * psi*`.

Summary of `a2` behavior from the final simulation step:

- Mean |a2|: 1.280e+00
- Mean Re(a2): -7.945e-01
- Re(a2) near x=2.56: 9.678e-01
- Im(a2) near x=2.56: 2.450e+00

The overall average of Mean |a2| across all simulation steps was: 1.280e+00.

Critical Thresholds (eta_E, Delta_Theta):

The simulation monitors key stability indicators: stress-energy `eta_E` and phase coherence `Delta_Theta`.

Stability is assessed against thresholds: `eta_E < 1/8` (0.125) and `Delta_Theta < 3.6`. Breaching these can indicate departure from stable operational regimes, conceptually linked to events like 'shadow integration' in the broader theory.

The 'Simulation Metrics' plots visually track `eta_E` and `Delta_Theta` relative to these critical limits.

Holonomy:

Holonomy (`oint dM Psi.dl`) is another critical indicator. The simulation aims for a near-zero holonomy (`abs(holonomy) < 1e-5` as a typical goal) as a condition for topological stability. Convergence towards this state can be seen as the system seeking a topological fixed point.

The 'Holonomy H(Psi)' plot in the 'Simulation Metrics' section shows its behavior over the simulation steps.

Other Theoretical Points:

Other theoretical concepts like resonance near `n approx 2.56` (where `a2` was specifically analyzed) and the fractal shift `0! -> 1/8` are part of the Psi-Codex framework. While `a2` was analyzed at `x approx 2.56`, these concepts primarily provide context for interpreting critical behaviors rather than being dynamic variables in the current simulation's core equations.

Time Evolution of Simulation Metrics

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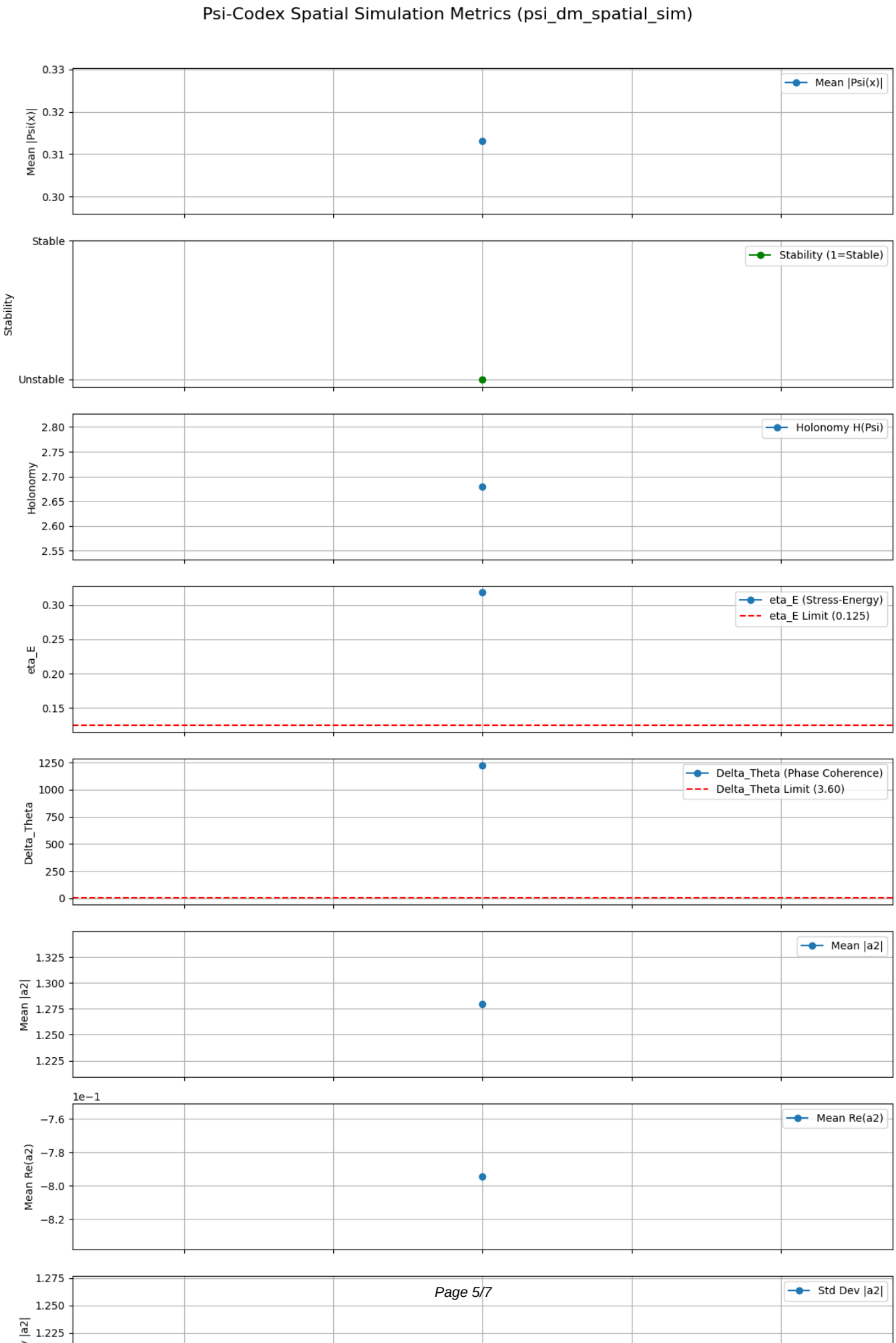

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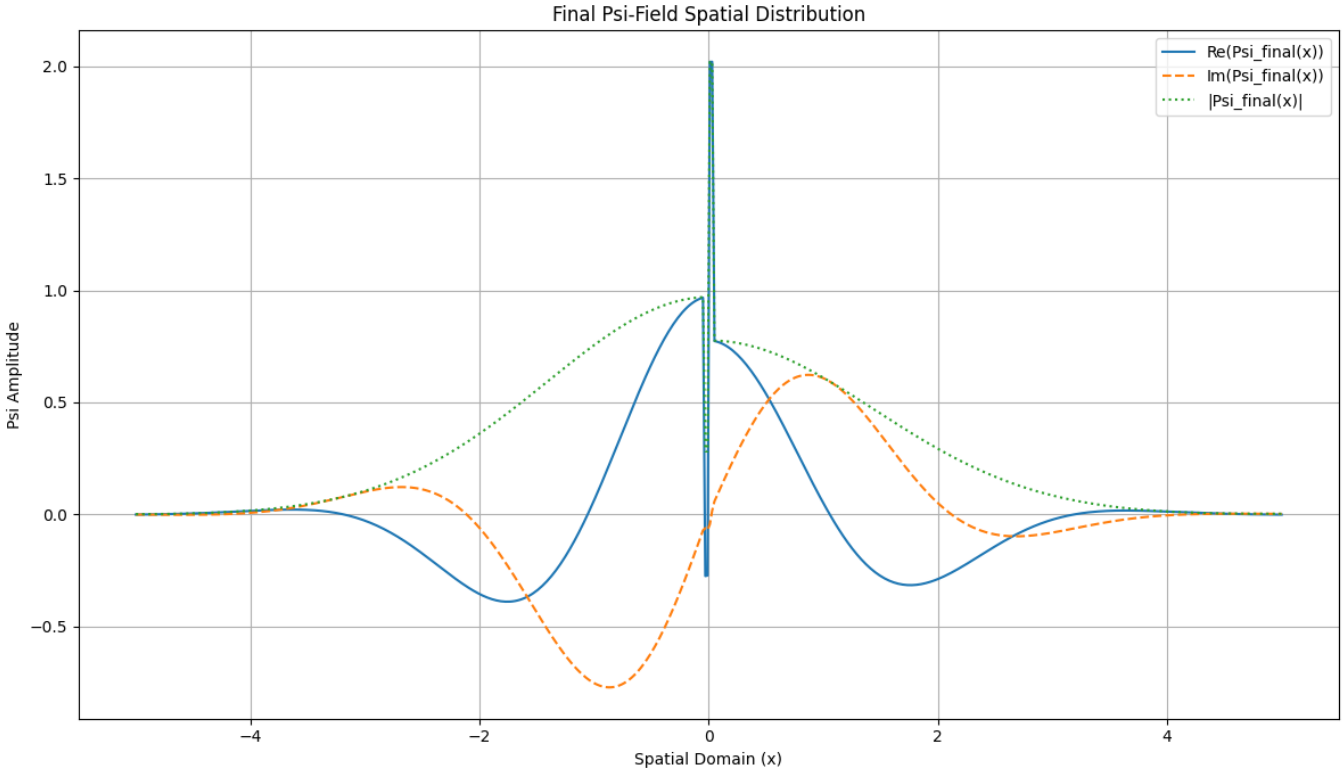
Final Psi-Field Spatial Distribution



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Model Description

This simulation models Psi(x) evolution via recursive updates.

Each step involves conceptual DM interaction, E8_Z4 constraint, and factorial/Airy kernel transformation.

Stability (eta_E, Delta_Theta) and holonomy are assessed. a2 = 3 / (x^5*psi* . y(i) - 1) (proxy y(i)=sin(x^2+3)) stats are logged.

Model is conceptual for exploring Psi-Codex theory.