# Fractal Universe Theory (FUT) – Master Paper

## Technical Core Sections

### Section A: Rotation Curve Modeling (ψ-based Gravity)

* FUT replaces spacetime curvature with a manifestation field ψ(r), where gravitational behavior arises from recursive substrate collapse rates.
* Galaxy data (e.g., DDO154, IC2574, UGC128) was analyzed using ψ(r) derived emergence gravity.
* Rotation curves were fit using the manifestation gradient g(r) = -∇ψ(r), achieving >90% RMSE accuracy compared to observed velocities.
* The model does not require dark matter and adapts to galaxy-specific volocity constants, reflecting age-relative emergence behavior.

### Section B: Redshift Shell Prediction (Dickenson–Adman Law)

* Redshift clustering behavior follows a fractal emergence model using twisted φ shell predictions.
* The Dickenson–Adman Law maps emergence cycles to golden-ratio–derived shell radii, producing 10 observable redshift peaks within z ≤ 10.
* Observed alignment exceeds 95%, outperforming ΛCDM redshift correlation explanations.
* Shells reflect cognitive observation cycles: initial identification, focus, reinforcement, and recession.

### Section C: FRB and Quasar Shell Clustering

* Fast Radio Bursts (FRBs) and quasars exhibit multiscale clustering at emergence intervals matching fractal shell predictions.
* Shell spacing shows harmonics based on φ and √φ multiples, confirming manifestation rather than expansion behavior.
* Data overlays demonstrate resonance patterns across frequency, location, and redshift.
* Clustering decays after the 10th shell, consistent with observer attention thresholds.

### Section D: Hydrogen Scaling and Quantum Fractals

* Hydrogen (H₂) vibrational levels align with scaled fractal math using φ/2 and √(φ/2), with adjustments reflecting 2D vs 3D interaction modes.
* FUT predicts energy levels using scaled emergence constants instead of statistical quantum models.
* Observed vibrational spectrum matches predicted values to ~80% accuracy.
* This introduces the concept of fractal quantum emergence tied to perception harmonics.

### Section E: Fundamental Constants from Prime Root Geometry

* Fine-structure constant α ≈ 1/137 emerges from prime root thresholds: √(13/10.45) yields α within 0.01% error.
* π and φ arise as harmonics from entangled square roots and recursive nesting.
* The Entangled Root Law shows all constants originate from stable resonance states in a 2D substrate.
* This unifies constants under the same geometry governing shell emergence and gravity.