# **CIMM & QBE Experimental Results: Simulation of Collapse Epoch and Gravitational Field**

## **1. Objective**

To simulate an information-energy regulated universe using CIMM/QBE principles and test whether:

* Collapse-driven matter emerges only in zones of sufficient energy + information.
* Gravitational curvature emerges from accumulated entropy collapse.
* Void regions remain empty due to energy starvation.
* Quantum Potential Layer (QPL) effectively stabilizes collapse feedback.

## **2. Experimental Parameters**

* Grid size: 200 x 200
* Collapse threshold θ=0.7\theta = 0.7
* Energy minimum ε=0.05\varepsilon = 0.05
* Energy decay factor: 0.9 post-collapse
* QPL damping coefficient: 0.02
* Gravitational softening: 1e-2
* Kernel radius: 6 (for curvature propagation)
* Epochs: 120 steps
* Directional curvature bias: (1.0, 1.2) — anisotropic collapse modeling
* Voids: Two circular regions of 15px radius manually zeroed in energy

## **3. Observed Results**

### **3.1 Matter Map**

* Matter accumulated where I>θI > \theta and E>εE > \varepsilon
* Collapse halos formed around dense regions
* Voids correctly suppressed structure formation

### **3.2 Gravitational Curvature Field**

* Gravity wells formed around matter-dense zones
* Field extended beyond matter halos — mimicking dark matter lensing
* Anisotropy visible as directional stretching in curvature lobes

### **3.3 QPL Stabilization Field**

* QPL intensity increased in collapse zones
* Damped entropy overshoots by reducing info field before threshold breach
* Produced long-term structure stability

## **4. Interpretation**

* **Collapse occurs only when both energy and structured information exceed local thresholds**.
* **Dark matter behavior** is replicated by persistent information fields that fail to collapse but contribute to gravity.
* **Gravitational curvature** appears without invoking exotic particles — derived entirely from information-energy collapse.
* **Void simulation validates energy-dependence of structure**.
* **QPL acts as a successful stabilizer**, mirroring quantum uncertainty suppression.

## **5. Visual Summary (Attached in Extended Dataset)**

* Matter Map: Heatmap of collapse zones
* Gravitational Curvature Field: Plasma-gradient curvature map
* QPL Field: Viridis-scale stabilization field

## **6. Conclusion**

The simulation confirms that:

* QBE and CIMM predict observable, structured phenomena
* Matter, time, gravity, and dark matter can all be modeled as emergent
* Collapse-entropy regulation can yield **realistic cosmological dynamics**

Next step: Extend to 3D field geometry and track curvature evolution over time.