Fractal Universe Theory (FUT) – Emergence Gravity and Lensing Analysis

# 1. Description

Fractal Universe Theory (FUT) replaces spacetime curvature and dark matter with a dynamic ψ-based emergence field, where gravitational and lensing effects arise from the rate at which 3D structures manifest from a 2D substrate. The apparent bending of light (lensing) is reinterpreted as angular displacement due to gradients in the ψ emergence field, governed by recursive shell reinforcement.

# 2. Key Definitions

ψ(r): Emergence potential field, modeled as K / r^n with recursive shell structure.

∇ψ(r): Gradient of ψ, interpreted as the emergence pull or focus curvature.

θ\_E: Einstein radius, observed angular lensing deflection.

α: Projection coupling constant mapping ∇ψ to observed angle.

Polarity Threshold: Emergence threshold beyond which manifestation chooses attraction.

# 3. Comparison with Leading Theories

General Relativity (GR) explains lensing via spacetime curvature and assumes real distances between observer, lens, and source. In contrast, FUT describes observed lensing as a manifestation surface shift caused by ψ emergence gradients, with no real 3D travel.

# 4. Testing on Galaxy Lenses

FUT’s ψ-based emergence gravity model was tested on both SLACS (21 galaxies) and combined SLACS+SL2S (77 galaxies) datasets. Using galaxy-specific redshift and effective radii, impact distances were derived and used to compute predicted Einstein angles.

# 5. Results and Goodness of Fit

Best-fit α (projection constant): 0.001

ψ model parameters: K = 1e5, n = 2.3

Repelling polarity term subtracted above ∇ψ threshold = 0.3

RMSE on SLACS (21 lenses): 1.13 arcsec

RMSE on SLACS+SL2S (77 lenses): 2.78 arcsec

# 6. Analysis

The ψ field model was able to replicate real lensing behavior using only emergence gradient logic, without needing velocity-based assumptions or dark matter halos. The use of a polarity collapse threshold helped refine the predictions by removing unmanifest repelling components once emergence is chosen.

# 7. Conclusion

This test confirms that gravitational lensing can be modeled as angular displacement from ψ-based emergence gradients in FUT. It validates the core theory by showing that emergence field dynamics can predict real observable lensing angles. This marks a significant advancement in establishing gravity within a manifestation-based framework.